Indigenous communities and global markets: the commoditization of artisanal mezcal from Oaxaca, Mexico

by

María Guadalupe Lira Ledesma

A Thesis submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfilment of the requirements of the degree of

Doctor of Philosophy

Clayton H. Riddell Faculty of Environment Earth and Resources

Natural Resources Institute

University of Manitoba

Winnipeg

Abstract

Global markets offer development opportunities for rural and Indigenous communities through the commoditization of elements from their cultures and territories. However, when participating in global value chains, they often face challenges linked to their autonomy and territorial management. Using the case of mezcal, an agave-based spirit produced in Mexico, this thesis addresses the relationship between Indigenous communities and global markets through the commoditization of artisanal products. My goal is to examine the commoditization process of mezcal, its impacts on the commons of Indigenous producer communities and the community-level responses to these impacts. My objectives are:

1. Examine how Indigenous producers are integrated into the mezcal value construction process and the barriers they face to capture more value and meet their development goals.
2. Analyze how mezcal markets impact LULC (Land Use and Land Cover) dynamics in the producer community's territory.
3. Examine how mezcal markets impact the commons of the producer community, including institutional responses to change.

Data was collected using participant observation; semi-structured interviews; and participatory classification of LULC. Results show the narratives used for mezcal commoditization (craft and small-scale production; uniqueness of flavor; Mexican culture; association with landscape and culture of production sites; sustainability and social justice) and the contrasting situation in production sites with a trend towards increased production, standardization of techniques, a disadvantageous position of producers in the value chain and LULC changes (expansion of agave crops) due to the growing demand. Furthermore, rural and Indigenous producers have limited influence in the mezcal commoditization context, and limited opportunities to obtain more benefits from the value chain. In conclusion, participation in global markets is not a straightforward path for producer communities to take to meet their development goals. Patterns of cooperation, in the form of locally crafted institutions, become important for maintaining the autonomy and control of producer communities over their territorial resources. Policy changes will be important to reduce community vulnerabilities and increase community capacities to capture more benefits from their insertion in global value chains.

Acknowledgements

I would like to thank my thesis advisors Dr. Iain Davidson-Hunt and Dr. James Robson for their consistent support and guidance throughout my PhD studies. Thanks also to the Indigenous community of San Juan del Río for allowing my data collection. Thanks to the members of my thesis committee for their time and valuable feedback. Thanks to my NRI colleagues for their support and encouragement. Thanks to my family and friends for their unconditional love and support throughout this program. Thanks to CONACYT for funding my PhD studies (423149).

Table of Contents

List of tables

List of figures

Appendices

CHAPTER 1. Introduction

The commoditization of certain elements from rural and Indigenous cultures and territories have increased the points of contact between Indigenous communities and global markets. These elements are often referred as 'Artisanal products' (Arfini & Mora, 1998), characterized by having close links to their territories of production, and coming from small-scale agricultural systems with specific attributes that reflect the inherited traditional production techniques used by rural and Indigenous producers to process local raw materials (Bell & Valentine, 1997; Berard & Marchenay, 1995; Bessiere, 1998).

The commoditization of artisanal products and the resulting relationship between markets and producer communities can be viewed as an opportunity for these communities given the potential of artisanal products to contribute to local development through the creation of jobs (Ventura & Milone, 2000; Tregear, 2001), community members' skills enhancement (Tregear, 2001), revitalization of community vibrancy (Ray, 1998; Tregear, 2003), and environmental sustainability (Vasta, 2019). However, critics warn about the risks of promoting market strategies to address systemic inequities faced by Indigenous communities. They note that global value chains can bring different challenges for rural and Indigenous producers such as dependency relationships with other actors in the value chain (McMichael, 2013; Hudson & Hudson, 2003), marginalization, unfair competition, inequality, and changes to community social relationships (Goodman & Goodman, 2009). For communities under commons regimes, scholars warn that market integration could cause the overexploitation of resources for cash income (Jodha, 1985; Ostrom, 1990; Colchester, 1994) and ultimately lead to the depletion of commons resources (Jodha, 1985; Bollier & Helfrich, 2014); furthermore, it could alter community social relationships and weaken commons institutions (Agrawal, 2001).

This doctoral research addresses the relationships that Indigenous communities build with global markets through the commoditization of artisanal products and how this impacts the territories and institutions of these producer communities. Through the case of mezcal, a craft spirit made from agave in rural Mexico, I examine the mezcal commoditization process, the impacts on local land use dynamics and Indigenous commons, and the institutional adaptations that communities make in response to these impacts and their positioning within

new global value chains. This research contributes to the discussion around market strategies, in this case the commoditization of artisanal products, as alternatives for rural development, the potential benefits for producer communities and the risks for communities' autonomy and territorial resources.

This introductory chapter comprises the following: the purpose and objectives of the research (Section 1.1); the theoretical framework used, which brings together thinking on the creation of value and commodity fetishization, artisanal products, land use dynamics, and Indigenous commons and markets (Section 1.2); a detailed description of the study region and community, along with the research design (methodology and methods) (Sections 1.3–1.6); and, finally, a run through of how the thesis is structured (Section 1.7).

1.1 Purpose and objectives

The purpose of this research was to trace the emergence of mezcal as a global commodity, its impacts on the commons of producer Indigenous communities, and the community-level responses to these impacts and changes. Three objectives guided the work:

1. Examine how Indigenous producers are integrated into the mezcal value construction process and the barriers they face to capture more value and meet their development goals.
2. Analyze how mezcal markets impact LULC (Land Use and Land Cover) dynamics in the producer community's territory.
3. Examine how mezcal markets impact the commons of the producer community, including institutional responses to change.

The first objective addresses an unresolved debate discussed in rural studies (Van der Ploeg, 2000; 2008; Ventura & Milone, 2000), value-chain scholarship (Barrientos & Gereffi, 2011; McMichael, 2013) fair-trade literature (Goodman et al., 2012) and common-pool resources scholarship (Bollier & Helfrich, 2015; McKean, 2000; Bollier, 2014; Jodha, 1985). Namely, the benefits that small-scale producers can obtain and the risks they face when participating in global markets. The second objective addresses an issue that has been largely studied for industrially produced commodities (Barona et al., 2010; Laurance, 2007; Morton et al., 2006; Pendrill et al., 2019), but less applied to the case of artisanal commodities. Specifically, my work

considers whether local artisanal production for global markets becomes unsustainable and changes LULC dynamics to the point of undermining the communities' resource base and damaging the environment. The third objective builds on this predicament to further consider the relationship between commons and markets, to focus on the resilience that traditional, communal governance structures can provide to small-scale local producers and producer communities when engaging global value-chains.

1.2 Theoretical framework and literature review

A theoretical framework was developed for this thesis research. It is depicted below in Figure 1.1, which shows production, exchange, and consumption as the main parts of an artisanal product value chain, and how these are embedded in national and international markets, regulating institutions for the production and trade of artisanal products, and in the local commons of producer communities This framework helped me to frame the process by which objects produced by Indigenous communities exit production sites and enter global markets and then the consequences of demand growth on productions sites. Artisanal objects turn into commodities as they go through a value construction process outside production sites led by actors that are not necessarily part of the producer communities. With the demand growth driven by the value created, pressures over resources and communities in production sites grow too. The framework shows how value creation, commodity fetishization and impacts to local commons are interconnected processes that comprise and define these value chains. The figure also depicts the different theories and concepts that I use to frame each of these processes, along with the corresponding thesis chapters (and objectives) where the results of my empirical work are presented.

Shown in the red boxes on the right side of the figure, the process of value creation is driven by a manufacturing of meaning process through a set of narratives built from a selection of elements from the producer communities, their territories, and cultures. While value creation drives demand in national and international markets, it also feeds the commodity fetishization process by which marketing messages and long-distance trade can hide the relationships of production and the impacts that commoditization can have on producers themselves, and the local commons in which they are embedded. The value creation of

artisanal commodities is framed by Appadurai's Commodities Theory and the Manufacturing Meaning concept, while the fetishization of artisanal commodities is addressed by the Marxist concept of commodity fetishization. These are brought together to address Objective 1 of the thesis and form the focus for Chapter 2. Further details are provided in section 1.2.1 below.

As the demand for artisanal products increases, the need for raw materials grows too. In the case of artisanal products derived from agricultural goods, the increasing demand often leads to changes in LULC dynamics in local territories. This process is captured in the orange and green boxes on the left-hand side of the figure. First, Land Systems Science is used to understand the impacts of global demand for artisanal products on LULC processes, a theme explored in section 1.2.2 below and then more fully in Chapter 3 of this thesis (Objective 2 of the research). Second, artisanal production systems can often be embedded in territorial commons, such that market demand can place pressure on associated natural resources and the traditional institutions that govern their use and management. Section 1.2.3 below, and then Chapter 4 of this thesis, juxtaposes insights from scholarship on the commons and the so-called 'new peasantries' to understand the relationship and interactions between commons, commoners (but also rural producers) and markets. This work corresponds to the third and final research objective.

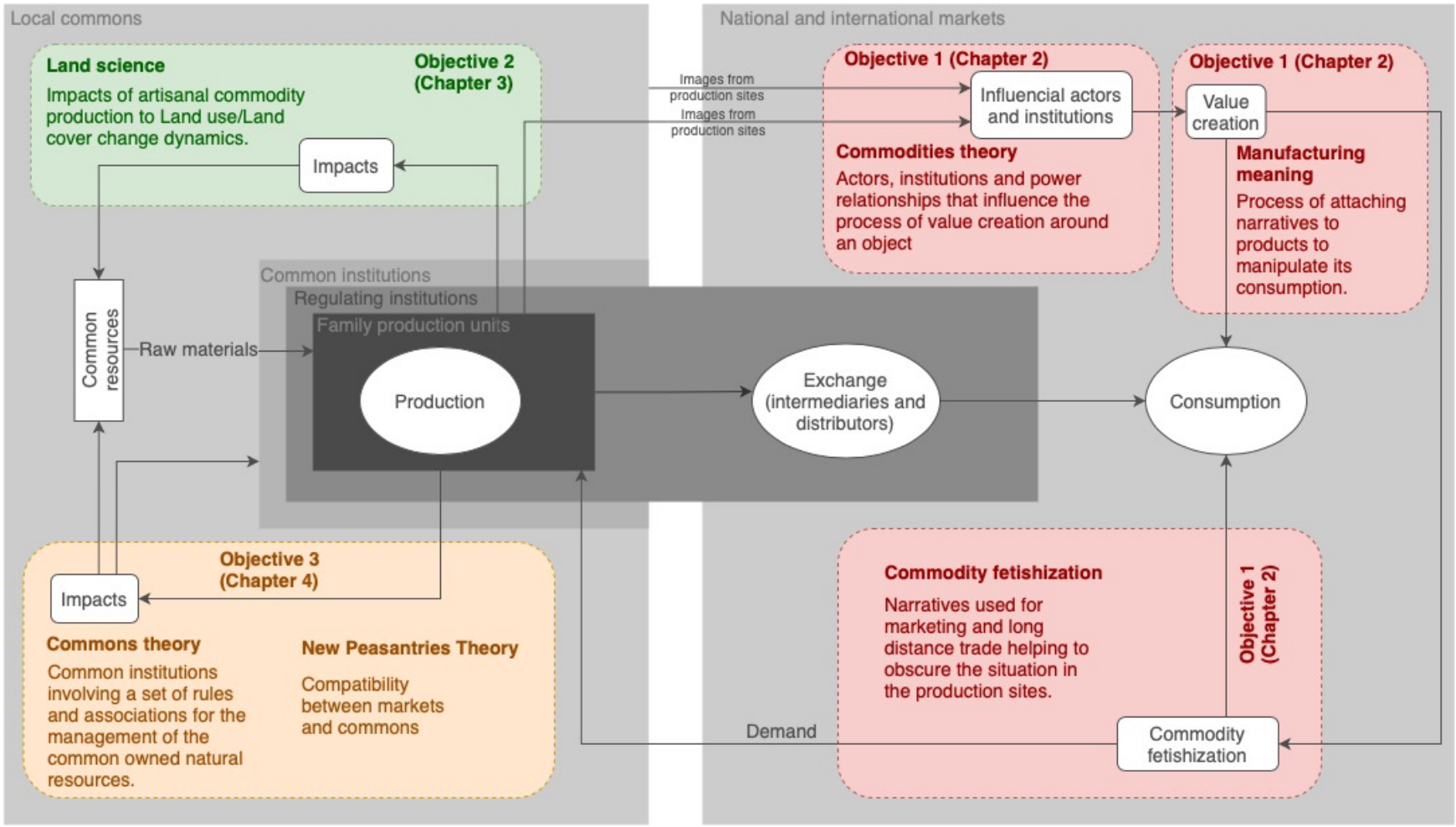

FIGURE 1.1 THEORETICAL FRAMEWORK.

1.2.1 Creation of value and commodity fetishization

The work of Arjun Appadurai has been highly influential in globalization studies. His work has explained the globalization process linking it to the flows of people, ideas, capital, technology, and information (Appadurai, 1997). He offers a view on consumption patterns shaped by these flows, particularly the flows of ideas, people, and information (Appadurai, 1997). Furthermore, Appadurai's commodities theory emerged as a response to the need for a broader view of commodity value that is not exclusively focused on production (Appadurai, 1986; Kopytoff, 1986). His work reflected an emerging concern at that time that too great a focus on production as embedded resources and labour ignored exchange and consumption as processes that also produce value for commodities. Appadurai (1986) suggested a broader idea for commodities, arguing that things go through different phases — one of which is the 'commodity phase' — and that there is a whole social and cultural process determining the phases of an object (1986). Appadurai defined 3 elements that determine the commodity situation:

1) Commodity stage: refers to the phase in an object's 'social life' in which it is exchangeable, thus can be defined as a commodity.
2) Commodity candidacy: refers to the standard and criteria that determines the exchangeability of an object in a particular social and historical context.
3) Commodity context: the social arenas in which the commodity situation of an object is determined.

For global commodities, its commodity context consists of a wide variety of institutions and actors around the world influencing what objects become global commodities and which ones do not.

The concept of commodity situation and its defining elements help to frame the analysis of the commoditization of artisanal products by reflecting on how the actors and institutions in the value chain enable artisanal products to be in the commodity phase. In this way, one must look beyond the sites of production to consider multiple pathways of commodities and the actions of a diversity of actors and institutions that influence value creation. Particularly important for global commodities are narratives, which are used for marketing campaigns and

constructed by selectively choosing images of the object's production contexts (Hernández, 2013).

Through the creation of messages, images and symbols embedded in such narratives, value is created for an object and this value is then protected by creating and registering a trademark (Hull, 2016). This process of 'manufacturing meaning' is defined as the producers' and marketers' efforts to control the meanings that consumers attach to a commodity (Jackson et al., 2010, p. 169). For artisanal products, these narratives are usually built from the selection of images of the producer communities (culture, locality, tradition, collective memories, history of a particular place and a group of people) (Harvey, 2002). The use of these narratives helps to hide from consumers the actual conditions of producers in distant places; a process known as commodity fetishism by scholars (Hudson & Hudson, 2003). Such narratives become the means by which demand for a product, and new conditions for production, are created; continuously transforming the lives of producers and their territories. Through this concept, the thesis analyzes how the narratives used to market mezcal act as a veil to conceal (from consumers) the impacts of value chains on producer communities.

1.2.2 Artisanal products and land use dynamics

Artisanal products (Kupiec & Revell, 1998) refer to those commodities that result from the processing of local raw materials using inherited traditional production techniques (Bell & Valentine, 1997; Berard & Marchenay, 1995; Bessiere, 1998) (See Chapter 2, section 2.1 for other similar concepts used). The interest in artisanal products emerged in global markets as a response to the dominant agro-industrial paradigm of food production, based on principles of intensification, standardization, engineered foods and the globalization of the value chains (Wiskerke, 2009). These products are often linked to other values focused on functional (health and taste), aesthetic (diversity and distinction), ecological (food miles, biodiversity, and landscape), ethical (authenticity, identity and solidarity) and political aspects (balance of power in the food chain and reorientation of the consumption patterns) (Brunori, 2007). Furthermore, they are often presented as being supportive of social, economic, and environmental sustainability among local producing communities (Nygard & Storstad, 1998; Tregear et al., 2007; Vasta et al., 2019).

The impacts of the conventional agro-industrial production model and global value chains to economies, societies, and cultures of rural and Indigenous communities have been widely discussed in the literature (Bennett et al., 2019; Bowen & Gerritsen, 2007; Cramb & Sujang, 2013; Koczberski & Curry, 2004; Tetreault et al., 2021). Research on soybean (Barona et al., 2010; Laurance, 2007; Morton et al., 2006; Pendrill et al., 2019) and oilseed production has shown evidence of the devastating effects of agro-industrial production and global value chains on Land Use and Land Cover (LULC) dynamics in tropical countries (Pendrill et al., 2019). But in the case of artisanal products, studies have often addressed issues of sustainability tied to socio-cultural (Capone et al., 2016; Moscatelli et al., 2017) as well as economic and environmental dimensions (Bilali et al., 2020; Bowen & Zapata, 2009; Capone et al., 2016). Although LULC has been recommended as a sustainability indicator (FAO, 2013), it has not been included as a criterion for research on artisanal commodity production.

LULC is defined as any transformation to the Earth's surface driven by humans (Turner & Meyer, 1991) and incorporates two concepts: land use and land cover. Land use is defined as the function of the Earth's surface for humans — for example, agricultural land or residential land. Land cover refers to the objects on the Earth's surface, such as water, forest, and scrublands (Turner & Meyer, 1994). The field of Land System Science has evolved over time through methodological advances that make use of different technologies (satellite imagery, modelling tools, GIS, etc.) to enhance research on LULC changes at multiple spatial and temporal scales (Hansen & DeFries, 2004; Terzi & Bolen, 2009). For example, earth observation techniques have provided evidence that industrially produced crops are major drivers of LULC processes (Barona et al., 2010; DeFries et al., 2010; Laurance, 2007; Morton et al., 2006; Pendrill et al., 2019) with devastating consequences to local ecosystems and societies (Hansen et al., 2009; Morton et al., 2006; Persson et al., 2014).

More recently, land system science has begun to consider globally connected land systems in which the consumption of land-based trade commodities connects distant places (so-called 'telecouplings') (Liu et al., 2013). It is now recognized that LULC dynamics and community land governance are strongly linked to the demand and consumption of products that originate far from where they are produced (Boillat et al., 2017; Eakin et al., 2014; Gasparri

& Le Polain de Waroux, 2015). Studying land systems through this lens requires the incorporation of social and cultural dimensions (Turner et al., 2021). And while land systems science has produced research on global, industrially produced, commodities, such as soybean or palm oil (Browder et al., 2008; Hansen et al., 2009; Le Polain de Waroux et al., 2016; Morton et al., 2006; Persson et al., 2014), global markets for artisanal products and their impact on LULC dynamics have not been a focus. This thesis contributes to filling this gap in the land systems science literature.

1.2.3 Commons and markets

Interactions between commons and the market have often been viewed in a negative light, with adverse consequences for local commons (Bollier & Helfrich, 2015; McKean, 2000, p. 5), whether through the depletion of shared resources (Bollier, 2014; Jodha, 1985) or the weakening of institutions that underpin such regimes (Agrawal, 2001). Because of an apparent incompatibility between market principles (efficiency, competitiveness, and profit maximization) and the social norms of the commons, commoners are told to distrust the market (Bollier & Helfrich, 2015), which, if unchecked, will inevitably drive a process of "decommonisation" (Nayak, 2021). But are such outcomes inevitable? Further exploration provides examples of commons that have interacted with external markets to incentivize collective action to solve issues related to access rules, harvest or withdrawal rules and boundary conflicts (Acheson, 2003; Bray, 2020), or to generate economic development through the estbalishment of cooperatives and social enterprises (Antinori & Bray, 2005; Aranda & Morales, 2002; Berkes & Davidson-Hunt, 2010; Davidson-Hunt et al., 2012; King et al., 2013; McCay et al., 2014; Mutersbaugh, 2002; Nigh, 1997). These insights suggest that despite tensions between the commons and the market, interactions can be managed for mutual benefit.

What is clear from reviewing the commons literature is that there has been relatively little focus on the actions of individual rural producers embedded (along with their production systems) in commons regimes. The New Peasantries literature, led by Dutch political economist, Jan Douwe van der Ploeg (2008) is instructive here, with van der Ploeg being dismissive of the idea that interactions with markets always lead to ruin (for the commons) as

simplistic and misguided. Rather, integration into the global marketplace should be considered an essential element of the 'peasant condition', with the commoditization of elements of local culture and territories both significant *and* necessary in agrarian societies based on (appropriate) market relationships. As van der Ploeg (2008, p. 23) explains, the *"struggle for autonomy […] takes place in a context characterized by dependency relations, marginalization, and deprivation. It aims at and materializes as the creation and development of a self-controlled and self-managed resource base, which in turn allows for those forms of co-production of man and living nature that interact with the market, allow for survival and for further prospects and feed back into and strengthen the resource base, improve the process of co-production, enlarge autonomy and, thus, reduce dependency".* This condition is defined by nine elements (Table 1.1).

TABLE 1.1 ELEMENTS THAT DEFINE THE PEASANT CONDITION.

Element	Description
Co-production	Continuous interaction and mutual transformation of man and living-nature. Co-production conflates the terms of production and reproduction to describe how, through agricultural production, the quality and productivity of the resource base can be improved.
Resource base	Central element of the peasant condition and it refers to key resources that allow agricultural production — such as land, animals, biodiversity, water, buildings, infrastructure, and knowledge, among others.
Relations with the markets	One of the set of relations that peasants stablish with the external world, and it can be constructed, maintained or changed depending on local cultural repertoires. It consists of three processes: mobilization of resources; conversion of resources into products; and marketing and reuse of products.
Survival	Amount of resources required for reproduction and improvement of living conditions. In a context of self-sufficiency, this concept refers to the nutritional requirements of the farming family. In other cases, it refers to the amount of income obtained, or the capacity to meet the requirements — of the state, banks or other institutions — to be able to continue the production.
Further strengthening of the resource base	The resource base can be extended, as a result of the co-production process, its quality can be improved, or its composition can be redefined. However, this point not only refers to the resource as such, it also involves the networks that determine their use, valorization and mobilization.
Reducing dependency	Being embedded in globalizing capitalist economies, peasants often must deal with dependency relations and deprivation. The survival and strengthening of the resource base is the only way to reduce that dependency.
Striving for autonomy	Constant struggle to achieve a level of freedom by which farmers can avoid being trapped in relationships of exploitation.
Pluriactivity	Diversity of livelihoods by which farmers diversify and complement their sources of income which contributes to reduce their levels of dependency.
Patterns of cooperation	Mutual arrangements that improve co-production and help in the struggle for autonomy. Include a variety of institutions which balance individual and collective aspects.

Note. Adapted by M. Lira, from Van der Ploeg, 2008

Among these, 'Patterns of Cooperation' is an assertion by van der Ploeg that collective action and coordination among producers becomes necessary to mediate the relationships between

markets, peasants, and the communities they belong to. Collective action undertaken through commons institutions, he suggests, can play a role in safeguarding the resource base, maintaining or even enhancing autonomy (from the market), and mitigating potentially far-reaching social and cultural impacts. Chapter 4 of this thesis looks in detail at this tension between the market and the commons for artisanal products, and how commons institutions may respond to the on-the-ground impacts of mezcal production and agave cultivation in the study site in Mexico.

1.3 Study Region

The state of Oaxaca is in southern Mexico, bordered by the states of Guerrero, Puebla, Veracruz, and Chiapas, and by the Pacific Ocean (Figure 1.2). It covers a little over 9.5 million hectares and has a population of 4.1 million people (INEGI, 2020). Administratively, Oaxaca is divided into eight regions — Cañada, Costa, Istmo, Mixteca, Papaloapan, Sierra Norte, Sierra Sur, and Valles Centrales — 30 districts, and 570 municipalities.

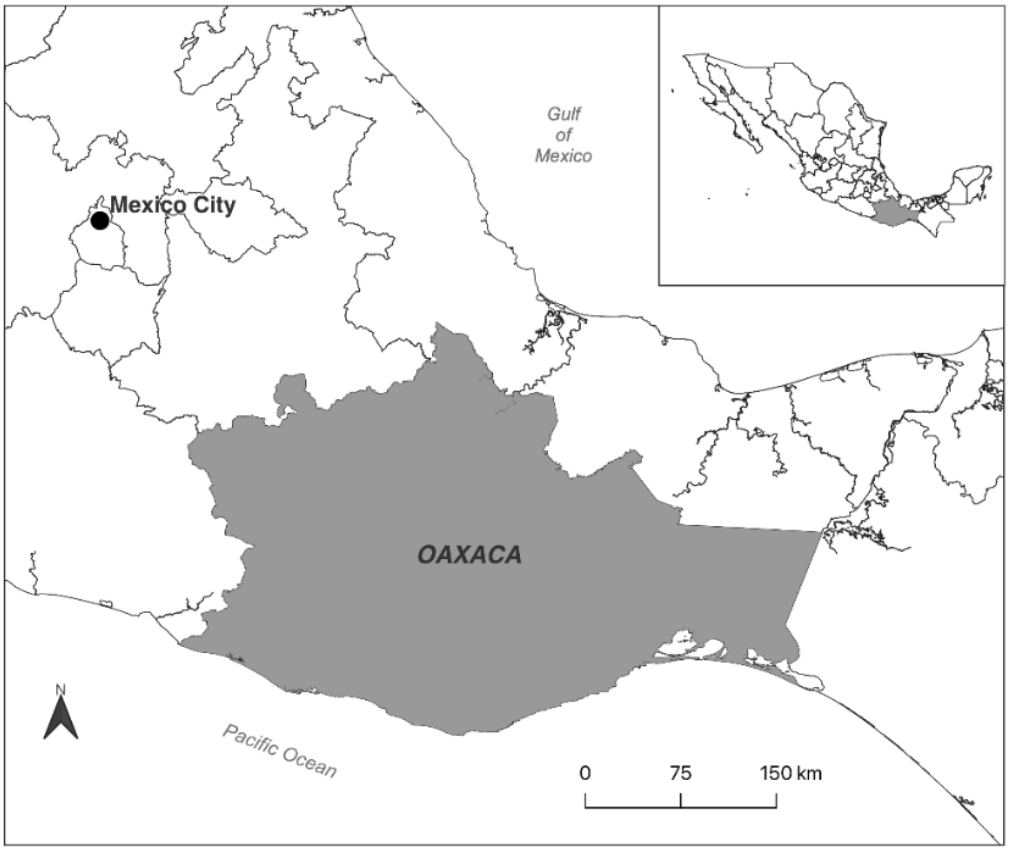

FIGURE 1.2 LOCATION OF THE STATE OF OAXACA, MEXICO (CREATED BY M. LIRA WITH DATA FROM INEGI. MARCO GEOESTADÍSTICO. 2017).

Oaxaca marks the convergence of two important mountain chains, the Sierra Madre del Oriental and the Sierra Madre Occidental (Hernández Díaz & Robson, 2019), with elevations that run from sea level to 3000 m.a.s.l. Oaxaca has a high diversity of soils and climate types that allow for an impressive amount of ecosystem diversity (Flores Villela & Gerez, 1994). However, while an important provider of environmental services, Oaxaca has experienced intense processes of land use and land cover (LULC) change in recent decades. Velázquez et al. (2003) reported that 40% of primary forest was converted to secondary forests between 1980 and 2001.

Almost 90% of the land in Oaxaca is held and managed communally, most by Indigenous communities (INEGI, 2016). Most adult community members, known as comuneros, have rights to access the lands, watercourses and forests of these communal territories, and to work and profit from them, but also the obligation (responsibility) to participate in collective decision

making regarding territorial use and management (Hernández Díaz & Robson, 2019). Most rural communities in Oaxaca organize their collective work through three social institutions: cargos, which are the non-renumerated tasks by which community members offer civil, communal, and religious service to their community; tequios, which are physical labor days used to get projects and infrastructure work carried out in the village or in the communal territory ; and, the asamblea (or assembly) of members where issues are debated and decisions taken collectively (Hernández Díaz & Robson, 2019). More details about these governance arrangements are provided in Chapters 3 and 4 of this thesis.

This thesis research was conducted in San Juan del Rio, which is a Zapotec community, one of 16 different ethnic groups currently identified in Oaxaca. The Zapotec people have been present in Oaxaca since at least 700 B.C. and probably well before then (Barabas, 1999). Currently, Zapotecs live in different regions of Oaxaca state, notably the Sierra Norte (northern highlands), Valles Centrales (central valleys), Istmo (Istmus), and Sierra Sur (southern highlands). As a result of the different conditions in which these communities have developed, Zapotec culture and language have diversified across these regions (Schrader-Kniffki, 2004). However, a strong sense of community remains at the core of who they are, with the home village the center of socio-political life and individual and collective identity (Schrader-Kniffki, 2004).

Despite its impressive biocultural heritage and diversity, it should be noted that Oaxaca is one of Mexico's most impoverished and marginalized states. In 2016, 27% of the population was experiencing conditions of extreme poverty (CONEVAL, 2016), 27% of the population suffered an educational gap[1], 16% had no access to health services, 78% lacked access to social security, and 31% were considered food insecure (CONEVAL, 2016). Poverty, in addition to a lack of employment opportunities and low salaries, have seen many people in rural Oaxaca migrate to urban centres in Oaxaca, Mexico and the United States. According to the National Council of Population (CONAPO, 2020a), Oaxaca's migration intensity was registered as high in 2020.

[1] Percentage of population between 3 and 21 years of age who have not completed basic education levels (grades 1-9), and population older than 22 years who have not completed high school (grades 10–12).

1.4 Study Community

The community of San Juan del Río is located in the Central Valleys region of Oaxaca (Figure 1.3), in the district of Tlacolula. Its geographical coordinates are 16°51’ and 16°57’ North Latitude and 96°05’ and 96°14’ West Longitude, and its altitude ranges from 1,000 to 2,600 m.a.s.l. It borders the communities of San Pedro Quiatoni, Santa Ana del Río, San Lorenzo Albarradas, Santa Maria Albarradas, and Tepuxtepec Mixes. San Juan del Río was officially recognized as a municipality by the Spanish Crown in 1600, although Zapotecs have been in the area since the early 1400’s (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020). San Juan del Río comprises three localities: San Juan del Río (the main village where nearly all community inhabitants reside), Tierra Morada (unpopulated in 2020) and Daañ Viciaa Duun (2 inhabitants in 2020) (INEGI, 2020). During the last 20 years, the population has fluctuated from 1509 inhabitants in 1990 (INEGI, 1990) to 1350 in the year 2000 (INEGI, 2000), 1231 in 2010 (INEGI, 2010) and 1372 in the year 2020 (INEGI, 2020). At the last count, 82% of inhabitants could speak Zapotec.

It has a total of 443 inhabited dwellings with a 99% coverage of electricity and drainage services (INEGI, 2020). Most of the houses are made of concrete and with more than one floor (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020). The community has a health post that is open Monday to Friday, with residents often travelling to the town of Tlacolula to access a wider range of medical services (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020). Regarding education, the village has a kindergarten and elementary school (grades 1–6) for in-person instruction along with a secondary (equivalent to intermediate or junior high school in Canada) school (grades 7–9) and high school (grades 10–12) where students receive remote (video) classes (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020). According to 2020 data (CONAPO, 2020b), the marginalization in San Juan was categorized as medium.

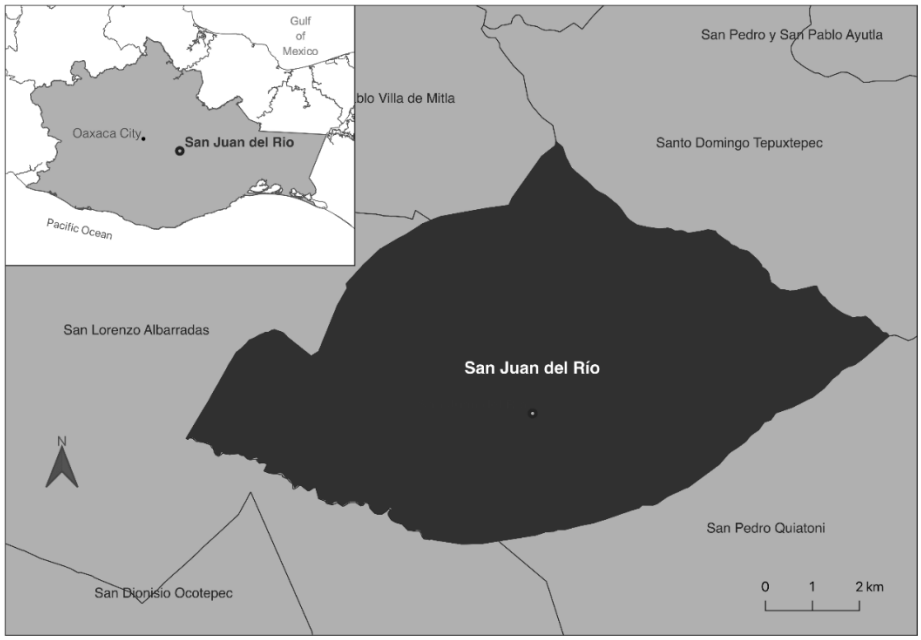

FIGURE 1.3 LOCATION OF SAN JUAN DEL RÍO, OAXACA.
(CREATED BY M. LIRA WITH DATA FROM INEGI. MARCO GEOESTADÍSTICO. 2017).

The predominant climate in San Juan del Río is hot, semi-arid and sub-humid with rain in the summer. The temperature ranges between 16 and 26 °C, 600 to 1,000 mm of rain per year. Official community documents indicate that the community territory covers 6,948 hectares, although National Agrarian Registry records show an area of 7121.41 hectares (RAN). This territory comprises hilly terrain covered by pine and oak forest in the east, with tropical dry forest (TDF) dominant in central and western areas. Arid conditions and steep slopes are challenging for traditional agricultural systems such as milpa but are suitable for growing agave. In the more fertile land plots, people do plant corn and beans in between the rows of agave for subsistence use. Alongside the river, people plant chillies, and different fruit trees such as: soursop, papaya, lemon, and orange.

The community's territory is divided into two main categories of use: individual land plots, belonging to the community but assigned as usufruct to community members to work and profit from them; and, a reserve zone (mainly pine and oak forest), which is a protected area where some sustainable harvesting (of timber and non-timber products) is allowed via permits provided by the communal authorities. An important source of water in the community is the river "Río Grande" o "Río San Juan" (Comunidad Indígena de San Juan del Río & Hernández Márquez,

2020), which also provides important construction materials (gravel and rocks) for the community to make use of — either directly (in construction or repairs) or through selling to outside buyers. The river is also culturally important and forms part of the community's name.

For several generations, San Juan del Río has been known as a mezcal and agave producing community. Most inhabitants are directly or indirectly involved with agave production and there are 25 stills in the community that belong to local families. Most agave producers focus on the production of the species of agave commonly known as *espadín* (*Agave angustifolia*) but other agave species can be found in the community lands, mostly wild agaves such as *tepextate* (*Agave marmorata*) or *jabalí* (*Agave convallis*), among others. Although production techniques have changed over the years incorporating innovative technologies that allow for a more efficient production, most of the mezcal produced in San Juan is artisanal *joven* (young) mezcal that is baked in an underground oven, crushed with a *tahona* (a large stone wheel used to crush roasted agave) pulled by a horse, fermented in wooden vats, and distilled in cooper stills. More details on this process are provided in Chapters 2 and 4.

Mezcal production has traditionally been a male-dominated occupation. Women in the community are involved in making traditional clothing and textiles to sell and do participate in the planting and cleaning of agave crops (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020). Women are increasingly being included in higher level positions within the municipal and communal authorities, and their right to hold possession of land plots is recognized in the community statute (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020). While women are invited to attend the assembly meetings, their participation is low.

1.5 Methodology and Methods

1.5.1 Paradigm and research design

Having a background in an interdisciplinary field such as Environmental Sciences has helped me to learn how concepts and tools from different disciplines can enrich and contribute to knowledge. Furthermore, my studies and research project during my master's program in Geography were focused on Land Systems Science, with a strong technical component in

Geospatial tools. During this stage of my studies, I learned how Land System Science was an evolving field that looked to adopt an interdisciplinary approach and incorporate ideas and perspectives from different disciplines. I also learned the importance of using different types of data to understand the linkages between the land-use patterns observed in certain regions of the world and the socio-economic processes happening in distant areas.

For this thesis, I considered necessary the use of a similar approach with a variety of tools to obtain not only qualitative data explaining the socio-economic processes behind the commoditization of mezcal and the development of markets; but also, quantitative spatial data to document the land-use dynamics happening in production sites.

I considered Pragmatism as the appropriate paradigm to situate this research, given the need for a convergence of qualitative and quantitative methods to serve the purposes of the research question presented above. Pragmatism as a research paradigm emerges from the Pragmatist philosophy which is based on the linkages between human actions, past experiences and the beliefs that result from those experiences (Pansiri, 2005; Maxcy, 2003; Morgan, 2014). Pragmatists believe that humans act depending on the possible consequences of their actions; also, the results of their actions help them to predict the consequences of similar future actions (Kaushik, 2019). Furthermore, these "actions are linked to consequences in ways that are open to change" (Morgan, 2014: 26); in other words, the consequence of an action can change depending on the context of that action. Moreover, actions also depend on worldviews that are socially shared at different degrees (Morgan, 2014). Morgan (2014) explains that the degree to which beliefs are shared in a society determines how differently two people can act -and assign meanings to the consequences of their actions- in similar situations. Pragmatists accept the existence of an objective reality; however, this reality is embedded in a particular environment and can only be met through human experience (Kaushik, 2019) resulting in single or multiple realities open to empirical inquiry (Creswell & Clark, 2011). According to pragmatists, this makes it impossible to determine reality (Pansiri, 2005); therefore, selecting one version of reality over another depends on its utility for the desired purpose.

Accordingly, pragmatism and its view of the world as containing different layers that can be subjective, objective or a mix of the two (Dewey, 1925), works as an alternative paradigm

focused on solving real world practical problems (Kaushik, 2019). This paradigm allowed my research to not be restricted to the particular methods or techniques linked to the postpositivist or constructivist paradigms (Robson, 2002). Pragmatism focuses on the problem and the questions that are being researched; therefore, researchers can opt for the methodological approach that better serves the purpose of that particular problem (Tashakkori & Teddlie 1998). Furthermore, pragmatist scholars have been opposed to the idea that a single scientific method is enough in social sciences research (Maxcy, 2003); hence, pragmatism has often been linked to the use of mixed-methods (Biesta, 2010).

The value of pragmatism as a research paradigm has been discussed in different areas of study, such as social work (Hothersall, 2019; Kaushik, 2019), social justice (Kaushik, 2019) feminism (Miller, 2013), education (Pavlis & Gkiosos, 2017) and environment and sustainability science (Wiek et al., 2012). The need for transdisciplinary research in sustainability science makes pragmatism an appropriate research paradigm to allow the use of different methods and the integration of knowledge from different disciplines (Wiek et al., 2012). Research on environmental conservation expressed the need for a pragmatic approach that allows setting multiple goals and making decisions based on what works; considering how different values depend on specific contexts, and allowing scientific knowledge to develop through monitoring and learning (Norton, 2005; Robinson, 2011). Environmental pragmatism emerged as way to link environmental issues to classical pragmatism philosophy and it aims to help to bridge the gaps between activists, environmental policy analysts, environmental theorists, and the public (Light & Katz, 1996). In natural resources management, the pragmatic approach criticizes the use of one single strategy in the formulation of environmental policy and highlights the need for management strategies, which are pluralistic, pragmatic in application and adaptable (Castle, 1996). The need for these types of management strategies is based on the dynamism of social and ecological systems and the diversity of beliefs and preferences that exist in a social system (Castle, 1996).

Given my formation as a pragmatic researcher with a strong technical orientation I drew upon land systems science, complemented by qualitative research with mezcal producers and

other people involved in the value chain, to understand and enrich the connections between the people, the landscape and the markets linkages that have emerged for mezcal.

As these connections were not well documented, nor understood, I also chose a qualitative approach appropriate for the exploratory nature of my research objectives. According to Creswell (2014: 4), the qualitative approach seeks to "understand how the main individuals or groups ascribe to a social or human problem". However, following the principles of the pragmatic worldview, the research was open to incorporate quantitative designs if required, which was the case for my work presented in chapter 3 which used a LULC analysis to link the process of mezcal commoditization and the landscape changes in the producer community.

1.5.2 Strategy of inquiry

A case study was the strategy of inquiry selected for this research because it allowed me to examine the commoditization of mezcal, its impacts and the responses of local producer communities through units of analysis. This is a complex issue that required in-depth exploratory research and detailed data collection, with a community as unit of analysis; and a case study strategy enables a variety of lines of action and sources for data-gathering (Creswell, 1998; Yin, 2014; Berg, 2012). The case study community was selected following predefined selection criteria, namely: 1) a mezcal producing community located in the so-called "mezcal region" in Oaxaca; 2) an Indigenous community with a common property governance system; 3) the majority of agave cultivation and mezcal production being organized at a household level; 4) mezcal produced is sold to national and international markets; and, 5) mezcal was sold both unlabeled and using brands owned by community members[2].

1.6 Sampling procedures

Although mezcal is produced in several states of Mexico, Oaxaca was selected as the most iconic and important place of production in Mexico for this drink. During a pre-fieldwork trip to Oaxaca from April 26th–May 4th, 2017, a snowball sampling strategy was conducted to locate producers and understand better the context of mezcal production and how the emergence of global markets has affected small scale producers in the state.

[2] Factor influencing the producers' position in the value chain.

Several producer communities were identified as potential study sites — both in the Central Valleys, where most mezcal producers are concentrated, and more remote areas such as the Sierra Norte (northern highlands). Members of the research group (Iain J. Davidson-Hunt and James P. Robson), the Non-profit organization INDAYU, A.C., and other expert consultants, such as Alvin Starkman, provided contacts of individual mezcal producers in a number of these places. Producers and producer communities were visited during April 2017, and initial conversations were held to ascertain interest in the research and suitability as a potential study community. After that initial visit, I returned to Canada to prepare and present my Candidacy Exam. The community of San Juan del Río met all the criteria noted above and, in September 2018, the communal authorities (Common Property Commissioner) were approached about the project. This meeting took place in their office and a letter/agreement was signed by the community authorities (Appendix 8) that provided background on the research, the main activities that would be carried out within the community, and the products / benefits expected by the community. After obtaining the authorization from the Commissioner, data collection took place over a 7-month period, from October of 2018 to April of 2019.

During this period of field work, participant observation was done during the fabrication of mezcal in the *palenques* or family stills and during the work hours in the agave fields. The still chosen was a family-run still producing artisanal mezcal with a family member who actively participated in the community assembly. The selection of informants for interviews was a purposeful selection of participants done as a snowball sampling and included other mezcal and agave producers and community leaders.

1.6.1 Data collection methods

A complete and in-depth picture of a case study requires different data collection methods (Creswell, 1998). Table 1.2 summarizes the data collection methods used for this research, including details about the research participants and other sources of data.

1.6.1.1 Document review

To collect information about the main events, regulations, institutions, and actors involved in the commoditization process of mezcal, a review of literature, archives and norms was

undertaken. Internet searches were done using the Google and Google Scholar search engines with the terms “mezcal”, “agave”, “mezcal historia” (mezcal history), “San Juan del Río mezcal”, “norma oficial mezcal” (official mezcal norm), “Consejo Regulador Mezcal” (Mezcal Regulatory Council), “mezcal Oaxaca” and “agave espadín Oaxaca” (espadín agave Oaxaca). Also, web searches were done in the Scopus and Web of Science databases using the same terms. Furthermore, the National Autonomous University of Mexico, University of Guadalajara and Benito Juárez Autonomous University of Oaxaca virtual thesis repositories were searched using the mentioned terms. After screening the results of these searches, I collected the books, journal papers, theses, reports, and government documents that contained relevant information about events, regulations, institutions and actors involved in the mezcal commoditization process. The materials used were referenced in Chapters 2, 3 and 4 of this thesis.

1.6.1.2 Participant observation in a family still

Participant observation is a data collection method in which researchers immerse themselves into a community, group, or culture of study to gather data which is often qualitative — but can also be quantitative — and register it in the form of field notes about things they observe, photographs or videos of peoples’ environments, videos and audios of conversations with people or storytelling (Bernard, 2011). After becoming immersed in the context of the study, participant observers must be able to remove themselves from it to intellectualize their observations, put it into perspective and write about it convincingly in their fieldwork notes (Bernard, 2011).

To observe the mezcal production process in San Juan del Río, a family still was selected to conduct participant observation during their daily activities. This method allowed me to gather qualitative data on the mezcal production process, including tools, techniques and family dynamics.

1.6.1.3 Semi-structured interviews in the case study community

Semi-structured interviews can be defined as a spoken exchange of information, involving an interviewer and an interviewee, that has a degree of predetermined order and control of the contents of the interview and a degree of flexibility (Hay, 2008). Such interviews usually involve a guide (Appendix 7) with the main issues or areas relevant for the research and the role of the

interviewer is to guide the interviewee through these topics with the flexibility to expand in certain areas (Hay, 2008).

TABLE 1.2 DATA COLLECTION METHODS, PARTICIPANTS OR SOURCES OF DATA AND VARIABLES.

Data collection method	Participants or sources of data	Variables
Document review	Literature (books, journal papers, thesis, and reports), archives and norms.	Key events, norms, institutions, and actors involved in the commoditization process of mezcal.
Participant observation	Family working at the selected still.	Agave and mezcal production process, tools, and techniques; and family dynamics around the production.
Semi-structured interviews	San Juan del Rio • 3 members of the community authorities (males between 55 and 64 years old). • 16 producers:10 agave and mezcal producers (owners of a still) and 6 agave producers (14 male and 2 female producers; 10 producers between 55 and 64 years old and 6 of them between 25 and 54 years old).	Agave cultivation and mezcal production process; the increased market demand of agave and mezcal; the meanings and values attached to mezcal and agave inside the community; the rules the use of community resources; impacts to community resources resulting from the increasing demand; conflicts among producers and community members; brands owned by community members and the meanings behind their labels and marketing slogans.
	External brands • 4 brands interviewed sell their mezcal in Mexico and other countries of North America, Europe, and Asia. • 1 new brand starting with their first batch of mezcal to be distributed in Germany at a small scale	The start of the companies, how the market has changed over time, volumes of production, the components of their value chain, national markets and export products, the relationship with producers and the communities they belong to, their approach to sustainability, and the characteristics of their consumers.
	Mezcal value chain (Oaxaca and Mexico City) • 5 consultants focused on different topics around mezcal (sustainability, tourism, marketing, and distribution) (Mexico City and Oaxaca City). • 1 Non-profit organization focused on mezcal (Oaxaca City) • Mezcal owner (Mexico City)	Value around mezcal and how it has changed over the years, the evolution of mezcal markets, the type of consumers of mezcal in urban areas, the perceptions of consumers around the production of mezcal in Oaxacan communities, the perception of consumers around production processes and sustainability.
	Mezcal value chain (Toronto, Canada) • 1 Mexican consultant, residing in Toronto, focused on the distribution of Mezcal in the Canadian market. • 2 owners of bars, located in Toronto, that sell mezcal as one of their main products.	The evolution of the mezcal market in Canada; the challenges to import mezcal to Canada; the characteristics of mezcal consumers in Toronto; the value and perceptions of mezcal among Canadian consumers and how it has changed during the last years; their perception of Indigenous producer communities in Oaxaca; and their perception around sustainability in the production processes.

LULC data	Satellite imagery and aerial photographs
	• 1 printed aerial photograph (INEGI, 1993)
	• satellite images (NASA/USGS) showing San Juan del Rio Territory delineated by a boundary polygon (INEGI):
	  • Landsat 7 2001 (Band combination: 4,3,2)
	  • Landsat 8 2013 (Band combination 5,4,3)
	  • Landsat 8 2019 (Band combination 5, 4, 3)
		Land Use and Land Cover

	4 LULC interpretation sessions with 4 community authority members.	

After finishing the participant observation phase, semi-structured interviews were conducted in the community with key actors involved in mezcal production as well as members of the community authority. Using this type of interview allowed me to cover several key topics and lines of inquiry required for the research while enabling the freedom to explore other topics not previously considered but relevant for the research. A total of 19 interviews were conducted in San Juan del Río: 3 members of the community authority (males between 55 and 64 years old) and 16 agave and mezcal producers. The interviews covered topics around the rules regarding the community resources (land, wild agaves, water, and firewood); the penalties for breaking the rules; local values and perceptions around the resources used to produce mezcal; and the dynamics among members of the community assembly. Using a snowball sampling technique, agave and mezcal producers were selected to conduct semi-structured interviews. A total of 16 producers were interviewed, 10 of them were agave and mezcal producers (owners of a still) and 6 of them were only agave producers.[3] (14 male and 2 female producers; 10 producers between 55 and 64 years old and 6 of them between 25 and 54 years old). Interviews covered topics about agave cultivation and mezcal production processes; increased market demand for agave and mezcal; the meanings and values attached to mezcal and agave inside the community; rules for the use of community resources; impacts to community resources resulting from increased demand; conflicts among producers and community members; brands owned by community members; and, the meanings behind their labels and marketing slogans.

1.6.1.4 Semi-structured interviews with external brands

Several of the external brands that are supplied (agave and unbranded mezcal) by community producers were identified and contacted through social media, 5 of them replied and agreed to be interviewed. 4 of the 5 brands interviewed sell their mezcal in Mexico and other countries of North America, Europe, and Asia; the other brand is just starting with their first batch of mezcal to be distributed in Germany at a small scale. The topics covered in these interviews were: the start of the companies, how the market has changed over time, volumes of production, the

[3] San Juan del Río has a total of 25 mezcal producers who consistently operate their own still. The number of agave producers is difficult to define because most of the community members do this activity or are starting to get involved with it either as a main or side activity.

components of their value chain, national markets and export products, the relationship with producers and the communities they belong to, their approach to sustainability, and the characteristics of their consumers. These interviews took place in Oaxaca and Mexico City from January to June 2019.

1.6.1.5 Semi-structured interviews with different actors in the mezcal value-chain

Several other actors involved in the mezcal value chain were identified through a snowball sampling method and internet searches. Ten actors were contacted and 6 of them agreed to be interviewed in Oaxaca City and Mexico City from January to June 2019. 5 of them were consultants focused on different topics about mezcal (sustainability, tourism, marketing, and distribution). 1 of them was the founder of a Non-profit organization focused on mezcal, culture and sustainability and the other one was the owner of one of the mezcal bars in Mexico City. In these interviews, actors were asked questions about the values of mezcal and how this has changed over the years, the evolution of mezcal markets, the type of consumers of mezcal in urban areas, the perceptions of consumers about the production of mezcal in Oaxacan communities, and the perception of consumers regarding production processes and sustainability. Previously identified through internet searches and contacted by e-mail, 3 different actors were interviewed in the city of Toronto from June 11th to June 15th, 2019. One of them was a Mexican consultant, residing in Toronto, focused on the distribution of Mezcal in the Canadian market. The other two interviewees were owners of bars, located in Toronto, that sell mezcal as one of their main products. These interviews covered topics about the evolution of the mezcal market in Canada; the challenges to import mezcal to Canada; the characteristics of mezcal consumers in Toronto; the value and perceptions of mezcal among Canadian consumers and how it has changed during the last years; their perception of Indigenous producer communities in Oaxaca; and, their perception around sustainability in the production processes.

1.6.1.6 Land Use Land Cover (LULC) data collection

Participatory methods have increasingly been incorporated to Land Systems Science to improve and refine the results of remote sensing techniques in LULC (Land Use Land Cover) analysis (Dunn, 2007; Fritz et al., 2012; Leiss & Rasmussen, 2012; Wakie et al., 2016). Through

participatory methods, the knowledge of local-land managers can be made explicit using GIS and remote sensing tools and by doing so improving classifications (Hoover et al., 2017), allow for further analysis, and identifying linear and non-linear connections between changes in LULC and resource management decisions (An, 2012; Hoover et al., 2017). Participatory remote sensing focuses on the incorporation of local knowledge for the improvement of LULC classifications of satellite data (Hoover et al., 2017). Participatory remote sensing was used in this research to collect data from local land managers — through visual LULC interpretations of aerial and satellite images — that allowed for the improvement of LULC classifications.

4 LULC interpretation (classification) sessions (1.5 to 2 hours) were conducted from October 2018 to April 2019 with 4 members of San Juan del Rio authority. These sessions required the use of:

- 1 printed aerial photograph (Instituto Nacional de Estadísticas y Geografía (INEGI), 2013)
- 3 satellite images (NASA/USGS) showing San Juan del Rio Territory delineated by a boundary polygon (INEGI):
  - Landsat 7 2001 (Band combination: 4,3,2) (USGS, 2001).
  - Landsat 8 2013 (Band combination 5,4,3) (USGS, 2013).
  - Landsat 8 2019 (Band combination 5, 4, 3) (USGS, 2019).

In the first session, participants defined 4 LULC categories: 1) Pine/Oak; 2) Low Dry Forest; 3) Agave crops; 4) Built-up. Subsequently, they classified the INEGI Aerial Photograph (1993) by delineating polygons they visually detected. During the second, third and fourth sessions, participants used the same method to classify the 2001, 2013 and 2019 images, respectively. Using the 1993 INEGI aerial photo classified by participants and own visual interpretation, 1993 LULC polygons were digitized using the software QGIS 3.10. In the case of the satellite images, the participant's classification was used to create a training input to conduct a supervised classification using the Semi-Automatic Classification Plugin (SCP) 6 for QGIS 3.10 (Congedo, 2021), using the same LULC categories.

Furthermore, data on mezcal marketing was gathered through internet searches and participant observation in retail stores, restaurants and bars in Oaxaca, Mexico City and

Toronto. Data was recorded through fieldwork notes, photographs, and website screenshots. All the interviews were audio recorded, transcribed, and coded using the software NVIVO 11 (QSR International, 1999).

1.6.2 Data analysis

For the LULC change analysis, after doing the supervised classifications in SCP QGIS 3.10, the accuracy index was calculated using the SCP Accuracy tool and errors were corrected using the SCP Raster Edit tool. The corrections were based on the participant's LULC interpretation. The LULC change was calculated using SCP's Land Cover Change tool. LULC maps were created for the 4 periods of time and the total area of each LULC, and the change rates (r) were calculated. More details about the analysis and the results of this work can be seen in Chapter 3.

Interview transcripts were coded and analyzed focusing on identifying associations between different key topics and sources of data (Bernard, 2011). Initially, a codebook was defined using topics from the objectives of the thesis, the theoretical framework used and salient topics that I detected from an initial read to the interview transcripts (Figure 1.4).

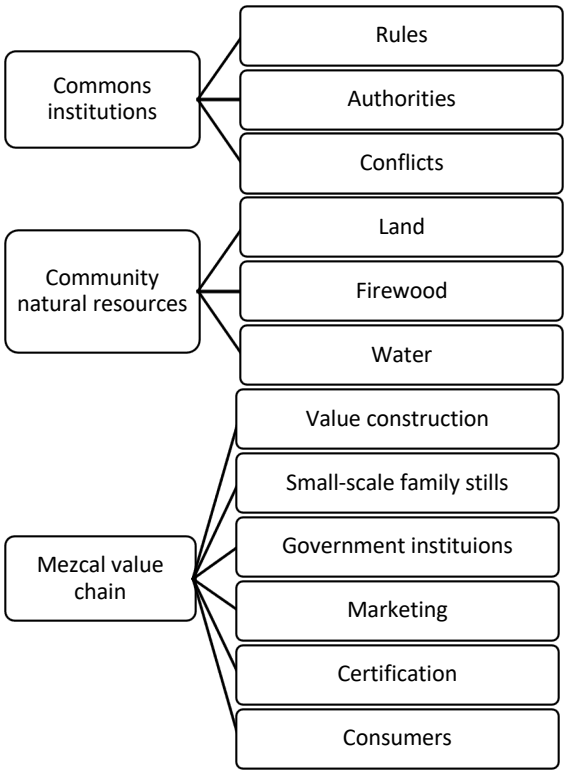

FIGURE 1.4 INITIAL CODEBOOK.

As the interviews were being coded, emergent topics were added and associations between different topics were identified; thus, the codebook changed to the one presented in Table 1.3

TABLE 1.3 FINAL CODEBOOK.

Common institutions	**LULC and other resources**	**Mezcal value-chain**
Rules • Wild agave • Water • Fruit trees • Cultivated agave • "Cargos" • "Tequios" • Assembly • Statute • Sanctions • Obligations	Land • Agave planting - Labor • Cleaning agave crops - Labor • Corn and agave • Temperate forest area • Herbicides • Deforestation • TDF • Agave expansion	Value construction • Perceptions around mezcal - Producers' perceptions - Consumers'perceptions • Sustainability • Oaxaca culture • Bars • Research • Consumers - Mexican - International • Demand increase - Impact in local livelihoods - Value chain complexity - Migration • Narratives - Oaxaca culture - Sustainability - Social justice - Small-scale production - Local natural resources
Authorities • Elections • Roles • Past experiences	Water • Water for mezcal production • Pollution	Government • Origin denomination • Standard - Regulatory council • Taxes
Conflicts • Discussions • Resolution • Past conflicts - Past agreements to plant agave	Firewood • Firewood for mezcal production	Promotors • NGO's • Consultants
Monitoring • Technology • Monitoring frequency • Reporting from community members		Small-scale family stills • Local brands • Collective work • Supply of unbranded mezcal • Production process - Labor - Tools • Socio-economic challenges - Producers' challenges - Agave price - Producers' past - Mezcal prices

1.6.3 Data validity

Validation of data for this research was done through the triangulation of data by cross verification from different sources. The LULC classifications were verified using LULC data obtained from community leaders.

1.7 Plan of the Thesis

This Introductory chapter has laid out the purpose and objectives of the research, the theoretical framework that helped to guide the work, and the main tenets of the research design (methods and methodology). In Chapters 2–4, I present the key findings from my empirical study, and discuss the scholarly relevance and contributions of this work.

Chapter 2 presents the different narratives driving the mezcal commoditization in the consumer context, and how Indigenous producers take part in this process (work that responds to Objective 1 of this thesis). This chapter speaks to discussion around the relationship between markets and communities, particularly showing the power imbalances in global value chains that make it difficult for communities to capture more benefits from their participation in such markets.

Chapter 3 addresses the impacts of growing mezcal markets on the community territory, particularly focusing on Land Use Land Cover (LULC) processes in the context of increased agave cultivation (Objective 2). This chapter contributes to our understanding of the relationship between artisanal production and global markets, specifically the impacts to producer communities' territorial resources and the resulting intracommunity tensions.

Chapter 4 examines the impacts of growing demand (for mezcal) on the commons regimes in which local production systems are embedded (Objective 3). This chapter contributes to the discussion around the relationship between local producers and markets and shows the role of commons institutions to balance producers' development goals with the protection of local territorial resources.

Finally, Chapter 5 acts as a comprehensive conclusion, which provides summaries of key findings for each research objective and identifies the main theoretical contributions of the work in relation to building understanding of the relationships between Indigenous commons

and global markets through the commoditization of artisanal products, impacts on the territories of producer communities, and the responses to change that these impacts trigger.

1.8 Grouped manuscript thesis

This thesis follows the grouped manuscript or "sandwich" style consisting of a — published or soon to be published — paper or collection of papers. The University of Manitoba requires this type of thesis to include an introductory and concluding chapter and the papers included as different chapters of the thesis, following the style manual of the journal in which this was published. Given the nature of the "sandwich" style, this thesis contains a certain level of repetition of information across the introductory chapter (Chapter 1) and part of the published and soon to be published papers that constitute Chapters 2, 3 and 4.

1.9 Contribution of authors

Chapters 2 to 4 of this thesis are a collection of published papers (Chapters 3 and 4) and a manuscript (Chapter 2). These chapters are multi-authored containing contributions from the co-authors to the conceptualization of the included papers and the manuscript. However, I — as the lead author — was responsible for collecting and analysing the data presented and for writing the papers and the manuscript.

1.10 References

Acheson, J. M. (2003). *Capturing the commons: Devising institutions to manage the Maine lobster industry*. Hanover: University Press of New England. http://site.ebrary.com/id/10989754

Agrawal, A. (2001). Common Property Institutions and Sustainable Governance of Resources. *World Development*, 29(10), 1649–1672.

An, L. (2012). Modeling human decisions in coupled human and natural systems: Review of agent-based models. *Ecological Modelling*, 229, 25–36. https://doi.org/10.1016/j.ecolmodel.2011.07.010

Antinori, C., & Bray, D. B. (2005). Community Forest Enterprises as Entrepreneurial Firms: Economic and Institutional Perspectives from Mexico. *World Development*, 33(9), 1529–1543. https://doi.org/10.1016/j.worlddev.2004.10.011

Appadurai, A. (1986). *The social life of things: Commodities in cultural perspective*. Cambridge: Cambridge University Press.

Appadurai, A. (1997). Modernity at Large. Delhi: Oxford University Press.

Aranda, J., & Morales, C. (2002). *Poverty Alleviation through Participation in Fair Trade Coffee Networks: The Case of CEPCO, Oaxaca, Mexico* (Unpublished Report). CEPCO. https://cfat.colostate.edu/wp-content/uploads/sites/63/2009/09/Case-Study-CEPCO-Oaxaca-Mexico.pdf

Arfini, F., & Mora, C. (Eds.). (1998). *Typical and traditional products: Rural effect and agro-industrial problems*. Proceedings of the 52nd Seminar of the European Association of Agricultural Economists Parma, Italy.

Barabas, A. (1999). Gente de la palabra verdadera. El grupo etnolingüístico zapoteco. In Barabas, A. & Bartolomé, M. A. *Configuraciones étnicas en Oaxaca: perspectivas etnográficas para las autonomías.* Mexico City: Instituto Nacional Indigenista, CONACULTA, INAH.

Barona, E., Ramankutty, N., Hyman, G., & Coomes, O. T. (2010). The role of pasture and soybean in deforestation of the Brazilian Amazon. *Environmental Research Letters*, 5(2). https://doi.org/10.1088/1748-9326/5/2/024002

Barrientos, S., & Gereffi, G. (2011). Economic and social upgrading in global production networks: A new paradigm for a changing world. *International Labour Review*, 150(3–4), 319–340.

Bell, D., & Valentine, G. (1997). *Consuming geographies: We are where we eat*. London: Routledge.

Bennett, A., Ravikumar, A., McDermott, C., & Malhi, Y. (2019). Smallholder Oil Palm Production in the Peruvian Amazon: Rethinking the Promise of Associations and Partnerships for Economically Sustainable Livelihoods. *Frontiers in Forests and Global Change*, 2(April), 1–16. https://doi.org/10.3389/ffgc.2019.00014

Berard, L., & Marchenay, P. (1995). Lieux, temps, et preuves: La construction sociale des produts de terroir. *Terrain*, 24, 153–164.

Berg, B. L. (2012). *Qualitative research methods for the social sciences*. New Jersey: Pearson. http://doi.org/10.2307/1317652

Berkes, F., & Davidson-Hunt, I. J. (2010). Innovating through commons use: Community-based enterprises. *International Journal of Commons*, 4(1), 1–7.

Bernard, R. (2011). *Research methods in anthropology*. Lanham: Altamira Press.

Bessiere, J. (1998). Local development and heritage: Traditional food and cuisine as tourist attractions in rural areas. *Sociologia Ruralis*, 38(1), 21–34. https://doi.org/10.1111/1467-9523.00061

Biesta, G. (2010). Pragmatism and the philosophical foundations of mixed methods research. In Tashakkori, A. & Teddlie, C. (Eds.). *Handbook of Mixed Methods in Social and Behavioral Research*. 2nd Ed. Thousand Oaks: Sage.

Bilali, H. E., Calabrese, G., Iannetta, M., Stefanova, M., Paoletti, F., Ladisa, G., Bottalico, F., & Capone, R. (2020). Environmental sustainability of typical agro-food products: A scientifically sound and user friendly approach. *New Medit*, 19(2), 69–83. https://doi.org/10.30682/nm2002e

Boillat, S., Scarpa, F. M., Robson, J. P., Gasparri, I., Aide, T. M., Aguiar, A. P. D., Anderson, L. O., Batistella, M., Fonseca, M. G., Futemma, C., Grau, H. R., Mathez-Stiefel, S. L., Metzger, J. P., Ometto, J. P. H. B., Pedlowski, M. A., Perz, S. G., Robiglio, V., Soler, L., Vieira, I., &

Brondizio, E. S. (2017). Land system science in Latin America: Challenges and perspectives. *Current Opinion in Environmental Sustainability*, 26–27, 37–46. https://doi.org/10.1016/j.cosust.2017.01.015

Bollier, D., & Helfrich, S. (2014). *The Wealth of the Commons: A World Beyond Market and State*. Amherst: Levellers Press. https://www.wealthofthecommons.org

Bollier, D., & Helfrich, S. (Eds.). (2015). *Patterns of commoning.* CSG-Commons Strategies Group. https://patternsofcommoning.org

Bowen, S., & Gerritsen, P. R. W. (2007). Reverse leasing and power dynamics among blue agave farmers in western Mexico. *Agriculture and Human Values*, 24(4), 473–488. https://doi.org/10.1007/s10460-007-9088-7

Bowen, S., & Zapata, A. V. (2009). Geographical indications, terroir, and socioeconomic and ecological sustainability: The case of tequila. *Journal of Rural Studies*, 25(1), 108–119. https://doi.org/10.1016/j.jrurstud.2008.07.003

Bray, D. (2020). *Mexico's Community Forest Enterprises: Success on the Commons and the Seeds of a Good Anthropocene*. Tucson: University of Arizona Press.

Browder, J. O., Pedlowski, M. A., Walker, R., Wynne, R. H., Summers, P. M., Abad, A., Becerra-Cordoba, N., & Mil-Homens, J. (2008). Revisiting Theories of Frontier Expansion in the Brazilian Amazon: A Survey of the Colonist Farming Population in Rondônia's Post-Frontier, 1992–2002. *World Development*, 36(8), 1469–1492. https://doi.org/10.1016/j.worlddev.2007.08.008

Brunori, G. (2007). Local food and alternative food networks: A communication perspective. *Anthropology of Food*, S2, 1–19. https://doi.org/10.4000/aof.430

Capone, R., El Bilali, H., & Bottalico, F. (2016). Assessing the sustainability of typical agro-food products: Insights from Apulia Region, Italy. *New Medit*, 15(1), 28–35.

Castle, E. (1996). A pluralistic, pragmatic and evolutionary approach to natural resource management. In Light, A., & Katz E. (Eds). *Environmental pragmatism*. New York: Routledge.

Colchester, M. (1994). Sustaining the Forests: The Community-based Approach in South and South-East Asia. *Development and Change*, 25(1), 69–100. https://doi.org/10.1111/j.1467-7660.1994.tb00510.x

Comisión Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL) (2016). *Resultados de pobreza en México 2016 a nivel nacional y por entidades federativas*. http://www.coneval.org.mx/Medicion/MP/Paginas/Pobreza_2016.aspx

Comunidad Indígena de San Juan del Río, & Hernández Márquez, G. Y. (2020). *Protocolo Comunitiario Biocultural de la comunidad agraria y municipio de San Juan del Rio, Oaxaca, Mexico*. https://absch.cbd.int/database/CPP/ABSCH-CPP-SCBD-253752?fbclid=IwAR3LDdXi-Sv0MC89fyfzbNX9tcFHl4nQ2vPIsHXOV0eZF3DmHXZZqWQitus.

CONAPO. (2020a). *Base de datos del índice de intensidad migratoria por entidad federativa* [Database]. https://www.conapo.gob.mx/work/models/CONAPO/IIM/iim_base2020e.csv (Accessed Feb 12, 2022).

CONAPO. (2020b). *Población total, indicadores socioeconómicos, índice y grado de marginación por municipio* [Database]. http://www.conapo.gob.mx/work/models/CONAPO/Marginacion/Datos_Abiertos/Municipio/IMM_2020.xls (Accessed Feb 12, 2022).

Congedo, L. (2021). Semi-Automatic Classification Plugin: A Python tool for the download and processing of remote sensing images in QGIS. *Journal of Open Source Software*, 6(64), 3172. https://doi.org/10.21105/joss.03172

Cramb, R. A., & Sujang, P. S. (2013). The mouse deer and the crocodile: Oil palm smallholders and livelihood strategies in Sarawak, Malaysia. *Journal of Peasant Studies*, 40(1), 129–154. https://doi.org/10.1080/03066150.2012.750241

Creswell, J. W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks: Sage Publications, Inc.

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Los Angeles: Sage Publications, Inc.

Creswell, J. W., & Clark, V. L. P. (2011). *Designing and Conducting Mixed Methods Research*, 2nd ed. Thousand Oaks: Sage Publications, Inc.

Davidson-Hunt, I. J., Turner, K. L., Te Pareake Mead, A., Cabrera-lopez, J., Bolton, R., Idrobo, C. J., Miretski, I., Morrison, A., & Robson, J. P. (2012). Biocultural Design: A New Conceptual Framework for Sustainable Development in Rural Indigenous and Local Communities. *S.a.P.I.En.S*, 5(2), 33–45. https://journals.openedition.org/sapiens/1382

DeFries, R. S., Rudel, T., Uriarte, M., & Hansen, M. (2010). Deforestation driven by urban population growth and agricultural trade in the twenty-first century. *Nature Geoscience*, 3(3), 178–181. https://doi.org/10.1038/ngeo756

Dewey, J. (1925). *Experience and nature*. Whitefish: Kessinger.

Dunn, C. E. (2007). Participatory GIS — a people's GIS? *Progress in Human Geography*, *31*(5), 616–637. https://doi.org/10.1177/0309132507081493

Eakin, H., Defries, R., Kerr, S., Lambin, E., Liu, J., Marcotullio, P., Messerli, P., Reenberg, A., Rueda, X., Swaffield, S., Wicke, B., & Zimmerer, K. (2014). Significance of Telecoupling for Exploration of Land-Use Change. In Seto, K.C. & Reenberg, A. *Rethinking Global Land Use in an Urban Era* (pp. 141–162). Cambridge: The MIT Press. https://doi.org/10.7551/mitpress/9780262026901.003.0008

Flores Villela, O., & Gerez, P. (1994). *Biodiversidad y conservación en México: Vertebrados, vegetación y uso del suelo*. Mexico City: UNAM.

Food and Agriculture Organization (FAO). (2013). *Sustainability Assessment of Food and Agricultural System: Indicators*. Rome: FAO. http://www.fao.org/nr/sustainability/sustainability-assessments-safa

Fritz, S., McCallum, I., Schill, C., Perger, C., See, L., Schepaschenko, D., van der Velde, M., Kraxner, F., & Obersteiner, M. (2012). Geo-Wiki: An online platform for improving global land cover. *Environmental Modelling & Software*, 31, 110–123. https://doi.org/10.1016/j.envsoft.2011.11.015

Gasparri, N. I., & Le Polain de Waroux, Y. (2015). The Coupling of South American Soybean and Cattle Production Frontiers: New Challenges for Conservation Policy and Land Change Science. *Conservation Letters*, 8(4), 290–298. https://doi.org/10.1111/conl.12121

Goodman, D. & Goodman, M. K. (2009). Alternative Food Networks. In Kitchin, R. & Thrift, N. (Eds.) International Encyclopedia of Human Geography. Amsterdam: Elsevier.

Goodman, D., DuPuis, E. M., & Goodman, M. K. (2012). *Alternative food networks: Knowledge, practice, and politics*. London, New York: Routledge.

Hansen, M. C., & DeFries, R. S. (2004). Detecting long-term global forest change using continuous fields of tree-cover maps from 8-km Advanced Very High Resolution Radiometer (AVHRR) data for the years 1982-99. *Ecosystems*, 7(7), 695–716. https://doi.org/10.1007/s10021-004-0243-3

Hansen, M. C., Stehman, S. V., Potapov, P. V., Arunarwati, B., Stolle, F., & Pittman, K. (2009). Quantifying changes in the rates of forest clearing in Indonesia from 1990 to 2005 using remotely sensed data sets. *Environmental Research Letters*, 4(3). https://doi.org/10.1088/1748-9326/4/3/034001

Harvey, D. (2002). The art of rent: Globalization, monopoly and the commodification of culture. *Socialist Register*, 38, 93–110.

Hay, I. (Ed.). (2008). *Qualitative Research Methods in Human Geography*. Melbourne: Oxford University Press.

Hernández Díaz, J., & Robson, J. (2019). Population, territory, and governance in rural Oaxaca. In Robson, J.P., Klooster, D.J. & Hernández Díaz, J. (Eds.). *Communities surviving migration: Village governance, environment, and cultural survival in indigenous Mexico*. Oxon: Routledge Taylor & Francis Group.

Hernández, J. (2013). Paisajes vemos, de su creación no sabemos. El paisaje agavero patrimonio cultural de la humanidad. *Relac. Estud. hist. soc*. 34(136), 115-144. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-39292013000400006&lng=es&tlng=es.

Hoover, J. D., Leisz, S. J., & Laituri, M. E. (2017). Comparing and Combining Landsat Satellite Imagery and Participatory Data to Assess Land-Use and Land-Cover Changes in a Coastal Village in Papua New Guinea. *Human Ecology*, 45(2), 251–264. https://doi.org/10.1007/s10745-016-9878-x

Hothersall, S. J. (2019). Epistemology and social work: enhancing the integration of theory, practice and research through philosophical pragmatism. *European Journal of Social Work*, 22(5), 860-870.

Hudson, I., & Hudson, M. (2003). Removing the veil? Commodity fetishism, fair trade, and the environment. *Organization and Environment*, 16(4), 413–430. https://doi.org/10.1177/1086026603258926

Hull, G. (2016). Cultural Branding, Geographic Source Indicators and Commodification. *Theory, Culture & Society*, 33(2), 125–145. https://doi.org/10.1177/0263276415583140

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (2016). *Actualización del marco censal agropecuario* [Database]. https://www.inegi.org.mx/programas/amca/2016/#Tabulados (Accessed 11 February 2022).

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (1990). *XI Censo general de población y vivienda 1990. Tabulados básicos* [Database]. https://www.inegi.org.mx/programas/ccpv/1990/ (Accessed 12 March 2020).

Instituto Nacional de Estadística, Geografía e Informática (INEGI) (1993). Ortoimágenes (E14d59a, E14d59b, E14d59c, E14d59d, E14d59e, E14d59f). https://www.inegi.org.mx/temas/imagenes/ortoimagenes/#Descargas (Accessed 13 June 2021).

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (2000). XII Censo general de población y vivienda 2000. [Database]. https:// www.inegi.org.mx/programas/ccpv/2000/ (Accessed 25 Mar 2020).

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (2010). *Censo de población y vivienda 2010. Tabulados basicos* [Database]. https://www.inegi.org.mx/programas/ccpv/2010/ (Accessed 12 March 2020).

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (2020). *Censo de Poblacion y Vivienda* [Dataset]. https://www.inegi.org.mx/programas/ccpv/2020/ (Accessed 3 May 2021).

Jackson, P., Ward, N. and Russell, P. (2010). Manufacturing meaning along the chicken supply chain: consumer anxiety and the spaces of production. In Goodman, M.K., Goodman, D and Redclift, M, (Eds.) *Consuming Space: Placing Consumption in Perspective*. Aldershot: Ashgate.

Jodha, N. S. (1985). *Market forces and erosion of common property resources. Agricultural Markets in the Semi-Arid Tropics*. Proceedings of an International Workshop held at ICRISAT Center, India.

Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a research paradigm and its implications for social work research. *Social sciences*, 8(9), 255.

King, R., Adler, M. A., & Grieves, M. (2013). Cooperatives as Sustainable Livelihood Strategies in Rural Mexico. *Bulletin of Latin American Research*, 32(2), 163–177. https://doi.org/10.1111/j.1470-9856.2012.00796.x

Koczberski, G., & Curry, G. N. (2004). Divided communities and contested landscapes: Mobility, development and shifting identities in migrant destination sites in Papua New Guinea. *Asia Pacific Viewpoint*, 45(3), 357–371. https://doi.org/10.1111/j.1467-8373.2004.00252.x

Kopytoff, I. (1986). The cultural biography of things: Commoditization as process. In Appadurai, A. (Ed.), *The social life of things* (pp. 64–92). Cambridge: Cambridge University Press.

Kupiec, B., & Revell, B. (1998). Speciality and artisanal cheeses today: The product and the consumer. *British Food Journal*, 100(5), 236–243. https://doi.org/10.1108/00070709810221454

Laurance, W. F. (2007). Switch to Corn Promotes Amazon Deforestation. *Science*, 318(5857), 1721 LP – 1721. https://doi.org/10.1126/science.318.5857.1721b

Le Polain de Waroux, Y., Garrett, R. D., Heilmayr, R., & Lambin, E. F. (2016). *Land-use policies and corporate investments in agriculture in the Gran Chaco and Chiquitano*. Proceedings of the National Academy of Sciences, 113(15), 4021. https://doi.org/10.1073/pnas.1602646113

Leisz, S. J., & Rasmussen, M. S. (2012). Mapping fallow lands in Vietnam's north-central mountains using yearly Landsat imagery and a land-cover succession model. *International*

Journal of Remote Sensing, 33(20), 6281–6303. https://doi.org/10.1080/01431161.2012.681712

Light, A., & Katz E. (1996). *Environmental pragmatism*. New York: Routledge.

Liu, J., Hull, V., Batistella, M., DeFries, R., Dietz, T., Fu, F., Hertel, T. W., Izaurralde, R. C., Lambin, E. F., Li, S., Martinelli, L. A., McConnell, W. J., Moran, E. F., Naylor, R., Ouyang, Z., Polenske, K. R., Reenberg, A., de Miranda Rocha, G., Simmons, C. S., … Zhu, C. (2013). Framing Sustainability in a Telecoupled World. *Ecology and Society*, 18(2). http://www.jstor.org/stable/26269331

Maxcy, S. J. (2003). Pragmatic threads in mixed methods research in the social sciences: The search for multiple modes of inquiry and the end of the philosophy of formalism. In Tashakkori, A. & Teddlie, C. (Eds.). *Handbook of Mixed Methods in Social and Behavioral Research*. Thousand Oaks: Sage.

McCay, B. J., Micheli, F., Ponce-Díaz, G., Murray, G., Shester, G., Ramírez-Sánchez, S., & Weisman, W. (2014). Cooperatives, concessions, and co-management on the Pacific coast of Mexico. *Marine Policy*, 44, 49–59. https://doi.org/10.1016/j.marpol.2013.08.001

McKean, M. A. (2000). *Community governance of common property resources.* Panel on "Governance and Civil Society," at the Fifth Annual Colloquium on Environmental Law and Institutions, Sustainable Governance, 1–7.

McMichael, P. (2013). Value chain Agriculture and Debt Relations: contradictory outcomes. *Third World Quarterly*, 34(4), 671–690.

Miller, M. C. (2013). Pragmatism and feminism. In Malachowski, A. (Ed.) *The Cambridge Companion to Pragmatism*. Cambridge: Cambridge University Press.

Morton, D. C., DeFries, R. S., Shimabukuro, Y. E., Anderson, L. O., Arai, E., del Bon Espirito-Santo, F., Freitas, R., & Morisette, J. (2006). Cropland expansion changes deforestation dynamics in the southern Brazilian Amazon. *Proceedings of the National Academy of Sciences*, 103(39), 14637–14641.

Morgan, D. (2014). Pragmatism as a paradigm for mixed methods research. In *Integrating qualitative and quantitative methods* (pp. 25-44). Thousand Oaks: SAGE Publications, Inc.

Moscatelli, S., Gamboni, M., Dernini, S., Capone, R., Bilali, H. E., Bottalico, F., Debs, P., & Cardone, G. (2017). Exploring the Socio-cultural Sustainability of Traditional and Typical Agro-food Products: Case study of Apulia Region, South-eastern Italy. *Journal of Food and Nutrition Research*, 5(1), 6–14. https://doi.org/10.12691/jfnr-5-1-2

Mutersbaugh, T. (2002). The number is the beast: A political economy of organic-coffee certification and producer unionism. *Environment and Planning A: Economy and Space*, 34(7), 1165–1184. https://doi.org/10.1068/a3435

Nayak, P. K. (Ed.). (2021). *Making commons dynamic: Understanding change through commonisation and decommonisation*. Oxon: Routledge, Taylor & Francis Group.

Nigh, R. (1997). Organic Agriculture and Globalization: A Maya Associative Corporation in Chiapas, Mexico. *Human Organization*, 56(4), 427–436. https://doi.org/10.17730/humo.56.4.w761q3q1h4h8m247

Nygard, B., & Storstad, O. (1998). De-globalization of food markets? Consumer perceptions of safe food: The case of Norway. *Sociologia Ruralis*, 38(1), 35–53. https://doi.org/10.1111/1467-9523.00062

Norton, B.G. (2005). Sustainability: Philosophy of Adaptive Ecosystem Management. Chicago: University of Chicago Press.

Ostrom, E. (1990). *Governing the Commons*. Cambridge: Cambridge University Press.

Pansiri, J. (2005). Pragmatism: A methodological approach to researching strategic alliances in tourism. *Tourism and Hospitality Planning & Development*, 2(3), 191-206.

Pavlis, D., & Gkiosos, J. (2017). John Dewey, From Philosophy of Pragmatism to Progressive Education. Journal of Arts and Humanities, 6(9), 23-30.

Pendrill, F., Persson, U. M., Godar, J., & Kastner, T. (2019). Deforestation displaced: Trade in forest-risk commodities and the prospects for a global forest transition. *Environmental Research Letters*, 14(5). https://doi.org/10.1088/1748-9326/ab0d41

Persson, U. M., Henders, S., & Cederberg, C. (2014). A method for calculating a land-use change carbon footprint (LUC-CFP) for agricultural commodities — Applications to Brazilian beef and soy, Indonesian palm oil. *Global Change Biology*, 20(11), 3482–3491. https://doi.org/10.1111/gcb.12635

QSR International. (1999). *NVivo data analysis software* [Computer software]. https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home

Ray, C. (1998). Culture, intellectual property and territorial rural development. *Sociologia Ruralis*, 38(1), 3–20.

Robson, C. (2002). *Real world research: A resource for social scientists and practitioner-researchers*. Oxford: Wiley-Blackwell.

Robinson, J. G. (2011). Ethical pluralism, pragmatism, and sustainability in conservation practice. *Biological Conservation*, 144(3), 958–965. https://doi.org/10.1016/j.biocon.2010.04.017

Schrader-Kniffki, M. (2004). *Introducción a la lengua y cultura zapotecas*. Valencia: Univ. de Valencia.

Tashakkori, A., & Teddlie, C. (2008). *Mixed Methodology: Combining Qualitative and Quantitative Approaches*. Thousand Oaks: Sage Publications.

Terzi, F., & Bolen, F. (2009). Urban Sprawl Measurement of Istanbul. *European Planning Studies*, 17(10), 1559–1570. https://doi.org/10.1080/09654310903141797

Tetreault, D., McCulligh, C., & Lucio, C. (2021). Distilling agro-extractivism: Agave and tequila production in Mexico. *Journal of Agrarian Change*, July 2020, 219–241. https://doi.org/10.1111/joac.12402

Tregear, A. (2001). *Speciality Regional Foods in the UK: an Investigation from the Perspectives of Marketing and Social History* [Unpublished doctoral dissertation]. University of Newcastle.

Tregear, A. (2003). From Stilton to Vimto: Using Food History to Re-think Typical Products in Rural Development. *Sociologia Ruralis,* 43(2), 91-107.

Tregear, A., Arfini, F., Belletti, G., & Marescotti, A. (2007). Regional foods and rural development: The role of product qualification. *Journal of Rural Studies*, 23(1), 12–22. https://doi.org/10.1016/j.jrurstud.2006.09.010

Turner, B. L., & Meyer, W. B. (1991). Land use and land cover in global environmental change: Considerations for study. *International Social Science Journal*, 43(130), 669–679.

Turner, B. L., & Meyer, W. B. (1994). Global land-use and land-cover change: An overview. In Meyer, W. B. & Turner, B. L. (Eds.). *Changes in land use and land cover: A global perspective*. Cambridge: Cambridge University Press.

Turner, B. L., Lambin, E. F., & Verburg, P. H. (2021). From land-use/land-cover to land system science. *Ambio*, 50(7), 1291–1294. https://doi.org/10.1007/s13280-021-01510-4

United States Geological Survey (USGS), Department of the Interior. (2001) *Landsat-7 Image* (Scene ID: LE70240482001101EDC00). https://landsatlook.usgs.gov/bundle/LE07_L2SP_024048_20010411_20200917_02_T1.tar?requestSignature=eyJjb250YWN0SWQiOjI2MzMwMTg0LCJkb3dubG9hZElkIjoxMzc1NzExNTYsImRhdGVHZW5lcmF0ZWQiOiIyMDIyLTAzLTAzVDE3OjI5OjE1LTA2OjAwIiwic2lnbmF0dXJlIjoiJDUkJGIyU0ZcL0dyTnlKVzh2dmtsN1VVQ3Q3ZXBDLkt4Qkc1VnFTb1plcXlCeTI5In0= (Accessed 15 November 2021).

United States Geological Survey (USGS), Department of the Interior. (2013). *Landsat-8 Image*. (Scene ID: LC80240482013078LGN02). https://landsatlook.usgs.gov/bundle/LC08_L1TP_024048_20130319_20200913_02_T1.tar?requestSignature=eyJjb250YWN0SWQiOjI2MzMwMTg0LCJkb3dubG9hZElkIjoxMzc1Nzc2NzksImRhdGVHZW5lcmF0ZWQiOiIyMDIyLTAzLTAzVDE3OjM5OjUzLTA2OjAwIiwic2lnbmF0dXJlIjoiJDUkJDJUUkJ5clltMFNFcFJVRDdqNlNJT2dJTnRDM2V5OHUwYm9DSlhOUzdld0IifQ== (Accessed 15 November 2021).

United States Geological Survey (USGS), Department of the Interior. (2019). *Landsat-8 Image* (Scene ID: LC80240482019047LGN00). https://landsatlook.usgs.gov/bundle/LC08_L1TP_024048_20190216_20200829_02_T1.tar?requestSignature=eyJjb250YWN0SWQiOjI2MzMwMTg0LCJkb3dubG9hZElkIjoxMzc1Nzg4NTgsImRhdGVHZW5lcmF0ZWQiOiIyMDIyLTAzLTAzVDE3OjQ0OjUyLTA2OjAwIiwic2lnbmF0dXJlIjoiJDUkJGkydWczTG5pNUh6bEVHTW51TXVrRUxHWEtcL25uUmswVmpSNTZlb0w3U0l0In0= (Accessed 15 November 2021).

van der Ploeg, J. D. (2008). *The New Peasantries: Struggles for Autonomy and Sustainability in an Era of Empire and Globalization*. London/Sterling: Routledge.

Vasta, A., Figueiredo, E., Valente, S., Vihinen, H., & Nieto-Romero, M. (2019). Place-based policies for sustainability and rural development: The case of a Portuguese village "spun" in traditional linen. *Social Sciences*, 8(10), 1-17. https://doi.org/10.3390/socsci8100289

Velázquez, A., Durán, E., Ramírez, I., Mas, J.-F., Bocco, G., Ramírez, G., & Palacio-Prieto, J. L. (2003). Land use-cover change processes in highly biodiverse areas: The case of Oaxaca, Mexico. *Global Environmental Change*, 13, 175–184. https://doi.org/10.1016/S0959-3780(03)00035-9

Ventura, F., & Milone, P. (2000). Theory and practice of multi-product farms: Farm butcheries in Umbria. *Sociologia Ruralis*, 40(4), 452–465.

Wakie, T. T., Laituri, M., & Evangelista, P. H. (2016). Assessing the distribution and impacts of Prosopis juliflora through participatory approaches. *Applied Geography*, 66, 132–143. https://doi.org/10.1016/j.apgeog.2015.11.017

Wiskerke, J. S. C. (2009). On places lost and places regained: Reflections on the alternative food geography and sustainable regional development. *International Planning Studies*, 14(4), 369–387. https://doi.org/10.1080/13563471003642803

Yin, R. K. (2014). *Case study research: Design and methods* (5th Edition). Los Angeles: SAGE Publications. http://doi.org/10.1097/FCH.0b013e31822dda9e

CHAPTER 2. The construction of value around mezcal and its impact on Indigenous producer communities in San Juan del Río, Oaxaca

Interconnections among chapters

Chapter 2 addresses the commoditization process of mezcal and analyzes the narratives, actors and institutions behind it. It is closely linked to Chapter 3 because the value construction process drives the demand of agave and mezcal that results in LULC (Land Use and Land Cover) changes. Chapter 2 is also linked with Chapter 3 and Chapter 4 because of the way it examines the narratives used to motivate the consumption of mezcal based in different qualities of artisanal production such as small-scale, craft production, uniqueness of flavour, sustainability and social justice; and how these contrast with the growing challenges that producer communities face, such as LULC changes — presented in Chapter 3 — and pressures on their common institutions — presented in Chapter 4.

ABSTRACT

Food tourism, rural studies and place marketing have promoted the marketization of craft products as a rural development strategy. Through the case of mezcal, a spirit produced by Mexican rural and Indigenous communities, this research draws from commodity theory, the concept of manufacturing meaning and the Marxist concept of commodity fetishism to critically address the commoditization process of craft products. Through semi-structured interviews in San Juan del Rio, Oaxaca City, Mexico City, and Toronto, and the review of relevant literature I gathered data on the main events, actors and institutions that enabled mezcal to become a global commodity; furthermore, interview data allowed us to examine the process of value creation and the narratives that allowed the construction of value around mezcal and how these reflect the situation and challenges of producer communities in the mezcal value-chain. My results show that the context that allowed the commoditization of mezcal has been ruled by powerful elites controlling the design and management of the key ruling institutions. Tensions between industrial and traditional mezcal advocates have led to important changes in these institutions, such as the categorization of mezcal in 3 categories (ancestral, artisanal, and

industrial) to make space for small and medium-scale producers in the emerging markets. However, the artisanal category has been used not only by small and medium-scale rural producers but also by powerful participants of the value chain which are capturing value from this labeling and the narratives attached to artisanal mezcal. These narratives depict mezcal as craft product with a unique flavor that reflects biophysical and cultural aspects of its place of origin; a beverage associated with Mexican culture, particularly with Oaxaca, its traditions, landscapes and people; a sustainable production process; and a distribution system that ensures social justice for producers. In many cases, these narratives reflect the real conditions of producer communities and the production techniques used to produce mezcal; however, the case of San Juan del Río shows different circumstances: an increase in the scale of production; standardization of techniques; environmental issues; and a disadvantageous position of local producers in the value chain. Power imbalances restrict Indigenous producers' participation in policy design processes and limit their value chain upgrading potential. This creates on-going challenges for mezcal producers and associated communities in achieving the benefits they hoped to realize from the sale of mezcal to national and international markets.

2.1 Introduction

The commoditization of local products linked to cultural identity and territory has received attention from many fields of research focused on their potential to contribute to rural development. Food tourism (Porter, 1990; Mak et al., 2012; Montanary & Staniscia, 2009; Viassone & Grimmer, 2015), place branding (Pike, 2011; Giovanardi, 2015; Donner et al., 2017; Gatrell et al., 2018) and rural studies (Van der Ploeg, 2000; Knickel & Renting, 2000; Renting et al., 2003) are among the research areas that have addressed the process of commoditization of these products, focusing on their role for rural development. A variety of terms, as listed in Table 2.1, have been utilized in the literature to refer to products with strong linkages to cultural identity and territory, products that combine traditional production techniques and resources obtained from small scale natural resource systems (Bell & Valentine, 1997). Artisanal is a generic term often applied to such products (Santamaría Aguirre & Leucona López, 2017; UNESCO 1997). Although I use the term artisanal in the rest of the thesis, I will use the term

craft in this chapter, to be clear when I am talking generally about these types of products, reserving artisanal for the category of artisanal mezcal that I will describe in section 4.1.

TABLE 2.1 TERMS USED TO REFER TO PRODUCTS LINKED TO CULTURAL IDENTITY AND TERRITORY.

Concept	Authors
Cultural commodities	Rausch, 2005
Typical products	Arfini & Mora, 1998 Marescotti, 2003
Artisanal products	Kupiec & Revell, 1998
Craft food & beverage products	Williams, Atwal, & Bryson, 2020
Traditional foods	Bessière 1998; Amilien 1999; de Roest and Menghi 2000
Regional speciality products	Tregear et al. 1998; Ilbery & Kneafsey, 2000

Craft products are distinct from other things produced locally because of their associated value creation process. Values that are highlighted include the place and culture of origin, traditional production tools and techniques, and other elements that denote authenticity, uniqueness, specialty and originality (Harvey, 2002; Hull, 2016). Research has demonstrated that craft products can contribute to the development of producer communities by creating new employment opportunities, enhancing skills of community members, contributing to environmental sustainability, promoting the production of healthy food and revitalizing community vibrancy (Table 2.2). Such findings have supported rural development policies that focus on place and territory (Barca et al., 2012; Bentley & Pugalis, 2014; Celata & Coletti, 2014; Hildreth & Bailey 2014; Horlings 2018; Pugalis & Bentley, 2014; Van der Ploeg et al., 2008). The diversity of local contexts provides a way to differentiate products and the design of context-specific solutions for each place by building upon the agency and resources of each community (Vasta et al., 2019). This local potential activates rural development through the revalorization of rural resources and is particularly evident in the burgeoning field of scholarship and practice of gastronomy tourism (De Jong et al., 2018; Rinaldi, 2017).

TABLE 2.2 BENEFITS THAT CRAFT PRODUCTS BRING TO LOCAL COMMUNITIES.

Benefits for local communities	Authors
New employment opportunities	Ventura & Milone, 2000; Tregear, 2001
Skill enhancement	Tregear, 2001
Community vibrancy	Ray, 1998; Tregear, 2003
Environmental sustainability	Vasta et al., 2019
Healthy food production	Nygård & Storstad, 1998

However, critics highlight the risks and challenges local producers face when interacting with global markets and value chains as value is often captured by more powerful actors. McMichael (2013), for example, points to the lack of control local producers have over the global networks that create value for their craft products in faraway markets, which can create dependency relationships between themselves and those consuming their products (Hudson & Hudson, 2003). Goodman & Goodman (2009) warn that the mainstreaming of quality foods through globalized alternative food networks (eg. ethical, organic or fair-trade) is often viewed as a development possibility for producers in developing regions; however, the outcomes can be marginalization, altered community social relations, unfair competition and inequality.

This research aims to improve our understanding of the challenges faced by rural and Indigenous small-scale farmers to benefit from craft products that enter national and global value chains. I do this through the case of mezcal, a spirit produced by rural and Indigenous communities in Mexico. Mezcal has been produced for many generations mainly by rural and Indigenous distillers in key producing regions, such as Oaxaca, Mexico. Long perceived as a drink only consumed in rural areas, Mezcal's popularity is growing in international markets and its value has been built upon images of craft production, Oaxacan landscapes, tradition, and culture. However, as the mezcal market grew, the value chain became more complex, now consisting of many diverse actors and organizations in Mexico and global distilled beverage value chains. By analyzing the main actors, institutions and narratives involved in the value construction of craft products and how this reflects the situation in the production sites, I aim to have a better understanding on the degree to which Indigenous producers are taking part in this value production process and the barriers they face in the value chain to capture more value and meet their development goals.

The paper is divided into 6 sections. The next section presents a review of the theories framing this research. The Study Site and Methods section sets the context of the case through an overview of San Juan del Río, Oaxaca, Mexico followed by the methodology before turning to the results of research. I end the paper with a discussion linking the case study to broader conceptual currents related to craft products along with some concluding reflections.

2.2 Theoretical influences

In this paper, I draw upon three ideas from the broad field of commodity studies I found useful in thinking about the narratives created for craft products as a way to understand the challenges faced by many rural producers in obtaining benefits from their cultural products entering into national and global markets. My theoretical influences have similar roots to that of Osterhoudt et al's (2020; p. 1) "chains of meaning" although I develop my own lens for the work in this paper for craft products. The first idea I discuss briefly is that of commodity scholars who linked production through exchange to consumption and noted the importance of paying attention to how values are created in different contexts of consumption (Appadurai, 1986; Cook, 2004; Munn, 1977; Kopytoff, 1986). Next, I turn to those scholars who developed the concept they call 'manufacturing meaning' within the processes of marketing food and beverage products that create narratives and shape the meaning consumers attach to a specific product (Jackson et al., 2010; p. 169). Finally, I draw upon 'commodity fetishism', a term with a central place in the history of commodity studies, and currently utilized to examine the claims made by product narratives in relation to the actual conditions of production (Spagnuolo, 2021).

Consumption of Cultural Products. As noted in the introduction, craft products are often cultural things which have, or had, use and/or symbolic value within specific cultural contexts. I find Appadurai's (1986) work useful in pointing out that some cultural things will have characteristics that create the potential for them to move out of cultural contexts in which they are useful, or carry symbolic meaning, and into contexts in which they become exchanged and consumed as commodities. In each context, there are institutions and criteria that can be symbolic, classificatory, and moral that influence exchange and consumption and people who

create and enforce the rules and criteria. What this means for my work is the need to pay attention to what the rules are, and who is creating the rules, as craft products move from the context in which they are produced to those sites in which they are exchanged and consumed. While it is often taken for granted that cultural things have cultural values associated with the people who produce them, what the work of Appadurai (1986) and others (Cook, 2004; Munn, 1986; Kopytoff, 1986) pointed out is that as the thing moves people will create new and diverse cultural values relevant to people at sites of consumption. This points out that I need to pay attention to how the meaning of cultural things is generated for consumption even if the cultural values associated with its place of production are used to create meanings for consumers far away from the originating context.

Manufacturing Meaning. Marketing creates symbols to increase the value of a thing beyond its use, by creating an exchange value through the selective choosing of images, which in some cases include the producers and conditions of production. The goal is surplus value created at the point of consumption, which unequally benefits those who control the exchange of the value to consumers (Hernández, 2013). By using messages, images and symbols, companies create value around an object and at the same time, by creating and registering a trademark, they protect that value (Hull, 2016). This is the process of 'manufacturing meaning', defined as "*the process whereby food producers are not simply manufacturing a product […] but they are also simultaneously attempting to manipulate the meanings which consumers attach to that product*." (Jackson et al., 2010; p. 169). According to Freidberg (2003), in a market context where food is increasingly attached to a narrative, the process of *manufacturing meaning* has a direct economic impact. In the case of craft products, much of what makes them valuable is linked to its place and culture of origin; therefore, their value is created from culture, locality, tradition, collective memories, history of a particular place and a group of people (Harvey, 2002), a series of socially determined attributes that define the product — through processes of mediation and classification — and reflect not only cultural values but also relationships of power (Callon et al., 2002). The concept of manufacturing meaning allows us to analyze the narratives that drive the creation of value around craft products in global markets. However,

narratives can also distort the lived experience of those who are part of the production process, one dimension of a well-known concept, commodity fetishism, from Marxist literature.

Commodity Fetishism. The concept of commodity fetishism has a central place in social theory to draw attention to how long-distance trade and marketing can veil the conditions of the producers of a commodity from the final consumers. In their work on fair trade coffee in Chiapas, Mexico, Hudson & Hudson (2003) demonstrate that fair trade can produce better work conditions for Indigenous coffee producers as well as positive environmental outcomes for their territories. However, they point out that even behind fair trade labels there can be local struggles over the conditions of production. Long-distance trade helps to hide many social, economic, or environmental issues caused by the production and trade of a commodity; in this way, consumers remain unaffected and most of the times unaware of these issues (Hudson & Hudson, 2003).

The value of the commodity can become linked to its symbolic value of consumption at a site and no longer an accurate representation of its production. It is in this way that marketing constructs the meaning by which a commodity can become a fetish as its value has become uncoupled from the underlying conditions of its production. This concept reminds us to pay attention to the narratives created for marketing as they are manufactured for consumption and not, necessarily, to tell the story of those who produce the commodity, or perhaps more cynically, to veil such stories from consumers.

Theoretical lens. The theories and concepts presented in this section help us to frame this study on the commoditization of mezcal and the barriers to capture benefits for rural development. I trace the pathways of craft commodities as they move out of one context, local consumption, and exchange with other Indigenous communities, into a new one of global exchange and consumption. I trace the new institutions that have been developed to regulate the exchange of mezcal beyond its regional home, the role of narratives to manufacture meaning for distant consumers, how these reflect the situation in production sites and the action undertaken by rural and Indigenous producers to influence both the emerging regulatory institutions and the narratives. I now turn from the theoretical lens which frames my research to a description of the site at which my case was undertaken and the methods utilized.

2.3 Study site and methods

2.3.1 Study site

Located approximately 551 km from Mexico City, San Juan del Río is a Zapotec Indigenous community in the Southern state of Oaxaca, Mexico (16°51’ and 16°57’ North Latitude; and, 96°05’ and 96°14’ West Longitude) (Figure 2.1). The community, located at an altitude from 1,000 to 2,600 meters, governs an area of 6,948 hectares as a communal Indigenous territory. Approximately 90% of the 1,372 inhabitants speak Zapotec (INEGI, 2020). San Juan del Río’s weather is hot, semi-arid and sub-humid with rain in the summer, temperatures ranging between 16 and 26 °C, and 600 to 1,000 mm of rain per year. San Juan del Río is located in a hilly terrain covered by Tropical Dry Forest and a few areas of Pine and Oak Forest at higher altitudes. Outside of favored riverside plots, its lands are mostly unsuitable for traditional maize agriculture, but appropriate for agave. In the most fertile land plots closer to the river, people plant corn in between the rows of agave during the rainy seasons of the first four years of agave’s life cycle.

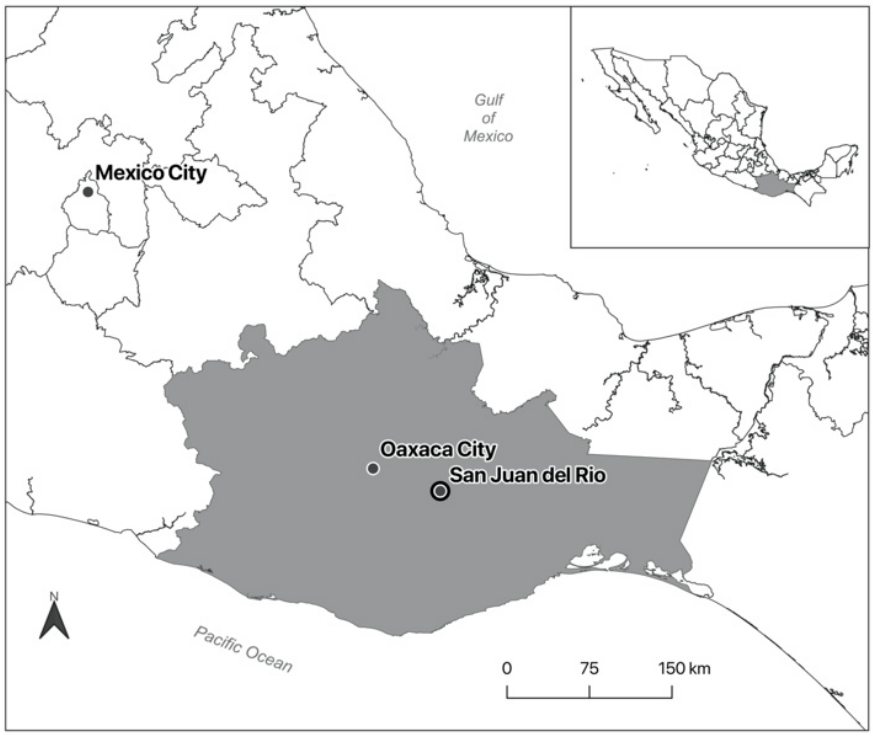

FIGURE 2.1 LOCATION OF STUDY SITE.
(CREATED BY M. LIRA WITH DATA FROM INEGI. MARCO GEOESTADÍSTICO. 2017).

San Juan del Río manages its lands and resources under a governance system based in commons institutions officially recognized by the Mexican government. These institutions are ruled by an assembly (*Asamblea de Comuneros*) which is comprised of community members over 18 years of age that hold possession rights for plots of land. These plots are held as individual usufruct; however, these rights can be withdrawn anytime if the assembly so decides. The community statute (*Estatuto Comunal*) guides community management of the resources (See Lira et al., 2022 for more details).

For several generations, San Juan del Río has been known as a mezcal and agave producer community. Almost all inhabitants are directly or indirectly involved with agave production and there are 25 stills owned by local families. Most cultivate agave *espadín* (*Agave angustifolia*) but wild species such as *tepextate* (*Agave marmorata*) or *jabalí* (*Agave convallis*) may be utilized. Production techniques have changed over time incorporating new technologies for a more efficient production; however, most of San Juan del Rio's mezcal is artisanal *joven*, baked in an underground oven, crushed with a *tahona* (a large stone wheel) pulled by a horse, fermented in wooden vats and distilled in copper stills.

2.3.2 Methods

This research began with a review of secondary documents to summarize the history of mezcal and identify the most important events, actors and institutions involved in it becoming a global commodity. This was followed by semi-structured interviews with mezcal producers in San Juan and people in various urban centers who were important in developing the global market for mezcal. The following criteria guided the selection of the case study producer community: Indigenous community in Oaxaca with a common property governance system; members produce mezcal at the household level; have their own labels; and sell unlabelled mezcal to national and international markets. Through a scoping exercise, San Juan del Rio was selected and authorization for the research obtained from the communal authorities and ethics approval from the University of Manitoba (Appendix 9). This research was part of a larger project during which Lira Ledesma undertook participant observation and semi-structured interviews during a seven-month period (October 2018–April 2019) while living in the community.

Using a snowball sampling technique, 19 informants were selected: 3 authority members (males between 55 and 64 years old) and 16 agave and mezcal producers. The interviews with authorities covered topics about the rules regarding community resources (land, wild agaves, water, and firewood); sanctions; local values and perceptions about resources needed to produce mezcal; and community institutions. 16 producers were interviewed: 10 agave and mezcal producers (owners of a still) and 6 agave producers[4] (14 male and 2 females; 10 producers between 55 and 64 years old and 6 between 25 and 54 years old). Interviews covered agave and mezcal production processes; market demands; meanings and values attached to mezcal; rules regarding community resources; conflicts; and entrepreneurship of community members.

Representatives of five mezcal brands were identified by community producers and interviewed. These brands purchase unlabelled mezcal produced by community members that own and operate their own stills. Four of these sell in North America, Europe and Asia while the other brand is expected to be distributed in Germany at a small scale. These interviews focused on: how the company started; market evolution; volumes of production; value chain; relationship with suppliers; sustainability; and customer profiles. The interviews took place in Oaxaca and Mexico City from January to June 2019. Other actors involved in the mezcal value chain were identified through internet searches and a snowball sampling method. Seven of them agreed to be interviewed in Oaxaca City and Mexico City from January to June 2019. Five of them were mezcal consultants, one was a member of a non-profit organization focused on mezcal, and one was the owner of a mezcal bar in Mexico City. These interviews covered topics about the value of mezcal over time, markets, consumers in urban areas, consumer perceptions of mezcal production and sustainability. In addition, three value chain actors, identified through internet searches, were interviewed in Toronto[5] from June 11th to June 15th, 2019. One was a Mexican consultant residing in Toronto who focuses on mezcal distribution in Canada while the other two were bar owners that sell mezcal as one of their main products. These interviews

[4] San Juan del Río has a total of 25 mezcal producers who consistently operate their own still. The number of agave producers is difficult to define because most of the community members do this activity or are starting to get involved with it either as a main or side activity.

[5] I choose the case of Toronto because it is a growing market which is not highly influenced by the Mexican immigration as it is the case of cities in the USA.

focused on the mezcal market in Canada, consumers in Toronto, perceptions about mezcal and sustainability of mezcal production. Furthermore, data on mezcal marketing was gathered through internet searches and participant observation in retail stores, restaurants and bars in Oaxaca, Mexico City and Toronto.

Data were recorded using field notes, photographs, and website screenshots. All the interviews were audio recorded, transcribed and coded using the software NVIVO 11 (QSR International, 1999). Descriptive codes were developed for themes identified previously through the literature and probed through research questions. During analysis interpretive codes that emerged as patterns were identified and associations made between key research themes (Bernard, 2011). This process allowed the data to be organized as key themes discussed below in the research results.

2.4 Results

Mezcal is widely known and consumed in Mexican markets while its popularity continues to grow in international beverage markets. Several actors and institutions are part of the commodity context that influenced the policies and construction of value that allowed the commoditization of this spirit. My results section gives an overview of the mezcal popularization process, the consumers, and the narratives involved in Mexican and global markets. I link these to the experience of Mezcal producers through my case of San Juan del Rio Oaxaca. By doing so, I was able to show how the commodity context construct value for a product resulting in value chains, which have varying benefits for, and impacts on, an Indigenous producer community.

2.4.1 Mezcal becoming a commodity

This section aims to provide an overview of the main actors, institutions, policies and events that participated in the commoditization process of mezcal as it shifted contexts of consumption through national and global value chains. Figure 2.2 displays these events in the form of a timeline and each event is described in the text below.

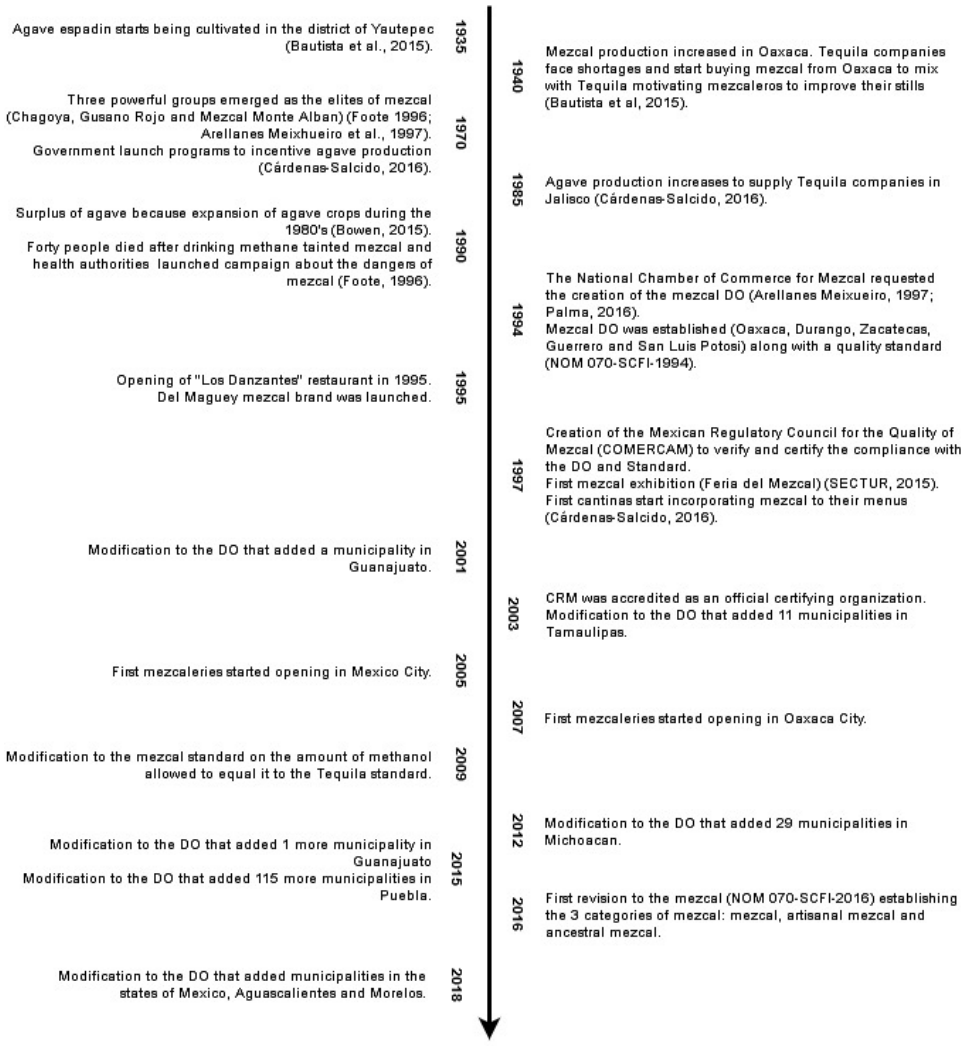

FIGURE 2.2 TIMELINE SHOWING RELEVANT EVENTS IN THE COMMODITIZATION OF MEZCAL.

The distillation of agave spirits in Mexico has a long tradition, which likely originated in Western Mexico, in the Colima volcanoes region; however, there is no agreement among scholars on whether the distillation technique was practiced by Indigenous Peoples before the arrival of Spanish colonial settlers or was brought by them (Bowen, 2015). The origins of the word 'Mezcal' are the Nahuatl words *metl* (agave) and *ixcalli* (cooked) and it refers to a practice traditionally used in rural and Indigenous communities throughout Mexico to produce agave-based beverages (Domínguez Arista, 2021). The mezcal production process and its tools and techniques have modified overtime and diversified according to the biophysical and cultural context of each site of production leading to the wide diversity of mezcal types that now exist.

In Oaxaca — the state with the largest mezcal production in Mexico —, agave started being cultivated in 1935, when indigenous farmers in Yautepec district started planting *Agave espadín*; before that, all the mezcal was made with the wild agaves collected by mezcal producers (Bautista et al., 2015).

Tequila was the first agave spirit that gained international popularity, which resulted in significant demand for this product. While data is not available prior to 1995, an idea of the of the total production of Tequila can be seen through its growth from 104 millions of liters in 1995 to 527 millions of liters in 2021 (CRT, 2022). As a result, when tequila companies of Jalisco faced shortages of the blue agave used for its production, they started purchasing mezcal from Oaxaca producers. The mezcal was used to mix with tequila to meet the growing demand (Bowen, 2015). This had a knock-on effect of creating demand for mezcal, which led to it being bottled and distributed at a small scale in Oaxaca and other parts of Mexico (Bautista et al., 2015). During this early period of mezcal in the 1970's, 3 powerful groups emerged as the elites of mezcal: Chagoya, Gusano Rojo and Mezcal Monte Alban (Foote; 1996; Arellanes Meixhueiro, 1997). At the same time, the Oaxaca government launched programs to incentivize agave production in the 1970's and by 1985 Oaxacan producers started supplying agave to Jalisco (Cárdenas-Salcido et al., 2016). Despite these changes, the popularity of mezcal was not by any means like the popularity of Tequila at this time.

Most of Oaxacan rural and Indigenous distillers, during the 1970's and 1980's, continued producing mezcal at a small-scale to sell locally or neighboring communities to which they would travel. For example, Mrs. Leonor's late husband harvested agave and produced 20 liters of mezcal to sell locally in San Juan del Rio, Oaxaca during this period of time. Sometimes, he also travelled to other communities in the Sierra Norte region to sell his product. This was the case for many other mezcal producers in San Juan del Río as well.

> *"My husband would travel to San Francisco Cajonos or Yalalag where people bought his mezcal […] His trip would last 3 to 4 days; one day to get to San Francisco Cajonos, the next day he would go to Yalalag, and after that he took one entire day to come back. He had to go by mule or walking, we had no cars and there were no roads back then"* (Leonor Solis, San Juan del Río. Nov 26th, 2018).

Producers often worked on their own, or sometimes with the help from family members, to do every step of the production process, from planting and harvesting the agave in the fields, to selling small batches of mezcal (20 to 40L). It was a cycle in which producers worked in their agave fields for a few months, then they would take it to the *Palenque* (still) to bake, crush, ferment and distill, a process that would take more than a month.

> *"…they used to plant and harvest here… and this harvested agave was transported to the Palenque, where it was distilled and everything else. One person was doing all the steps of the production chain. They would produce the mezcal and go to sell it to neighbouring villages or people from those villages would come here to buy. Then, they would harvest again… I mean, they were 100% focused on the maguey [agave] and mezcal production. There were months when they focused on planting, other months they harvested, one month or 15 days they distilled, one week or fifteen days they were focused on selling the mezcal. Everything was done by one person*" (Israel Mendez, San Juan del Río. March 10th, 2019).

Until the early 2000's, mezcal was a drink known and consumed mostly in rural areas of producing regions of Mexico, such as Oaxaca. It was consumed by peasants after long days of work or during community celebrations, weddings, baptisms, and other festivities. Mezcal had a strong cultural value in rural and Indigenous communities as part of their identity and daily life. In urban areas, mezcal was unknown or perceived as a low-quality drink, which was very strong in flavour and associated with rural people (García-Barrón et al. 2017). People preferred trendy, non-local drinks, such as whiskey, vodka and eventually tequila, when it started gaining popularity in the 1990's.

During the last 20 years, things have changed dramatically for mezcal producers. The growth of the mezcal industry is evident by the official data presented by CRM (2020), which shows a production of 7,145,039 liters in 2019, an increase of 700% since 2011 when the production was 980,000 liters. Among the three categories, artisanal mezcal represents the 92% of the total mezcal produced, while mezcal was 7% and ancestral only 1% (CRM, 2018). In Mrs. Leonor's family, her grandson, Rodolfo, is now in charge of mezcal production and he supplies to different brands, some of them for export; a similar experience for many other

families in the community. Over the last two decades, producers have seen a growing interest in their product among national and international consumers. However, mezcal popularization did not start in producer communities. Mezcal started gaining value among urban elites in North America and Europe, and this is what drove the popularization of mezcal at a larger scale. Although it is impossible to define one single event, site, or group of actors responsible for the popularization of mezcal, there were a few contributing in different ways and almost simultaneously to create the appropriate policies, institutions (Mezcal Regulatory Council, Mezcal Official Norm and Denomination of Origin), narratives and networks to allow the emergence of a new commodity.

In an effort to add value to traditional ingredients, recipes and elements of traditional Mexican cuisine, entrepreneurs and chefs included tequila and mezcal in the menus of new restaurants. These restaurants focused on the flavours and the aesthetics of Mexican culture and attracted customers of higher economic status as well as tourists. The opening of the restaurant "Los Danzantes", in 1995 in Mexico City, was one of the key moments for mezcal because this was one of the first mainstream businesses to offer it to the public. To find a good quality mezcal, the owners explored the mezcal region in Oaxaca until they found the Antonio family in San Juan del Río, which started sporadically supplying them small batches (around 20L) of mezcal. In the beginning, Mexico City costumers were hesitant to drink it and the restaurant started offering it as free samples. At first, they would only try 'reposado' (aged in barrels) mezcal because they associated the aging process with the quality of the drink, as it happens with other spirits and wines. However, producers clarified that the aging process does not increase the quality of mezcal, they recommended drinking '*joven*' (non-aged) mezcal. Gradually, people grew to like it and the demand increased to the point that 'Los Danzantes' launched 2 mezcal brands supplied by their own still in Matatlán, Oaxaca. They also continued to offer mezcal made by producers from different Indigenous communities, including their first suppliers, the Antonio family in San Juan del Río.

> *"Nobody wanted mezcal. Actually, people would get annoyed if they were offered or served complimentary mezcal. They did not sell mezcal back then, they offered it to the customers for free to promote it and people would get offended. There was a very negative image*

around mezcal, it was considered a low category beverage for people that were not able to afford other drinks. In Mexico, Tequila was starting to gain popularity and people preferred Brandy, Cognac or Whiskey. People had no idea where these drinks came from, but these were considered the finest alcoholic beverages. Therefore, it took a lot of time and effort until people understood a bit more about mezcal and where it came from. In the beginning, people did not want mezcal 'joven', they started with the 'reposado' and that is the only way people agreed to try mezcal." (Karina Abad, Grupo Los Danzantes, Matatlan, Oax., April 17th, 2019.)

Also, in the mid 1990's, 'Del Maguey' brand was launched by an American artist who became passionate about mezcal during his trips to rural communities in Oaxaca. He started the brand so his friends back in the USA could more easily access and try the drink. He explored several producer communities and chose producers with whom to collaborate. As a result, he became a key actor in the popularization of mezcal in the United States and other international markets.

"Ron decided to launch his brand with 2 partners in Teotitlán del Valle [Oaxaca] and he started at a small scale in 1995 with one producer from San Baltazar Chichicapan, one producer in San Luis del Rio and one producer in Santo Domingo Albarradas, Santa Catarina de Minas and Santa Maria Albarradas. With producers from 5 different communities, Ron wanted to share this drink with his American friends, but he realized how difficult it was to export the drink from Mexico to the USA. He started with the procedure to export mezcal and it was a slow process […]. When he first took mezcal to the USA, chefs and people working in the restaurants did not know what it was, even though these were mostly Latin Americans. But Ron found the right friends in several food and wine events, and they started to show mezcal, its flavor and the relationship with the agave species and production techniques. This is how things started, he started with mezcal made with espadin agave and then, he was the first one to export mezcal made with wild agave, tobala." (Del Maguey PR representative, Oaxaca City, May 9th, 2019).

However, mezcal plunged into a crisis when, in 1990, 40 people died from drinking methane tainted mezcal in Morelos. As a result, health authorities launched campaigns to warn people about the dangers of mezcal consumption (Foote, 1996) and the Nacional Chamber of

Commerce for Mezcal was created. The later to advocate for regulations to ensure quality standards that would allow for its distribution in national and international markets (Arellanes Meixueiro et al., 1997). This organization was formed by mezcal bottlers and members of the largest mezcal producer families — such as Pedro Mercade Pons and Jorge Chagoya — from Oaxaca, Zacatecas, San Luis Potosi, Durango and Guerrero (Bowen, 2015). In 1994, the chamber, presided by Jorge Chagoya requested the DO (Denomination of Origin) for mezcal (Palma et al., 2016).

In November 11th, 1994, the DO for mezcal was established along with a Standard (NOM–070 SCFI-1994). The Standard specifies the rules for the production and distribution process while the DO indicates that production should be restricted to the states of Oaxaca, Guerrero, Durango, San Luis Potosi, and Zacatecas. In 1997, a third-party organization was assigned as the Mexican Regulatory Council for Mezcal Quality (COMERCAM A.C.), which later changed its name to Mezcal Regulatory Council (CRM A.C.). The Standard also delineates the physicochemical specifications that mezcal must meet and the rules for bottling and labeling for national and international markets (Bowen, 2015; Hernández, 2018).

From the beginning, the Mezcal DO was controversial as it excluded several parts of Mexico where mezcal has been traditionally produced for several generations. The areas included in the region were selected based on the interests of the people involved in the National Chamber of Commerce for Mezcal at the time (Bowen, 2015). This led to a series of revisions and modifications to the DO region in the following years. Groups of small producers, rural organizations, associations, academics, promotors, companies, and some government actors outside the DO region were pushing for the extension of this region; on the other hand, certified producers, the CRM, mezcal companies and distributors were strongly opposed to this extension (Domínguez Arista, 2021). Furthermore, the Standard was criticized for being too general and homogenized production techniques and resources used to produce mezcal. This was considered to threaten the existing diversity of mezcal types and their linkages to the territories of production (Bowen, 2015). Defenders of the Standard argued that it was necessary to guarantee the quality of mezcal and to make producers competitive in national and international markets. However, critics pointed out that it was a copy of the Tequila

Standard, which favoured industrialization and protected the interests of the powerful elites involved in its creation. The Tequila Standard, as a result, neglected rural and Indigenous producers and the concern was that this type of Standard for Mezcal would lead to the loss of the biocultural diversity and associated production processes for Mezcal (Bowen, 2015).

These debates led to a series of modifications with the result that new municipalities were added to the DO region and the Standard was modified. In 2001, the DO was revised to add Guanajuato (1 municipality), followed by Tamaulipas (11 municipalities) in 2003 and Michoacán (29 municipalities) in 2012. Since 2018, there has been a legal battle over its extension to Aguascalientes, Morelos, and the State of Mexico. However, producers from Oaxaca, supported by the CRM, protested this change arguing a lack of relevant historic evidence of mezcal production in those areas. The controversy around the Standard led to a major revision in 2016 (NOM-070-SCFI-2016), which required the participation of many producers and stakeholders. This revision specified 3 mezcal categories regarding the production techniques used: ancestral, artisanal and mezcal. To be labeled as ancestral, mezcal must be made with agave baked in an in-ground oven; fermented in stone, wood, leather, or clay; crushed with a mallet or a *tahona* (stone wheel pulled by a horse); and distilled in a clay pot. Artisanal mezcal allows the previously mentioned tools, but it permits the use of agave shredders in the crushing process and copper or stainless-steel stills for the distillation. The mezcal category allows all the previously mentioned tools plus autoclaves for baking, industrial crushers, diffusers, stainless-steel tanks for fermentation and column stills. The definition of these categories, along with the banning of industrial technologies (such as the use of diffusers and column stills) for the ancestral and artisanal categories, made this revision significantly different from the previous version, but created tension with the industrial producers (Bowen, 2015).

Despite these revisions, critics still argue that the Standard is directed towards homogenization of mezcal diversity and mass production by pressuring rural and Indigenous producers to modify their production methods to increase their efficiency, which threatens the diversity of production processes. Non-profit organizations argue that the Standard failed to include the role of mezcal producers, their traditional knowledge and expertise as distillers,

allowing anybody with the capital to become a mezcal producer if their product meets the Standard technical requirements:

> *"The greatest issue is that many brands have technified the whole process, neglecting the role of the 'maestro mezcalero' [traditional mezcal distiller], replacing him by a chemist but selling the product as 'artisanal' […] Therefore, we have started a discussion on who can be an artisanal producer. An artisanal producer is the one that respects the historical taste of mezcal, 40 to 55 degrees (% alcohol volume). If you reduce that percentage below 40, that is not artisanal mezcal, because you are not respecting how mezcal is produced and consumed in the communities […]. The bottles that the final consumer receive even include the signatures of 'maestros mezcaleros' and it turns out that the 'maestro mezcalero' is in reality a chemist who calls himself 'maestro mezcalero. That is like what happened to 'maestros tequileros', which are nowadays chemists, and it is not like it used to be in the past when a producer acquired their traditional knowledge from previous generations."* (Luis Nogales, CEMMEZ, A.C., Oaxaca City, March 26th, 2019).

In urban areas, the popularization of mezcal was strongly linked to the opening of specialized mezcal bars. The story of La Botica, the first specialized mezcal bar in Mexico City, which opened in 2005, showed that the interest around mezcal was associated with its production (producers, site, ecosystems, agave species, techniques). La Botica used storytelling, during tastings, as a way to inform consumers about the production of mezcal. This strategy created a huge interest among consumers who quickly disseminated stories about their good experiences with mezcal at this bar, which helped to popularize La Botica in a very short period of time, motivating the opening of more branches throughout Mexico City.

> *"We decided to sell only mezcal and beer […]. That is how we started the first mezcal bar. We started selling Cutberto's [La Botica's mezcal supplier from Oaxaca] mezcales by doing a tasting that we called The Route through Oaxaca. We offered a sip of each one of Cutberto's mezcales and I explained […] the whole story that producers in Oaxaca tell you. For example, why one particular mezcal was called "minero", coming from Santa Catarina de Minas, or the story behind the 'pechuga' mezcal, for example. That is how I would explain the whole route […]. So, this Oaxaca Route storytelling started to be like a snowball*

> *effect among people because one person liked it and would bring two more friends, those two friends would bring more and more. Before I knew it, we had finished 200 or 250 liters of the first batch of mezcal that we bought from Cutberto in one week. This was unbelievable."* (Cesar, La Botica, Mexico City, June 8th 2019).

Furthermore, "La Botica" started sponsoring art events at Mexico City museums, which captured the attention of people involved with the art and Mexican entertainment scenes. This influenced the consumption patterns of people from diverse socio-economic backgrounds, interests, and occupations. Most consumers were attracted by the uniqueness of mezcal, its flavour, its artisanal production, and its relationship with rural and Indigenous cultures, characteristics that were difficult to find in mass produced beverages. Others followed the trend created by influential and hip urban elites. In this way, mezcal fitted perfectly with a new wave of urban consumers who opted for sustainable, and craft over industrial, mass-produced commodities. The success of mezcal bars such as La Botica, motivated the opening of similar businesses in other parts of Mexico. In Oaxaca City the first specialized mezcal bar opened in 2007 (Hernández-Diaz & Robson, 2019).

As mentioned above, other actors contributed to the popularization of mezcal in different ways. Writers like Ulises Torrentera; NGO's like Asociacion Pro Cultura del Mezcal A.C. or CEMMEZ A.C.; several new emerging brands of mezcal like Mezcal Ilegal or Los Amantes; mezcal consultants, and tourist guides who specialized in mezcal like Alvin Starkman. The popularization of mezcal led to a huge interest from different actors who became involved in the value chain and contributed to its growing complexity.

The legal, economic, and cultural moments presented above have changed the ways and production modes of producer communities. Mezcal has become an investment opportunity attracting national and international capital. While these changes have brought development opportunities for producers, there are also new challenges in terms of their precarious position in a complex value chain, challenges to the management of their natural resources, their shifting common institutions and considerations of how they should frame the narrative around mezcal.

2.4.2 Mezcal consumers

Since those early days mezcal consumers have diversified, now belonging to different age groups, socio-economic backgrounds, and occupations. Tourism and gastronomy entrepreneurs were among the first people interested in mezcal, looking for new and unique products and ingredients to bring back the authentic Mexican cuisine. At the time, this type of cuisine was not appreciated in Mexico, and it was unknown outside of Mexico. Businesses, such as bars, restaurants or tourist experiences rooted in authentic Mexican cuisine opened a new market niche. At the start, mezcal mostly attracted consumers 25 to 35 years old and who were interested in authentic, non-mass-produced commodities, linked to local, organic, and craft production. In Mexico, the interest of some of these consumers is linked to identity and the revalorization of traditional Mexican gastronomy. Others appreciated its flavor, as an object of national pride and identity, or because they wanted to follow the trends of hip urban neighborhoods and bars. Furthermore, having information about the distiller, the production site, the agave species used and the production process is seen to be important among consumers:

> *"Millennials like products that do not come from an assembly line, such as mezcal. Mezcal is not produced in an assembly line or a large industrial process, it comes from a small-scale producer from a small town in Oaxaca, which gives mezcal an added value among millennials. They are interested in organic, vegan or craft products and that is a very good match with mezcal. Mezcal is linked to somebody who is making it and I can even know the name of that person. Therefore, it is possible to link it with a person and with a community. We, the Millennials, grew up consuming mass production commodities; when I was very young, I remember there was not a good image behind craft products and people were looking to buy branded products in large stores. Now, things are reversing, we are looking to buy unique products, that are not coming from mass production processes."* (Luis Nogales, CEMMEZ, A.C., Oaxaca City., March 26th, 2019).

Many international consumers first discovered mezcal during their vacations to Mexico and later they found mezcal at bars, restaurants, or retail stores in their cities. Outside Mexico, chefs and bartenders also started to promote mezcal, incorporating the first export brands (e.g.

Del Maguey) into their menus, creating different cocktails, or opening Mexican themed businesses that offered mezcal as one of their main products.

> *"There are different types of people interested, but during the last years we have seen a growing interest among chefs and bartenders. It seems like they are looking for new products for their bars and mezcal is one of those products […] There is also a wave of Mexican restaurants opening all around the world that helped too. But mostly bartenders and spirit enthusiasts are the ones I have seen more interested…"* (La Mezcaloteca, Oaxaca City, April 11th, 2019).

Current international consumers have some similarities with consumers who first consumed mezcal in Mexico during the early 2000's. They are usually 25 to 35 years old, interested in trying new things, experienced it during travels in Mexico, heard about it from friends or social media, or had an opportunity to taste it. For those already with an affiliation for craft products, mezcal provided another type that was not found in most bars and liquor shops. However, markets are very different from one country to another. The high rates of migration and tourism between the USA and Mexico have contributed to the mezcal market growth in the USA. In other countries, like Canada, the process has been much slower, not only because there is less cultural exchange with Mexico but also because of alcohol import regulations.

> *"There's a good amount of local people interested, that never heard of it… but it's one of those things that… We created a bar that is… in Kensington Market… a unique place culturally, so we needed to make something that was going to be exciting for a lot of reasons, like cocktails for people or beer for some people… […]. You can't really base an entire business around mezcal, that would be very difficult especially here in Ontario. So, you got to make sure there's something there for everyone, but there was a good reception of interest and that has a lot to do with… when we opened there was a huge increase in popularity of mezcal and there still is obviously, but it's now become more understood what mezcal is all about. You start to see more and more people that are interested in it specifically beyond just the people from Mexico."* (El Rey Bar, Toronto, Canada, June 12th, 2019).

2.4.3 Mezcal narratives and disjunctures

The narrative that positioned mezcal in markets includes several elements that attracted, and continues to attract, consumers in different ways. my interviews suggest 5 global mezcal narratives that have circulated contributing to the popularization of mezcal. These narratives are presented in Table 2.3 along with disjunctures that are emerging from pressures on the value chains as mezcal has become more popular.

TABLE 2.3 NARRATIVES AROUND MEZCAL AND TRENDS IN THE MEZCAL VALUE CHAIN.

Global mezcal narratives	Value Chain Disjunctures
A non-mass-produced commodity	• Increase of production 700% since 2011 (CRM, 2020) • A few changes to production techniques to increase efficiency while still being considered craft • Most producers are focusing on artisanal mezcal made with agave espadín as it results in a higher volume of mezcal
A product that reflects biophysical and cultural aspects of the place of origin	• Standardization of techniques of mezcal production and inputs among different regions (artisanal production with agave espadín) • Policies that promote standardization
A product with unique and varied flavor	• Mezcal is described by many people as 'strong' or 'smoky' and flavor profiles are adjusted to the consumer's taste, diverging from traditional values. • Brands develop homogenous flavor profiles, at the expense of the variations that build value around the product
A local product delivering sustainability and social justice	• Driving Land Use/Land Cover change • Risk of depleting wild agave populations • The involvement of more external actors into the artisanal production of mezcal is pushing rural and Indigenous producers towards disadvantageous positions in the value-chain • Producers overwork themselves and their family members to meet the high demands of markets • Low profits and no recognition for producers (end of the value chain)

We expand on Table 2.3 below to show the work being done by actors within the mezcal value chain to create narratives of value for consumers while at the same time veiling any emergent disjunctures.

2.4.3.1 A non-mass-produced commodity

This narrative draws upon consumer desires for craft production associated with authenticity and quality as an alternative to mass produced commodities. In places like Jalisco, or Oaxaca, traditional tequila and mezcal stills have become popular tourist attractions. Tourist guides offer experiences, which include the process of making mezcal, through a tasting of the

products. For example, the agave 'pineapples' piled up and ready to be baked or the *tahona* mill that consists of a grindstone pulled by a horse crushing the baked agave (Figure 2.3). Mezcal brands, as a way to remind people of their experiences after they return home, include these narratives constructed through text and photos in their marketing for tourists and urban consumers.

FIGURE 2.3 TAHONA MILL IN A SAN JUAN DEL RIO STILL. PHOTOGRAPH BY LIRA.

While this is a narrative that is in global circulation, the popularity of mezcal has at the same time increased demand, gradually transforming the scale of production toward more industrialized and efficient processes. Although ancestral mezcal production processes preserve more traditional production techniques, it only represents 1% of the total mezcal production (CRM, 2018). Artisanal, on the other hand, accounts for over 90% of total mezcal produced for commercial markets (CRM, 2020). This includes not only rural and Indigenous producers but also mezcal brands that are owned and managed by actors external to the producer communities who supply them with the unbottled mezcal or raw materials to produce it.

Artisanal mezcal producers regularly look for innovations to optimize the production process; for example, building larger stills with more vats to ferment a larger volume of agave at the same time, having more stills, or hiring more labour. Some producers started using gas

instead of firewood to distill, others are using a shredder machine to help crush the mezcal and some of them envision using a motor instead of a horse to pull the *tahona*. Furthermore, agave *espadín* is widely used because of its high sugar content which produces more mezcal than other agave species and agricultural practices are becoming more intensive. This has resulted in an increase in the use of herbicides and pesticides while the planting of agaves in straight, uphill lines on steep slopes has resulted in soil erosion. The Standard for artisanal mezcal does not include any rule against the use of gas ovens or motorized tahonas, and it allows the use of shredders for the crushing process. Furthermore, the Standard does not specify any limits to the number of fermentation vats or the total volume of mezcal produced.

2.4.3.2 A product that reflects biophysical and cultural aspects of its place of origin

Another common mezcal narrative focuses on the unique qualities of mezcal resulting from the agave species used, characteristics of the production site and the production techniques (i.e., terroir). The available resources in each producer community, its topography and climatic conditions have shaped how mezcal is made, what agave species is used, where the water comes from, and the speed of the fermentation process. All these elements influence the resulting flavor; therefore, mezcal from different regions develop unique characteristics.

> *"…the threshold between something good and something memorable or something great, I think lies within the concept of regional specificity and capturing a place […] So, let's say in Guerrero or in Durango where you'll find the tanneries, and lots of leather production, you find fermentation happening in the skins of the hides and for me this is a big portion of what makes that style of mezcal, it pays reference to terroir, this place, and these traditions. For me, a good or great mezcal that captures that identity. So, there is a place and a time that you associate with it…"* (El Rey Bar, June 12th, 2019, Toronto, Canada).

Uniqueness rests in an uneasy tension with the emerging certification standards, growing demand and production efficiency. These factors create pressure on mezcal produced in rural communities. Similar to the small-scale production narrative, this narrative reflects the production processes of the ancestral mezcal category defined by the DO; however, artisanal mezcal is the category with the largest production of mezcal (CRM, 2018). To be able to meet

the demand and the requirements of the standard, along with the tight deadlines and high volumes that external brands demand, rural and Indigenous producers — who are the suppliers of unbottled mezcal for these brands — are forced to modify their traditional production methods. This is gradually causing the standardization of mezcal production and putting at risk the diversity of inputs, techniques, tools, traditions and flavours that reflect natural and cultural aspects of mezcal production sites. Although the awareness of mezcal diversity is growing among certain consumers, mostly in Mexico, there is still a tendency to produce the most efficient type of mezcal, which is artisanal *joven mezcal* made with Agave *espadín*. Non-profit organizations worry that mezcal will follow a similar path as tequila; production processes become semi-industrial or industrial while it is marketed as a craft or traditional spirit. They suggest that this is starting to occur.

2.4.3.3 Flavor

The narrative around mezcal flavor is based on the diversity of inputs and production techniques, a result of the biophysical and cultural diversity of the producer region, reflected in the diversity of flavours of mezcal. Most consumers, particularly international consumers, cannot access a diversity of mezcal types and have only tasted the most common type made with agave *espadín*; however, the growing markets are allowing more consumers to have access to a variety of mezcals. Those consumers more interested in spirits are now able to taste, distinguish and appreciate the flavors among different types of mezcal; furthermore, they can link it to different agave species and production techniques.

The standardization of production tools, techniques and inputs also puts at risk the diversity of flavours. As mentioned above, this diversity is a result of the biocultural particularities of each production region. However, the availability of wild agaves, the intense labor required by craft production and the production cycles of some types of mezcal make it difficult for large scales of production to meet current market demands while protecting small-scale production techniques. Given the regulations, certification processes, and the intense competition in global markets, local producers are pressured to follow a model of industrial efficiency which in this case is the production of *joven* artisanal mezcal made with *Agave espadin*, leaving behind other types of mezcal made with different agave species and other

techniques. Joven artisanal mezcal made with Agave espadín is the type of mezcal with efficient production, yet can still capture the value of the artisanal label. Therefore, not only rural and Indigenous producers are following the trend and shifting to produce this type of mezcal, but also more and more actors — investors and brands owned by actors external to the producing communities — are getting involved in this type of production. This trend has repercussions on the flavour diversity and quality of mezcal. Furthermore, the DO, the official norm and certification process, are not designed to protect the existing range of mezcal diversity and only reduce it to the three categories of mezcal mentioned above, neglecting the value of traditional techniques and agave species associated to specific types of flavor.

2.4.3.4 Sustainability

Images of small-scale production, craft techniques and the involvement of rural and Indigenous producers have also associated mezcal production with a narrative of sustainability. As mentioned above, marketing campaigns usually feature images of agaves, in the crushing process in the *tahona*, or a pile of agave pineapples ready to be baked in the oven. Some of the brands even mention sustainable production practices and environmental side projects to benefit the community such as reforestation, or recycling by using the residual materials from mezcal production to fabricate different objects such as construction materials (made with the agave waste pulp). However, these narratives hide some of the challenges for producing communities trying to produce mezcal at a cost that does not exceed the price paid at the production end of the global value chains.

In San Juan del Río, community authorities are concerned about the rapid expansion of agave *espadín* crops and the associated agricultural practices that depend upon the frequent use of pesticides and the planting of agave in vertical lines that go uphill on steep slopes. The community has been trying to make use of its commons' institutions (See Lira et al., 2022) to mediate the relationship between the growing mezcal markets and the community stills to ensure a sustainable use of the community resources.

> *"Back in the day, we used to plant 500 or 1000 agaves. The rich people would plant 2000 or 3000 and they were still able to weed with a shovel. Now, with this whole mezcal boom, people are going crazy. They start to slash and burn their land plots at a larger scale and*

then it is not going to be possible to weed them out with the shovel. People fall into the trap of using herbicides to weed their plots. The authorities are worried about this" (President of the Commissioner of Communal Resources, November 11th, 2018; cited in Lira et al., 2022).

Although their mezcal is mostly made with agave *espadín*, authorities are concerned about the future of wild agave species. They fear that San Juan del Río will follow the path of other communities, where wild agaves were depleted in response to a growing external demand. However, the community regulations do not include a formal rule about wild agaves and authorities are limited to give recommendations to community members about sustainable extraction.

"We do not want to lose our wild magueys. There are communities where they started cutting them non-stop and they never planted any. Now, these wild agaves are extinct in those areas. We do not want that to happen in our community." (President of the Commissioner of Communal Resources, November 11th, 2018).

2.4.3.5 Social justice

The images of rural and Indigenous mezcal producers are often used as part of marketing campaigns for mezcal brands, often associating them with a narrative of a fair relationship in the value chain. Some of these brands claim a long-term, fair relationship with their local suppliers. However, my data shows that several producers have experienced unfair deals and limited benefits for them despite the intense labor, knowledge and skills that they invest to produce mezcal. Most mezcal producers in San Juan del Río supply unbranded mezcal for intermediaries or brands that bottle and distribute it to national and international markets. Nevertheless, producers' position in the value chain is very disadvantageous, not only because of the minimum benefits they receive, also they get little or no credit for producing a commodity that is being appreciated in different parts of Mexico and the world.

"…we produce mezcal but we do not receive the credit we deserve. They [brands] register our mezcal for spirits competitions and if they win, the brand and the owners of the brand get the prize and the credit for the mezcal, but nobody knows about us, the producers who

made that mezcal and made possible for the brand to win that prize. That happened with one of our clients, he entered into a contest with our mezcal and the mezcal from another producer from this community. Our mezcal won the third place and the mezcal from the other producer won the second place but we did not get any recognition or any credit." (José Rodolfo López, San Juan del Río, Oaxaca. October 4th, 2018).

2.4.4 Communities and mezcal value construction

Despite the central role of local producers in the global narratives of mezcal, as unbranded mezcal suppliers, their ability to influence how they are represented is limited. Sometimes their names, pictures or signatures are part of the branding, but they have little or no control on how these are included in the brand name, logo, images, slogan, website, promotional videos, posters, or booklets. In some cases, these elements are completely unrelated to the producer communities, the producers, or the production process. Rather, they are utilized by brand owners in a way that they think will link their brand to the global narratives that represent consumer desires about mezcal. In other cases, brands do not include any reference to a specific community or producer in their promotional materials. In either case, the goal is not to recognize producers, or producer communities, but rather to turn their characteristics into memes that link a brand to global narratives circulating amongst consumers.

In response to their disadvantageous position in the value chain, producers in San Juan del Río have opted to add value to their product by organizing groups for collective production. This has included the creation of a collective mezcal brand, and the creation of individual or family-owned brands. Through these initiatives, producers expect to have more benefits from participating in a global value chain. However, they have also experienced new challenges linked to marketing, use of new technologies, communication in other languages, and public relationships (President of the Commissioner of Communal Resources, November 11th, 2018; Efrain Nolasco, November 27th, 2018). While most producers master the craft production of mezcal, they lack skills and experience in marketing their products through new technologies, communicating in different languages and networking to access to new clients.

However, this has started to change as their children, some of whom have higher levels of education, have also become comfortable in using social media and other digital technologies.

Along with the ability to speak English, these new skills allow them to network nationally and internationally. According to the older mezcal producers, the involvement of the younger generations will be a key element for the success of their mezcal brands in global markets. Producers are confident that launching their own brands will upgrade their position in the value chain and will give them more control on the branding and the representation of their community, resources, and traditions.

The first mezcal brands in San Juan del Rio were created by Efrain Nolasco, born and raised in the community but who later migrated to the United States searching for a better life. After several years working in construction and landscaping jobs in the USA, Mr. Nolasco returned to the community in the early 2000's to start producing and selling mezcal. He had become familiar with the rules and regulations to certify, bottle and export mezcal to the USA. He obtained organic certification by the USDA and launched two brands: "Benesin" and "San Juan del Río". Mr. Nolasco travels several times per year between Oaxaca and California promoting his mezcal in different liquor events in the USA. Although he does not produce at a large scale and while he focuses on organic mezcal, his brands have received awards in different mezcal competitions and it has been featured by international media, such as the New York Times (Asimov, 2010).

Furthermore, there have been initiatives to establish a collective brand that allows mezcal producers in the community to produce sufficient mezcal for national and international markets and to reduce their individual vulnerability in these value chains. One group, "Los Sanjuaneros", has 10 members and was formed in 2017 to increase their volume of production, to create a collective brand, and to have control of mezcal production, bottling, distribution and marketing. In marketing, for example, they collectively selected a name and oversaw the logo design, advertising campaigns, and distribution.

FIGURE 2.4 PAAR LHIÍ MEZCAL.
PHOTOGRAPH BY LIRA.

The name of the collective brand is "Paar Lhii" (in Zapotec means "for you"), and according to producers, is a way for them to bring a taste of San Juan del Río to the world. The logo (Figure 2.4) shows a hand offering a "jícara" (container made with a dried fruit of the *Crescencia cajete* tree) with mezcal, surrounded by different drawings representing natural and cultural elements of the community's daily life. The media channels associated with Paar Lhii feature images of group members working in the stills, San Juan del Río's landscapes, agaves and production tools. Their Facebook page states:

> *"For several generations, San Juan del Río has been known as a mezcal producer community. From the agave planting to the mezcal distillation, San Juan del Río producers work every day to make a high quality mezcal with unique flavor and aroma. Most producers work for other brands that export large volumes of mezcal but from 2017 we decided to be more than only suppliers and we put all our work and effort to create Paar Lhii, which means 'for you' in Zapotec. We are an association of more than 10 experienced master distillers who joined forces to put the best of San Juan del Río in this bottle of*

artisanal mezcal. We invite you to try a glass of 'Paar Lhii', a spirit that is made close to the river" (https://www.facebook.com/Paar-Lhi%C3%AD-Mezcal-artesanal-427166617763127).

Along with changing their position in the value chain by establishing their own brands for export, part of the goal, as can be seen in the use of a Zapotec name and the story of the Paar Lhii, is to create brand narratives that they feel is representative of their product and their story. Another example of this is the "La Perla del Rio" brand launched in 2019 by Rogelio Juan and his family from San Juan del Río. This brand is the result of much time, money and effort invested in the branding and bureaucratic procedures. The name "La Perla del Rio" (The pearl from the river) refers to the bubbles, called "pearls", formed in the mezcal surface when it is agitated which, according to the producers, indicate its alcohol content. The brand name also refers to the river "San Juan" which runs through the village and is the main source of water for the fermentation and the distillation of mezcal; furthermore, it is a very important element in the everyday lives and the identity of the community.

FIGURE 2.5 LA PERLA DEL RIO MEZCAL. PHOTOGRAPH BY LIRA.

Likewise, their logo (Figure 2.5) represents the 'pearls' in the mezcal which according to the producers, have been traditionally used to measure the quality of mezcal for several generations:

> *"…the name of our mezcal makes reference to the pearls or bubbles that are created by shaking the drink, which, according to our ancestors it is synonymous with an excellent quality Mezcal."* (www.laperladelrio.com)

The logo also pictures the river and the "*quiote*" that grows from the agave plant when it is ready to reproduce. During the spring, it is very common to see "quiotes" with big yellow flowers all over the community, also used to make bread and church decorations for the Holy Week. "La Perla del Rio" website highlights San Juan del Río lands and how, according to producers, these have the ideal conditions to grow high quality agave that give a particular flavour to their mezcal. In the Facebook and Instagram pages of "La Perla del Rio", there are videos featuring Mr. Juan, his son and other collaborators working in the fields, the still or promoting their brand in different events.

San Juan del Rio brands are building their image through a series of symbolic elements highlighting the expertise and long tradition of mezcal producers; their community natural resources as high quality inputs, their identity not only as Indigenous Zapotecs, but particularly as members of the community of San Juan del Río. These symbols are represented in different ways in their brand names, logos, labels, websites, social media and other marketing materials. What comes out clearly from their efforts is that they are creating and controlling how they are represented through their own brands and marketing.

2.5 Discussion

Craft products rooted in cultural contexts can provide opportunities for Indigenous producers but as I discussed in the introduction, and as shown through my results, this is an outcome that requires vigilance. As I discuss in this section, to assume craft products somehow naturally support rural development can deny the voice of the producers of craft products and often distort their role in value chains and the conditions under which they are pressured to produce them. I now return to my theoretical lens to organize the discussion before returning to

highlight the actions taken by Indigenous producers to try and obtain an equitable share of benefits, a voice in the marketing of their products, and some ideas on the type of institutions needed to support their actions.

Globalizing Mezcal. Mezcal, a cultural product from the traditional gastronomy of several rural and Indigenous communities, has become a commodity now marketed at a global scale. Framed by a DO and a Standard first designed by large bottlers and powerful and influential mezcal groups, this process of value construction started in urban areas by these powerful groups, plus entrepreneurs, chefs, mezcal promotors, artists, writers and policy makers. To realize the value from these efforts they targeted their narratives to a group of consumers looking for authenticity and a particular aesthetic attached to mezcal. The cultural approach of Appadurai (1986) directed my attention to the actors and institutions that facilitated the movement of mezcal from a local cultural product to a globalized commodity. This process, as noted in section 4.1 above, facilitated new contexts of exchange and consumption through the construction of new policies and institutions that regulated its production and movement into new value chains. This was not initiated by the Indigenous producers but rather a group of entrepreneurs, NGO's, mezcal promotors and artists whose power allowed them to shape both the production of mezcal and the new contexts for its exchange and consumption. As Bowen (2015) points out, the mezcal DO, the Standard established in 1994 (NOM-070-SCFI-1994), and the creation of the Mezcal Regulatory Council (CRM) followed the model of Tequila. They were designed to protect the interests of powerful groups, promote industrialization, and eliminate small mezcal producers from the supply chain. Bowen (2015) and Hernandez (2018) also emphasize that policies, such as the mezcal DO and the 1994 standard, encouraged the standardization of production techniques.

Emerging and on-going tensions of globalizing mezcal. While Indigenous producers in San Juan participated in these values chains, as they often lacked the capital to establish stills and/or access to national and international markets, they soon realized that they were not receiving an equitable share of the benefits. They began to push back against these powerful actors and institutions resulting in a sustained debate between industrial and traditional mezcal promoters who brought the voices of producers and other stakeholders to the debate. They were

successful in the creation of a revised mezcal Standard (NOM-070-SCFI-2016), which was an attempt to create spaces for small and medium sized rural producers under the new categories of ancestral and artisanal mezcal. This tension has been noted for other cultural products. Osterhoudt et al. (2020:8) draw upon Tsing's (2005) work to characterize this as the friction that emerges when cultural products move into processes of globalization with unpredictable results. In the case of mezcal, the rural and Indigenous producers and other stakeholders involved in the debate, redefined the regulatory framework of mezcal. The result was the creation of three categories to classify and label the mezcal in an attempt to highlight and add value to the different ways that traditional mezcal can be made. Nevertheless, this research shows that there is still a power imbalance in the new contexts established for the production and exchange of mezcal. Small-scale and Indigenous producers have limited voice in the making of policy and representation on the boards of the regulatory institutions, which gives little opportunity for them to include mechanisms that stimulate and support their participation in the mezcal value chain, mitigate their vulnerabilities and capture more value.

As discussed in section 4.3, and with further commentary below, the narratives created to stimulate the national and global exchange and consumption of mezcal were rooted in the qualities of craft products from small-scale, often Indigenous producers. This new artisanal category drew upon the global value of some urban consumers for authentic craft products. This quickly drew the attention of powerful investors and large producers who became interested in the production of *joven* artisanal mezcal made from *espadín* agave. They began to partner with the rural and Indigenous producers, whose involvement has become as suppliers of unbottled mezcal that meet the production techniques outlined in the Standard for artisanal production. The action of powerful actors in other craft beverage sectors, like craft beer, has seen a similar tension emerge as the market grew and larger, more powerful actors began to coopt the term for their own purposes (Mathias et al. 2020). The challenge for smaller actors in such value chains, as demonstrated by craft breweries, is to establish a regulatory institution by which they can control the criteria of the categories utilized (Morgan et al. 2020). While an on-going friction for craft breweries, this has not yet emerged as an option for small mezcal producers in Mexico.

Manufacturing meanings of mezcal through narratives. In addition to agricultural, technical, and economic dimensions of mezcal becoming a commodity, manufacturing meaning (Jackson et al., 2010) through the creation of narratives were critical to its movement to national and global sites of consumption. The commoditization process of mezcal involved narratives that portray it as a non-mass-produced commodity; a product that reflects biophysical and cultural aspects of the place where it was made; a product associated with Mexican culture, particularly with Oaxacan culture; a spirit with a unique flavor; a commodity that is produced following sustainability and social justice practices. In line with Michael (2015), the case of mezcal shows that, beyond its physical qualities, the spirit was, for some consumers, an experience rooted in the aesthetics and authenticity of an Indigenous craft product.

This resonates with the tequila commoditization process (Hernández, 2013), which also involved cultural industries in charge of producing an aesthetic ideology consisting of symbols with no use value but with the potential to give exchange value to the drink where it is consumed. What is unique to mezcal is that through the creation of three categories as part of the revised Standard for production (NOM-070-SCFI-2016), the Standard itself became part of the process of manufacturing meaning for consumption. While rural and Indigenous producers wanted their techniques of production reflected in the revised Standard, what they did not predict was the use of the artisanal category by the more powerful actors in the national and international value chains. This category, with all of the cultural meanings associated with mezcal produced by rural and Indigenous producers (quality, small-scale production, traditional techniques, sustainability, and social justice) was something powerful actors (investors, promotors, distributors, large producers) could use to stimulate these values held by consumers. Without a strong voice for policy making and significant representation on the boards of regulatory institutions, rural and Indigenous producers find it challenging to ensure the category of artisanal mezcal benefits them and the development goals of their communities.

Fetishization of mezcal through narratives. While narratives were utilized to facilitate the movement of mezcal into new contexts of exchange and consumption, at the same time they have also tended to hide the vulnerabilities of small-scale rural and Indigenous producers. This

is a process well known in the literature and reported by many authors for cultural products, fair trade products, and organic products amongst others (Goodman et al., 2012; Osterhoudt et al. 2020; van der Ploeg et al. 2000; Ventura & Milone 2000). San Juan mezcal producers, like many other rural and Indigenous producers, face exclusion (Barrientos & Gereffi, 2011), unequal distribution of value along the value-chain, debt, dependency, and a loss of the capacity for diversified farming and self-sufficiency (McMichael, 2013). Mezcal narratives have led to an increase in demand, and as mentioned, the addition of new powerful actors to the value chain, which has pushed Indigenous producers towards a production and distribution model that creates a disjuncture between its production from the narratives of consumption. What is clear from my work, and supporting the point made by Osterhoudt et al. (2020), is that the purpose of these narratives is to facilitate exchange and consumption rather than to necessarily benefit producers, even when the images and stories of rural and Indigenous producers are the source for the narratives. By curating these stories for the consumer, the value is created at sites of exchange and consumption in spite of the overexploitation of community resources, local labor, and low prices to meet the growing demand of global markets. While these types of development schemes have increasingly been promoted as a means to rural development, the outcome, in the case of mezcal, is rural and Indigenous producers performing low-value activities at the end of the value-chain.

The narratives being created also obscures the trend to homogenize traditional production techniques to improve efficiency. By reducing the wide diversity of mezcal types to only three categories, and given the growing demand and competition in global markets, rural and Indigenous producers seem forced to fit into one category, which is often artisanal *joven* mezcal produced from agave *espadín*. In the case of global markets, long distance trade, the narratives used to market (Hudson & Hudson, 2003) and the labeling of mezcal as 'artisanal', helps to hide these issues, especially from customers overseas who only have access to the information found in websites, promotional materials and the product itself. The challenges Indigenous producers face in supplying mezcal for national and global value chains, the loss of mezcal diversity and the impacts to local resources are veiled from the consumer by mezcal narratives indicating that commodity fetishism has crept into the value chains of craft products.

This points to a need, as noted by Rinalidi (2017) and De Jong et al. (2018), for more critical research on craft products and the challenges local producers face when capturing value from global markets.

Small-scale producer strategies. Interacting with global mezcal markets was a new experience for rural and Indigenous producers; however, their early experiences in the value chains constructed by outside actors have led them to search for new relationships. They expressed the importance of mezcal value chains that provided them with the ability to meet their own community development goals while maintaining a level of autonomy for themselves and their communities. By upgrading their position in the value chain, through the creation of their own collective and family-owned brands of mezcal, local producers hope to gain more benefits and autonomy from new value chains. However, equally important is their involvement in the creative processes to market their brands and share the meanings and values that they attach to mezcal. Through symbolic elements contained in the name of their brands, their logos, labels, website, social media and other promotional materials, producers communicate their strong relationship with their lands and resources, their identity as Indigenous Zapotecs, and members of the San Juan del Río community with a long tradition and expertise in the production of mezcal.

While a higher position in the value chain promises more autonomy, creative control, and self-representation for Indigenous producers, it is still uncertain how their family brands will perform over time in national and global value chains, especially given the power imbalance embedded in the policies and institutions of mezcal production, marketing, and trade. As noted for other cases of Indigenous enterprises by Berkes & Davidson-Hunt (2010), collective initiatives in San Juan del Rio mezcal production may help overcome these challenges and reduce vulnerabilities while engaging in global markets. However, new self-determined policies and collective institutions are needed that can empower rural and Indigenous producers to govern value chains for cultural products that give rise to craft products (Vasta et al. 2019).

2.6 Concluding reflection

Craft products have become desired by consumers and a favoured strategy of rural development policies and programmes as they resonate with contemporary urban values, which creates surplus value that can contribute to local socioeconomic development (Ventura & Milone, 2000; Tregear, 2001) and sustainability (Vasta et al., 2019). In the case of mezcal, interactions between markets and Indigenous producers show it may be more complex than these proposals suggest. The low representation and influence that rural and Indigenous producers have had within the institutions that regulate mezcal production and distribution, have limited their ability to participate in the creation of the narratives that give value to the spirit; moreover, this has also reduced producers' and producer communities' capacities to capture value from the global exchange of mezcal and meet their development goals. High levels of vulnerability can create dependency relationships and low profits can make value chain upgrading difficult and result in pressure on a community's natural resources and institutions, the modification and standardization of traditional production techniques, and the underpaid or unpaid labor of family members and workers. While the narratives and categorizations that have been attributed to traditional mezcal often aim to create value from its unique qualities and open spaces for medium and small-scale producers, these have also contributed to hide the challenging situation happening in production sites. This suggests a need for critical attention to craft products and in the case of Indigenous producers, innovative policies and collective institutions that are self-determined and governed. In the case of mezcal, governmental and non-governmental (certification) structures need to take specific policy efforts with more representation and input from rural and Indigenous producers to set the mechanisms that allow them to capture more value to advance their development goals. For example, by including the figure of the traditional distillers and the mezcal diversity in the Standard and DO. This would provide more support for Indigenous mezcal producers to represent themselves in national and global value chains and address their concerns of land use change, homogenization of mezcal diversity, unsustainable agricultural practices and diminishing wild agave populations. This could allow them to withdraw from disadvantageous

supply agreements with external companies that push them toward more efficient but often unsustainable production practices in return for minimal benefits.

2.7 References

Amilien, V. (1999). *Is grandmother's cuisine traditional food? A concept definition in tourism research.* 8th Nordic symposium in hospitality and tourism research, Alta, Norway, 18–21 November.

Appadurai, A. (1986). *The social life of things: Commodities in cultural perspective*. Cambridge: Cambridge University Press.

Arellanes Meixueiro, A., Henestrosa, A., Franchini, C., De Aguinaco, J. P., Pepping, A. (1997). *Mezcal: elixir de larga vida*. Mexico City: CVS Publicaciones.

Arfini, F., & Mora, C. (Eds.). (1998). *Typical and traditional products: Rural effect and agro-industrial problems*. Proceedings of the 52nd Seminar of the European Association of Agricultural Economists Parma, Italy.

Asimov, E. (2010, August 16) Mezcal, Tequila's Smoky, Spicy Cousin. *The New York Times.* https://www.nytimes.com/2010/08/18/dining/reviews/18wine.html

Barca, F., Mccann, P., & Rodríguez-Pose, A. (2012). The case for regional development intervention: Place-based versus place-neutral approaches. *Journal of Regional Science*, 52(1), 134–152.

Barrientos, S., & Gereffi, G. (2011). Economic and social upgrading in global production networks: A new paradigm for a changing world. *International Labour Review*, 150(3–4), 319–340.

Bautista, J. A., Ramírez Juárez, J., and Smith, M. (2015). Origen, Auge, y Crisis de la Industria del Mezcal en Oaxaca. In Vera Cortés, J. L. (Ed.). *Aguas de las Verdes Matas: Tequila y Mezcal* (pp. 107–121). Mexico City: Artes de México.

Bell, D., & Valentine, G. (1997). *Consuming geographies: We are where we eat*. London: Routledge.

Bentley, G., & Pugalis, L. (2014). Shifting paradigms: People-centred models, active regional development, space-blind policies and place-based approaches. Local Economy: The *Journal of the Local Economy Policy Unit*, 29(4–5), 283–294.

Berkes, F., & Davidson-Hunt, I. J. (2010). Innovating through commons use: community-based enterprises. *International Journal of Commons*, 4(1), 1–7.

Bernard, R. (2011). *Research methods in anthropology*. Lanham: Altamira Press.

Bessiere, J. (1998). Local development and heritage: Traditional food and cuisine as tourist attractions in rural areas. *Sociologia Ruralis*, 38(1), 21–34. https://doi.org/10.1111/1467-9523.00061

Bowen, S. (2015). *Divided Spirits: Tequila, Mezcal, and the Politics of Production.* Berkeley: University of California Press.

Callon, M., Méadel, C., & Rabeharisoa, V. (2002). The economy of qualities. *Economy and Society*, 31(2), 194–217. https://doi.org/10.1080/03085140220123126

Cárdenas-Salcido, E. (2016). ¡Ay, mezcal me volviste a dar! Experiencias hedonistas para el consumo de una bebida destilada del agave. In Worthen, H., Hernandez-Diaz, J., and Curiel, C. *El valor de las cosas*. Oaxaca: Universidad Autonoma Benito Juarez de Oaxaca, Instituto de Investigaciones Sociologicas, Juan Pablos Editor.

Celata, F., & Coletti, R. (2014). Place-based strategies or territorial cooperation? Regional development in transnational perspective in Italy. *Local Economy*, 29(4–5), 394–411.

Consejo Regulador del Mezcal (CRM) (2018). *Informe Estadístico*. Consejo Regulador del Mezcal, Oaxaca. http://www.crm.org.mx/PDF/ INF_ACTIVIDADES/INFORME2018.pdf

Consejo Regulador del Mezcal (CRM). (2020). *Informe Estadístico*. Oaxaca: Consejo Regulador del Mezcal, Oaxaca. http://www.crm.org.mx/PDF/ INF_ACTIVIDADES/INFORME2019.pdf

Consejo Regulador del Tequila (CRT) (2022). *Producción Total: Tequila y Tequila 100%*. https://www.crt.org.mx/EstadisticasCRTweb/ (Accessed 11 March 2022).

Cook, I. (2004). Follow the Thing: Papaya. *Antipode*, 36(4), 642–664.

De Jong, A., Palladino, M., Puig, R. G., Romeo, G., Fava, N., Cafiero, C., Skoglund, W., Varley, P., Marcianò, C., Laven, D., & Sjölander-Lindqvist, A. (2018). Gastronomy Tourism: An

Interdisciplinary Literature Review of Research Areas, Disciplines, and Dynamics. *Journal of Gastronomy and Tourism*, 3(2), 131–146.

De Roest, K., & Menghi, A. (2000). Reconsidering "traditional" food: The case of Parmigiano Reggiano cheese. *Sociologia Ruralis*, 40(4), 439–451.

Domínguez Arista, D. (2021). Construcción de Un Signo de Calidad: La Lucha por la Geografía de la Denominación de Origen Mezcal en México. Veredas, 41, 100-124.

Donner, M., Horlings, L., Fort, F., & Vellema, S. (2017). Place branding, embeddedness and endogenous rural development: Four European cases. *Place Branding and Public Diplomacy*, 13(4), 273–292.

Foote, W. F. (1996). The resurrection of Oaxacan Spirits. *ICWA Letters*, 31, 1-15. http://www.icwa.org/wp-content/uploads/2015/10/WF-11.pdf

Freidberg, S. (2003). Editorial Not all sweetness and light: New cultural geographies of food. *Social & Cultural Geography*, 4(1):3-6.

García-Barrón, S. E., Hernández, J. Gutiérrez-Salomón, A. L., Escalona-Buendía, H. B., and Villanueva-Rodriguez. S. (2017). Mezcal y Tequila: Análisis Conceptual de Dos Bebidas Típicas de México. Mezcal and Tequila: Conceptual Analysis of Two Typical Mexican Beverages. *RIVAR,* 4 (12): 138–62.

Gatrell, J., Reid, N., & Steiger, T. L. (2018). Branding spaces: Place, region, sustainability and the American craft beer industry. Applied Geography, 90, 360–370.

Giovanardi, M. (2015). A Multi-scalar Approach to Place Branding: The 150th Anniversary of Italian Unification in Turin. *European Planning Studies*, 23(3), 597–615. https://doi.org/10.1080/09654313.2013.879851

Goodman, D., DuPuis, E. M., & Goodman, M. K. (2012). *Alternative food networks: Knowledge, practice, and politics*. London, New York: Routledge.

Goodman, D. & Goodman, M. K. (2009). Alternative Food Networks. In Kitchin, R. & Thrift, N. (Eds.) *International Encyclopedia of Human Geography*. Amsterdam: Elsevier.

Harvey, D. (2002). The art of rent: globalization, monopoly and the commodification of culture. *Socialist Register*, 38, 93–110.

Hernández Díaz, J., & Robson, J. (2019). Population, territory, and governance in rural Oaxaca. In Robson, J.P., Klooster, D.J. & Hernández Díaz, J. (Eds.). *Communities surviving migration: Village governance, environment, and cultural survival in indigenous Mexico*. Oxon: Routledge Taylor & Francis Group.

Hernández, J. (2013). *Paisaje y creación de valor. La transformación de los paisajes culturales del agave y del tequila*. Zamora: El Colegio de Michoacán.

Hernández, J. (2018). El mezcal como patrimonio social: de indicaciones geográficas genéricas a denominaciones de origen regionales. *Em Questão*, 24(2), 404.

Hildreth, P., & Bailey, D. (2014). Place-based economic development strategy in England: Filling the missing space. *Local Economy*, 29(4–5), 363–377.

Horlings, L. G. (2018). Politics of Connectivity: The Relevance of Place-Based Approaches to Support Sustainable Development and the Governance of Nature and Landscape. In T. Marsden (Ed.), *The SAGE Handbook of Nature: Three Volume Set* (pp. 304–324). SAGE Publications Ltd. https://doi.org/10.4135/9781473983007.n17

Hudson, I., & Hudson, M. (2003). Removing the veil? Commodity fetishism, fair trade, and the environment. *Organization and Environment*, 16(4), 413–430.

Hull, G. (2016). Cultural Branding, Geographic Source Indicators and Commodification. *Theory, Culture & Society*, 33(2), 125–145.

Ilbery, B., & Kneafsey, M. (2000). Producer constructions of quality in regional speciality food production: A case study from south west England. *Journal of Rural Studies*, 16(2), 217–230.

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (2020). *Censo de población y vivienda 2020* [Database]. https://www.inegi.org.mx/programas/ccpv/2020/ (Accessed 25 March 2020).

Jackson, P., Ward, N. and Russell, P. (2010) Manufacturing meaning along the chicken supply chain: consumer anxiety and the spaces of production. In Goodman, M.K., Goodman, D and Redclift, M, (eds.) *Consuming Space: Placing Consumption in Perspective* (pp. 163-187). Aldershot: Ashgate.

Knickel, K., & Renting, H. (2000). Methodological and Conceptual Issues in the Study of Multifunctionality and Rural Development. *Sociologia Ruralis*, 40(4), 512–528.

Kopytoff, I. (1986). The cultural biography of things: commoditization as process. In A. Appadurai (Ed.), *The social life of things* (pp. 64–92). Cambridge: Cambridge University Press.

Kupiec, B., & Revell, B. (1998). Speciality and artisanal cheeses today: The product and the consumer. *British Food Journal*, 100(5), 236–243. https://doi.org/10.1108/00070709810221454

Lira, M. G., Robson, J. P., & Klooster, D. J. (2022). Commons, global markets and small-scale family enterprises: The case of mezcal production in Oaxaca, Mexico. *Agriculture and Human Values*. https://doi.org/10.1007/s10460-021-10293-z

Mak, A. H. N., Lumbers, M., & Eves, A. (2012). Globalisation and food consumption in tourism. *Annals of Tourism Research*, 39(1), 171–196. https://doi.org/10.1016/j.annals.2011.05.010

Marescotti, A. (2003). Typical products and rural development: Who benefits from PDO/PGI recognition? *83rd EAAE SEMINAR. Production, Demand and Public Policy Food Quality Products in the Advent of the 21st*, 1–17. www.arsia.regione.toscana.it

Mathias, B.D., Huyghe, A., Williams, D.W. (2020). Selling your soul to the devil? The importance of independent ownership to identify distinctiveness for oppositional categories. *Strategic Management Journal*, 41, 2548–2584. https://doi.org/10.1002/smj.3180

McMichael, P. (2013). Value chain Agriculture and Debt Relations: contradictory outcomes. *Third World Quarterly*, 34(4), 671–690.

Michael, J. (2015). Its really not hip to be a hipster: Negotiating trends and authenticity in the cultural field. *Journal of Consumer Culture*, 15(2), 163–182.

Montanari, A., & Staniscia, B. (2009). Culinary tourism as a tool for regional re-equilibrium. *European Planning Studies*, 17(10), 1463–1483. https://doi.org/10.1080/09654310903141656

Morgan, D.R., Lane, E.T., Styles, D. (2020). Crafty marketing: An evaluation of distinctive criteria for “craft” beer. *Food Reviews International*, 1–17. https://doi.org/10.1080/87559129.2020.1753207

Munn, N. D. (1986). *The fame of Gawa: A symbolic study of value transformation in a Massim (Papua New Guinea) society*. Cambridge: Cambridge University Press.

NORMA Oficial Mexicana NOM-070-SCFI-1994, Bebidas alcohólicas-Mezcal-Especificaciones.

NORMA Oficial Mexicana NOM-070-SCFI-2016, Bebidas alcohólicas-Mezcal-Especificaciones.

Nygard, B., & Storstad, O. (1998). De-globalization of food markets? Consumer perceptions of safe food: the case of Norway. *Sociologia Ruralis*, 38(1), 35–53.

Osterhoudt, S., Galvin, S. S., Graef, D.J., Saxena, K. A., and Dove, M.R. (2020). Chains of Meaning: Crops, commodities, and the ‘in-between’ spaces of trade. *World Development*, 135. https://doi.org/10.1016/j.worlddev.2020.105070

Palma, F., Pérez P., and Meza, V. (2016). *Diagnóstico de La Cadena de Valor Mezcal en las Regiones de Oaxaca*. COPLADE. http://www.coplade.oaxaca.gob.mx/wp-content/uploads/2017/04/Perfiles/AnexosPerfiles/6. CV MEZCAL.pdf.

Pike, A. (2011). Brands and Branding Geographies. Cheltenham, Northampton: Edward Elgar Publishing. https://doi.org/10.4337/9780857930842

Porter, M. E. (1990). *Competitive Advantage of Nations*. New York: Free Press.

Pugalis, L., & Bentley, G. (2014). (Re)appraising place-based economic development strategies. *Local Economy*, 29(4–5), 273–282.

QSR International. (1999). *NVivo data analysis software* [Computer software]. https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home

Rausch, A. S. (2005). Local Identity, Cultural Commodities, and Development in Rural Japan: The Potential as Viewed by Cultural Producers and Local Residents*. International Journal of Japanese Sociology*, 14, 122–137.

Ray, C. (1998). Culture, intellectual property and territorial rural development. *Sociologia Ruralis*, 38(1), 3–20.

Renting, H., Marsden, T. K., & Banks, J. (2003). Understanding Alternative Food Networks: Exploring the Role of Short Food Supply Chains in Rural Development. *Environment and Planning A: Economy and Space*, 35(3), 393–411.

Rinaldi, C. (2017). Food and Gastronomy for Sustainable Place Development: A Multidisciplinary Analysis of Different Theoretical Approaches. *Sustainability*, 9(10), 1748.

Santamaría Aguirre, J. L., & Lecuona López, M. (2017). Ecuadorian artisanal production and its future projection from the Cultural and Creative Industries perspective (CCI). *City, Culture and Society*, 10, 26–32. https://doi.org/10.1016/j.ccs.2017.05.002

Spagnuolo, D. (2021). Problematizing "ethical eating": the role of policy in an ethical food system. *Food, Culture & Society*. https://doi.org/10.1080/15528014.2021.1939960

Tregear, A. (2001). *Speciality Regional Foods in the UK: an Investigation from the Perspectives of Marketing and Social History* [Unpublished doctoral dissertation]. University of Newcastle.

Tregear, A. (2003). From Stilton to Vimto: Using Food History to Re-think Typical Products in *Rural Development*. 43(2).

Tregear, A., Kuznesof, S., & Moxey, A. (1998). Policy initiatives for regional foods: Some insights from consumer research. *Food Policy*, 23(5), 383–394.

Tsing, A. L. (2005). *Friction: An Ethnography of Global Connection*. Princeton: Princeton University Press. https://doi.org/10.2307/j.ctt7s1xk

United Nations Educational, Scientific and Cultural Organization (UNESCO). (1997). *International symposium on "crafts and the international Market: Trade and customs codification"*. United Nations, Manila. http://unesdoc.unesco.org.uml.idm.oclc.org/images/0011/001114/111488eo.pdf

van der Ploeg, J. D., Renting, H., Brunori, G., Knickel, K., Mannion, J., Marsden, T., de Roest, K., Sevilla-Guzman, E., & Ventura, F. (2000). Rural Development: From Practices and Policies towards Theory. *Sociologia Ruralis*, 40(4), 391–408.

van der Ploeg, J. D. (2008). *The New Peasantries: Struggles for Autonomy and Sustainability in an Era of Empire and Globalization*. London/Sterling: Routledge.

Vasta, A., Figueiredo, E., Valente, S., Vihinen, H., & Nieto-Romero, M. (2019). Place-based policies for sustainability and rural development: The case of a Portuguese village "spun" in traditional linen. *Social Sciences*, 8(10), 1-17. https://doi.org/10.3390/socsci8100289

Ventura, F., & Milone, P. (2000). Theory and practice of multi-product farms: Farm butcheries in Umbria. *Sociologia Ruralis*, 40(4), 452–465.

Viassone, M. & Grimmer, M. (2015). Ethical Food as a Differentiation Factor for Tourist Destinations: The Case of "Slow Food." *Journal of Investment and Management*, *4*(1), 1–9. https://doi.org/10.11648/j.jim.s.2015040101.11

Williams, A., Atwal, G. and Bryson, D. (2020). Developing a storytelling experience: the case of craft spirits distilleries in Chicago. *International Journal of Wine Business Research*, 32(4), 555–571. https://doi.org/10.1108/IJWBR-06-2019-0040

CHAPTER 3. Artisanal Products and Land-Use Land-Cover Change in Indigenous Communities: The Case of Mezcal Production in Oaxaca, Mexico[6]

Interconnections among chapters

Chapter 3 presents the LULC (land-use and land-cover) changes in the case study community from 1993 to 2019 and how during the period 2013–2019 it was linked to the growing demand of agave and mezcal. This is strongly linked to Chapter 2 which addresses the process of value creation that has led to this growing demand in national and international markets. Furthermore, this is linked to Chapter 4 that focuses on the pressures over community lands for the expansion of agave, the tensions that this has created in the community assembly, and how common institutions have responded to balance the production of agave and the protection of community lands.

ABSTRACT

Artisanal products are considered an alternative to industrial production; however, upon entering global commodity markets, pressures are placed on the territories and customary governance of producer communities. Through the lenses of land system science and telecouplings, this paper examines the links connecting global markets and artisanal products, using the case of mezcal production in an Indigenous community in Oaxaca, Mexico, and the resulting impacts to LULC dynamics and associated governance. Data were collected through document review, semi-structured interviews, and LULC analysis comparing the years 1993, 2001, 2013, and 2019. Agave crops expanded from 6 to 14% during 1993–2001, stabilized through 2001–2013, and expanded from 14 to 22% during 2013–2019. Market dynamics played a crucial role in the resultant LULC changes, with the biggest impact on tropical dry forest (TDF).

[6] A version of this chapter was published as: Lira et al., 2022. Artisanal products and land use land cover change in Indigenous communities: The case of mezcal production in Oaxaca. *Land* 11(3), 387. https://doi.org/10.3390/land11030387

The LULC results were coupled with tequila markets during the first two periods, while the third period was linked to new mezcal markets. My research shows how artisanal production can drive LULC changes. However, customary governance institutions can mediate the relationship between producers and markets to support more sustainable management of territorial resources, including TDF as an ecologically important but locally undervalued forest type.
Keywords: *Indigenous communities; Oaxaca; global markets; mezcal; agave; land-use land-cover*

3.1 Introduction

Land system science is an evolving field that has produced key methodological advances and numerous empirical observations related to LULC (land-use and land-cover) dynamics and patterns (Lambin et al., 2006; Turner et al., 2007; Verburg et al., 2015). It has made use of satellite imagery, land change modeling tools, and research on LULC change drivers to improve our understanding of land management and associated impacts on earth systems, land transition dynamics, and scenarios for future changes (Robinson et al., 2013). Advances in earth observation techniques and information technologies have enabled LULC changes to be monitored at multiple spatial and temporal scales (Terzi & Bolen, 2009; Hansen & DeFries, 2004; Boillat et al., 2017).

Gradually, the field has evolved to address not only localized land change processes but globally connected land systems impacted by rural economic changes, urbanization processes, and global demand (Boillat et al., 2017). This has included a focus on the systems, flows, causes, and effects linked to the global trade of agricultural commodities (Grau & Aide, 2008) and the idea of "telecouplings" (Liu et al., 2013) or the processes that connect distant places through the consumption of land-based trade commodities (Pendrill et al., 2019a). Recent work has brought to light the importance of understanding how global supply chains link consumption in one place to changes in LULC in another (Green et al., 2019). While early work on LULC change tended to focus on quantitative approaches to document change at particular sites, recent work has looked to integrate social and cultural dimensions and enhance understanding of

consumption-driven LULC outcomes in coupled human–environment systems (Turner et al., 2021).

While distant linkages connect value chain actors located in different parts of the world, they pose challenges to community-level land governance (Eakin et al., 2014; Sikor et al., 2013; Gasparri & Le Polain de Waroux, 2015). For example, industrial crops that form part of global value chains have become important drivers of LULC processes (DeFries et al. 2010). Remotely sensed data show how intensive mechanized processes to produce palm oil in Southeast Asia (Morton et al., 2006; Pendrill et al., 2019b; Persson et al., 2014) or soybean in South America (Persson et al., 2014; Browder et al., 2008; Le Polain de Waroux et al., 2016) have driven deforestation, biodiversity loss, and conflicts in traditional territories (Gasparri, 2016). Understanding how land tenure, land governance, and values may lead to different outcomes from telecoupling is one important way that land systems approaches make critical examinations of sustainability (Green et al., 2019; Turner et al., 2021; Meyfroidt et al., 2018). Recent work has built on the perspectives of actors in global value chains — from consumers to traders, certifiers, and producers — to develop programs that support the sustainable transformation of such chains (Carmenta et al., 2020).

However, while work on global commodities such as soybean and palm oil has been notable (Morton et al., 2006; Hansen et al., 2009; Persson et al., 2014; Browder et al., 2008; Le Polain de Waroux et al., 2016), the incorporation of artisanal products (Kupiec & Revell, 1998) into global markets has been far less of a focus in land system science. These products, as is the case with “Traditional foods” (Bessiere, 1998; Amilien, 1999), “regional specialty products” (Tregear et al., 1998; Ilbery & Kneafsey, 2000a; Ilbery & Knesfey, 2000b), “special quality” products (Murdoch et al., 2000; Verhaegen & Van Huylenbroeck, 2001), and “typical products” (Arfini & Mora, 1998), are sourced predominantly from rural and indigenous communities, and have emerged (in global markets) as a response to the dominant agro-industrial paradigm of food production. They offer an alternative to the intensified, standardized, and nutritionally engineered nature of functional foods (Wiskerke, 2009). Most are produced within small-scale systems and often associated with inherited traditional production techniques used to process local raw materials (Bessiere, 1998; Berard & Macáay, 1995; Bell & Valentine, 1997). Their value

lies in symbolism around rurality (Bessiere, 1998; Montanari & Stanicia, 2009), craftsmanship and (sense of) quality (Paloviita, 2010), and production and exchange values that offer alternatives to industrial schemes (Paloviita, 2010; Terrio, 1996). The commoditization of such products targets consumers who hold social and/or environmental concerns and want their purchases to contribute to the sustainability of producing communities (Nygard & Storstad, 1998). Subsequently, product branding is often based on place of production and ideals of authenticity (Dwyer & Jackson, 2003; Gatrell et al., 2018) and often supported by place-based policies that promote the revalorization of local resources, the revitalization of local economies, and sustainable rural development (Vasta et al., 2019).

Yet commoditization inevitably requires local producers to interact with global markets — markets that demand a level of production (supply) that may be incompatible with embedded traditional and craft systems. When incorporated into the dynamics of global markets, increased demand and rising prices may change the logic of production, with an impact on producer communities and their local commons (Jodha, 1985; Bollier & Hellfrich, 2014; Ostrom, 1990; Colchester, 1994; Lira et al., 2022). In such cases, while sustainability principles may be promoted and even become a part of product branding, production itself may not be environmentally and/or socially sustainable (Dwyier, 2018). When it comes to industrially produced agricultural commodities, the effects of commodity markets on land-use dynamics in tropical regions are well discussed in the literature (DeFries et al., 2010; Morton et al., 2006; Laurance, 2007; Barona et al., 2010; Pendrill et al., 2019b). For artisanal products, while the cultural, social, economic, and environmental sustainability dimensions have been evaluated (Moscatelli et al., 2017; Capone et al, 2016; Bilali et al, 2020; Bowen & Zapata, 2009), the LULC dynamics linked to associated production processes have rarely been addressed.

This is where the study presented here makes its contribution. I use the case of mezcal — a craft spirit produced in Mexico from multiple varieties of the agave plant, whose value chain began with inter-community trade and then stretched to include national and global value chains — to illustrate the telecoupling of artisanal production to global markets, the resultant LULC change, and how this creates intracommunity tensions that require mediation through communal values and institutions. I make use of remote sensing techniques to analyze the

impact that growing demand for mezcal is having on LULC dynamics in producer communities and qualitative methods to understand how on-the-ground events shape change in communally owned and managed landscapes. I next describe my study region and site, detail the recent history of mezcal production, and explain my research approach and methods. I then present the results of my LULC analysis, document review, and interviews in the field. My discussion builds on these empirical findings to offer a critical reflection around the LULC dynamics that are tied to emergent markets for mezcal as an artisanal product. I end with a brief conclusion.

3.2 Study Region, Study Site, Materials, and Methods

3.2.1 Study Region and Mezcal Sector

Oaxaca is a state in southern Mexico surrounded by the states of Guerrero (West), Puebla (Northwest), Veracruz (Northeast), and Chiapas (East). An estimated 90% of Mexico's mezcal is produced in Oaxaca (CRM, 2020) with most of that production concentrated in the so-called "mezcal region" that covers the districts of Yautepec, Santiago Matatlán, Tlacolula, Miahuatlán, Ejutla, Ocotlán, Solá de Vega, and Zimatlán (Palma et al., 2016). The "mezcal region" was defined in the official DO (Denomination of Origin) declaration in 1994 (DOF/IMPI, 1994) and seen as a way to boost the agave and mezcal industry, improve the livelihoods of producers, and increase competitiveness of mezcal in global markets (Vega Vera & Pérez Akaki, 2017). Most of this mezcal comes from cultivated Agave espadín (*A. angustifolia* with a life cycle of 4 to 8 years) (CRM, 2020), with some produced with wild agave species, such as Tepeztate (*A. marmorata*) (up to 25 years to maturation), Jabali (*A. convalis*) (up to 12 years for maturation), Arroqueño (*A. americano*) (up to 25 years for maturation), and Cuish (*A. karwinskii*) (12–15 years to maturation). The agave species harvested and production process in use vary according to place, the raw materials (inputs) available locally, and what traditional production techniques are favored. However, in general, the process involves 5 key steps: agave planting and harvesting; the baking of agave pineapples; the crushing of baked agave; fermentation; and distillation. Traditionally organized as a family-scale activity, production uses locally designed and made tools such as in-ground ovens, mallets, tahonas, clay-pot distillers, and wood fermentation containers.

Mezcal was long perceived as a drink consumed in traditional production areas. However, during the last two decades, its wider popularity has increased, to the point where it is currently consumed by national and international urban elites (Bowen, 2015). As a result, there is a growing demand not only for mezcal but also for agave as the main raw material used in its production. Over 47% of agave cultivation in Oaxaca's mezcal region is found in Tlacolula district, in Oaxaca's Central Valleys region, where TDF (tropical dry forest) is dominant (Gallardo-Cruz et al., 2017). More than half of the world's TDFs are in the neotropical Americas (Miles et al., 2006), with 38% of these forests in Mexico (Portillo-Quintero & Sánchez-Azofeifa, 2010), where they harbor 31% of the country's endemic vertebrate terrestrial species (Ceballos & García, 1995) and 50% of its endemic vascular plant species (Dirzo & Ceballos, 2010). TDF is home to species considered highly adaptable to low and seasonal water availability, an important attribute given future scenarios of climate change (Maass et al., 2005). TDF also provides important ecosystem services, from climate regulation to the maintenance of soil fertility and as habitat for pollinators for local agricultural crops (Maass et al., 2005). These forests are also a source of food, medicine, timber, and fuel for local communities. In recent decades, researchers have identified multiple threats to TDF (Janzen, 1988), with agriculture, livestock farming, and human infrastructure the most prevalent (Noojipady et al., 2017; González-M. et al., 2018).

3.2.2 Study Site

The community of San Juan del Río (hereafter referred to as "San Juan") is in the Central Valleys region of Oaxaca, southern Mexico (Figure 3.1). The community's territory covers 6948 hectares and is home to 1372 inhabitants (INEGI, 2020), of whom 90% are Indigenous Zapotec speakers (INEGI, 2020). Terrain is hilly (from 1000 to 2600 m.a.s.l.) and covered by TDF, with smaller areas of mixed pine-oak forest in the more elevated eastern zone (INEGI, 2013). The local climate is hot, semi-arid, and sub-humid, with most rain falling in the summer months. Due to the dry climate and hilly topography, San Juan's lands are mostly unsuitable for traditional rain-fed agriculture but appropriate for agave that is well adapted to such conditions. In the most fertile lands, adjacent to the river that runs through the community, people plant corn (often in between rows of agave).

The community holds title to its communal territory, officially recognized by the Mexican government. They collectively manage their lands and resources under a traditional governance system called Usos y Costumbres (Lira et al., 2022). Under this system, civic and communal governance is the responsibility of a commoners' assembly (Asamblea de Comuneros) made up of adult community members who hold rights to lands within the community. The assembly devises rules regarding territorial use and management, which are captured in a written statute (Estatuto Comunal) and enforced by two community-elected bodies: A Commissioner of Communal Resources (Comisariado de Bienes Comunales) and an Oversight Council (Consejo de Vigilancia). One of the Commissioner's most important tasks is to allocate land rights and resolve conflicts between community members. The Oversight Council monitors compliance of community rules, borders with neighboring communities, and the actions and decisions of the Commissioner. Every three years, the assembly democratically elects a new group of incumbents for these two bodies.

We selected San Juan as a case study community because it met several key criteria. It produces artisanal mezcal and is located within Oaxaca's so-called "mezcal region". It is an Indigenous community operating under a common property governance system, but most agave cultivation and mezcal production are organized at a household or family level. In Oaxaca, San Juan is known as an important mezcal-producing community, with most of its inhabitants directly or indirectly linked to the mezcal sector (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020). At least 25 stills in San Juan are owned by local families, who produce mezcal mainly from agave espadín (*A. angustifolia*) using methods classified as artisanal by the Mezcal Regulatory Council (Consejo Regulador de Mezcal). This requires the use of an underground oven for the baking process, tahona (a large stone wheel) pulled by a horse for the crushing process, wooden vats for the fermentation process, and cooper stills for distillation (NOM-070-SCFI-2016).

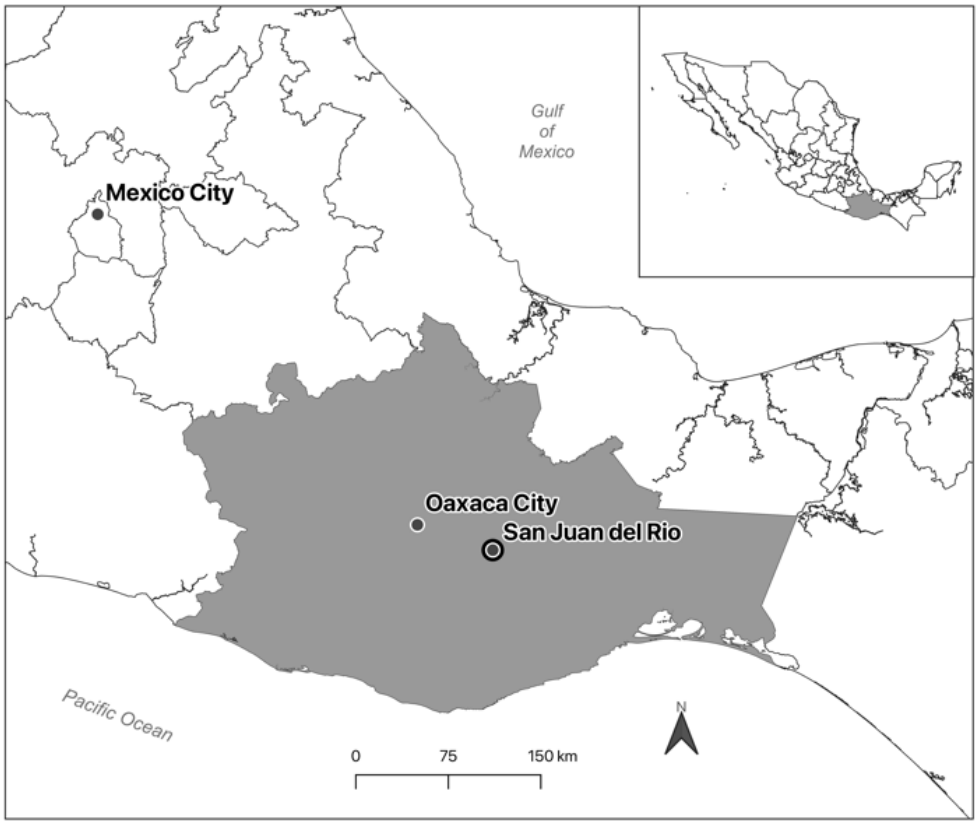

FIGURE 3.1 LOCATION OF SAN JUAN DEL RÍO, OAXACA.
(CREATED BY M. LIRA WITH DATA FROM INEGI. MARCO GEOESTADÍSTICO. 2017).

3.2.3 Methods

Authorization to conduct this research was obtained from community authorities in San Juan in September 2018, along with research ethics approval granted by the Ethics Board at the University of Manitoba (HS21856 (J2018:036)), Canada. Fieldwork and data collection included participatory interpretation of satellite imagery with community authorities to show the LULC dynamics in the San Juan territory, semi-structured interviews with community members to gather data on the key processes that drove these LULC dynamics, and a document review (focused on the San Juan del Río Community Statute, San Juan del Río Biocultural Protocol, and official norms) to gather information on important past events and regulations linked to the historical development of mezcal in the community. Below I provide further details on the first two data collection methods.

From October 2018 to April 2019, four LULC interpretation sessions (1.5 to 2 h) were conducted with representatives of San Juan's communal authorities. A total of 5 authority members (males between 45 and 64 years old) participated in session 1, 4 authority members (males between 55 and 64 years old) participated in session 2, 5 authority members (males between 45 and 64 years old) participated in session 3, and 6 authority members (males between 45 and 64 years old) participated in session 4. The materials used for these sessions were: 1 printed aerial photograph (union of 6 orto photographs 1:20,000) (INEGI, 1993) and 3 printed satellite images (USGS, 2001; 2013; 2019) showing San Juan Territory (Table 3.1) delineated by a boundary polygon (INEGI, 2017).

TABLE 3.1 SATELLITE IMAGES USED AND BAND COMBINATIONS.

Image	Date	Band Combination	Source
Landsat 7	2001	4,3,2	USGS
Landsat 8	2013	5,4,3	USGS
Landsat 8	2019	5,4,3	USGS

During the first session, participants defined 4 LULC categories: (1) pine/oak forest; (2) (low) tropical dry forest; (3) agave crops; (4) urban zone. Participants drew polygons on the INEGI Aerial Photograph (1993) and classified them in accordance with the previously mentioned categories. Following the same method, participants interpreted the 2001, 2013, and 2019 Landsat images during the second, third, and fourth sessions, respectively.

Using the participants' classification and own visual interpretation, LULC polygons of the INEGI aerial photograph (1993) were digitized — using the software QGIS 3.16 (qgis.org) — to create a LULC map for 1993. Visual interpretations were used to create the training points (file containing sample information about the spectral signatures contained in the image that will allow the classification) that allowed us to conduct a supervised classification using the Semi-Automatic Classification Plugin (SCP) version 7 for QGIS 3.16 (Congedo, 2021). The categories defined by the community representatives were the same categories used for this supervised classification. The accuracy assessment was calculated using the ArcGIS 10.8 (ESRI, 2020) software through accuracy points (Compute Confusion Matrix tool — ArcGIS Spatial Analyst) that allowed us to calculate kappa index (kappa index (k) allows one to measure the degree of agreement between two raters who categorize items into classes that are mutually exclusive.

The formula used to calculate kappa is $k = (p_o - p_e)/(1 - p_e)$, where p_o is the relative observed agreement between the two raters and p_e is the hypothetical probability of change agreement (Cohen, 1960)) to contrast to the participants' classifications of satellite imagery (ground truth) to the supervised classification results tool. Kappa ranks from 0 to 1, and it can be interpreted as indicated by Table 3.2 (Cohen, 1960):

TABLE 3.2 RANKING CRITERIA OF KAPPA INDEX.

Kappa (k)	Level of Agreement
<0.00	Poor
0.00–0.20	Slight
0.21–0.40	Fair
0.41–0.60	Moderate
0.61–0.80	Substantial
0.81–1.00	Almost perfect

Errors were corrected based on the participant's LULC interpretation using the SCP Raster Edit tool. LULC change was calculated using SCP's Land Cover Change tool (Figure 3.2).

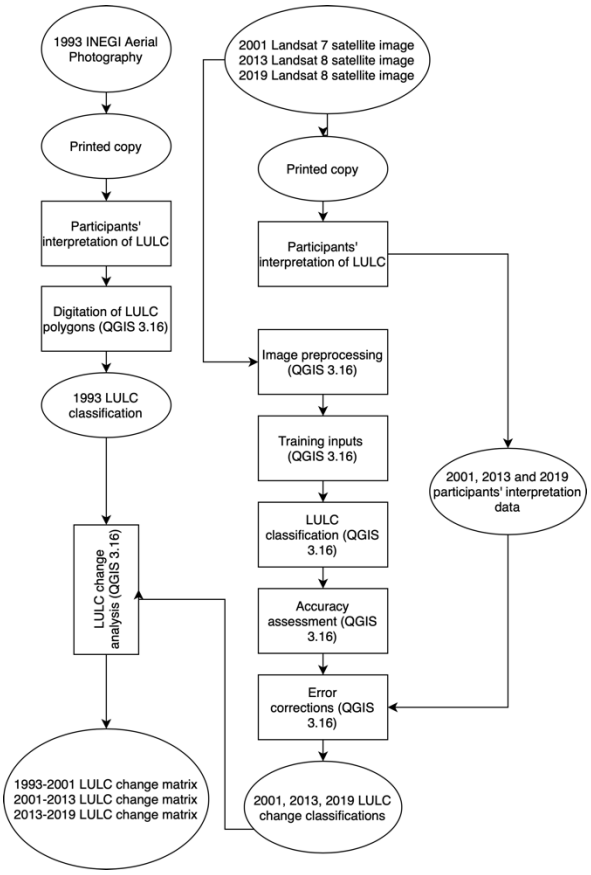

FIGURE 3.2 WORKFLOW OF LULC ANALYSIS.

Using the results of this analysis, LULC maps were created for 4 specific years (1993, 2001, 2013, 2019). The total area of each LULC category was calculated for these 4 classifications, as were change rates (*r*) using the following equation (1) (FAO, 1996):

$$r = 1 - 1 - \frac{A_1 - A_2^{\frac{1}{t}}}{A_1}, \quad (1)$$

where A_1 is the total area of one LULC category at a given time 1, A_2 is the total area of the same LULC category at a given time 2, while *t* is the number of years from time 1 to time 2. The resulting LULC change rates have a positive or negative sign. Negative sign rates indicate the category area increase while positive signs indicate the category area loss. Transition matrixes showing the surface increase and decrease for each LULC category (total area and percentages) were also created for each period.

Additional to the LULC interpretation sessions described above, semi-structured interviews with community members were conducted over a 7-month period from October 2018 to April 2019. Through a snowball sampling technique, a total of 19 informants were selected: 3 authority representatives (males between 55 and 64 years old), 10 agave and mezcal producers (owners of a still), and 6 agave-only producers. Of the 16 producers interviewed, 14 were male and 2 were female. Ten producers were between 55 and 64 years of age, with six between 25 and 54 years of age. At the time of the research, there were 25 mezcal producers (owners of their own still) in the community, and I estimated a total of 350 to 400 agave growers, each one of them with land plots of at least 2 hectares; authorities did not keep official data on the number of producers, which varies over time in response to agave price swings and fluctuating demand (See Lira et al., 2022 for details). The interviews with authority representatives focused on topics related to community resource use and management rules (for land, wild agaves, water, and firewood) and perceptions about market demand for agave and mezcal and its impact on these and other community resources. Interviews with producers focused on agave cultivation and mezcal production dynamics, changes in market demand, rules in use for community resources, and the impacts of rising market demand (for agave and/or mezcal) on those resources. All interviews were audio recorded and transcribed. Data

were coded by identifying key topics and the linkages between them (Bernard, 2017), using the qualitative data analysis software NVIVO 11(QSR International, 1999).

3.3 Results

3.3.1 The Growth of San Juan Del Río Mezcal Sector over Time

Figure 3.3 shows, in chronological order, a series of key events associated with agave and mezcal production in San Juan for the period 1950 to 2017. This draws on both interview and document review data.

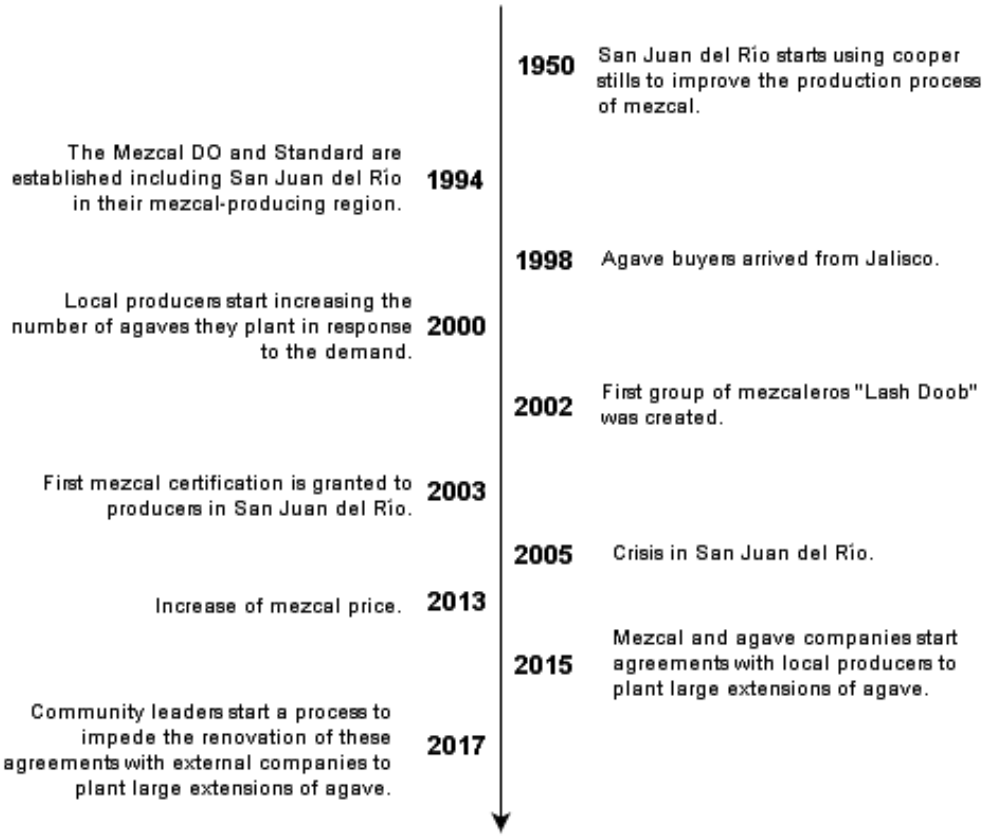

FIGURE 3.3 MAIN EVENTS REGARDING MEZCAL AND AGAVE PRODUCTION IN SAN JUAN DEL RÍO. (SOURCES: INTERVIEW DATA AND SAN JUAN DEL RÍO BIOCULTURAL PROTOCOL, 2020.)

The timeline can be broken into two main periods of specific relevance to this research. First is the period that runs from 1950 to the early 1990s. Before 1950, San Juan used clay pots to distill but then began to adopt copper stills that significantly changed their production process,

making it much more efficient (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020).

Interview data show that from the 1950s through to the 1990s, mezcal produced in San Juan was largely consumed by locals, with some finding its way to communities in the neighboring Sierra Norte and Mixes regions for purchase or barter:

"People would sell bulk mezcal to neighboring villages in the Mixes or Sierra Norte regions. It was a very good exchange relationship and it sometimes involved bartering; for example, they would give mezcal in exchange for coffee." (Méndez, Israel., 2019. Interview with María Lira. Personal interview. San Juan del Río, Oaxaca, Mexico, March 10).

During this period, producers might distill 20 to 40 L of mezcal and travel through these regions (for days at a time) to sell or exchange what they could. This enabled San Juan to build a relationship with other communities and their reputation as producers of quality mezcal. The spirit was still not popular in the large cities of Mexico, let alone internationally, and production remained small-scale.

This all changed in the 1990s when the mezcal DO and standard (NORMA Oficial Mexicana NOM-070-SCFI-1994) were established, and mezcal gradually became better known among people living in large urban centers, as restaurants and bars started to incorporate mezcal into their menus, and the first export brands were established. San Juan was part of the newly coined "mezcal region" of Oaxaca (included in the DO), allowing its producers to obtain their certifications to legally produce and distribute mezcal if they met the stipulations set by the standard. Another important moment came in the late 1990s when buyers from Jalisco — where tequila (another agave-based mezcal) originates — arrived in San Juan, looking to buy large volumes of agave because of a scarcity of agave in their home region. This encouraged farmers in San Juan to plant more agave espadín (*A. angustifolia*), as well as blue agave (*A. tequilana*), because of the anticipated demand. However, while these buyers purchased the agave available in San Juan during their initial visits, few returned in the mid-2000s to buy the newly planted agave now matured and ready for harvest. This led to an economic crisis in the community in 2004 and 2005 and the migration of some community members to the USA and

Mexican urban centers in search of work (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020).

Despite the problems caused by unsold agave, the mezcal sector in San Juan continued to establish itself and develop in new ways. In 2002, San Juan saw its first mezcal producer group "Laajsh Doob" created, and a year later, the first producers in San Juan were certified by the Mexican council that was set up to regulate the quality of Mezcal (COMERCAM, Consejo Mexicano Regulador De La Calidad del Mezcal, now called CRM, Consejo Regulador del Mezcal) (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020) (President of the Commissioner of Communal Resources. 2018. Interview with María Lira. Personal interview. San Juan del Río, Oaxaca, Mexico, November 11) (Abad, Karina (Los Danzantes). 2019. Interview with María Lira. Personal interview. San Juan del Río, Oaxaca, México, April 17). San Juan gained further visibility as a mezcal producer. Prices for mezcal climbed, and by the early 2010s, market demand resulted in more local people being involved in agave cultivation, mezcal production, or both.

A key development followed in 2015 when the first agreements were signed between agave growers and external companies to expand agave cultivation. This prompted an institutional response at the community level, as concerns surfaced about the influence of outside entities and the extent of land-use change and resource depletion.

3.3.2 LULC Analysis for the Period 1993–2019

These changes and events provide important context to understand the linkages between global mezcal markets and LULC dynamics in the places and territories where mezcal is produced. As described in the methods section, the accuracy of the supervised classification was calculated through k (Kappa values), and my results (Table 3.3) (see Appendix S1–S3) show a substantial level of agreement between the supervised classification and the participants' interpretation of satellite images.

TABLE 3.3 KAPPA VALUES FOR THE 2001, 2013, AND 2019 SUPERVISED CLASSIFICATIONS.

LULC Classification Year	k Value	Level of Agreement
2001	0.75	Substantial
2013	0.80	Substantial
2019	0.80	Substantial

In this following section, I present the results of my LULC analysis for the period 1993–2019 (Table 3.4) (see Appendix S4–S6), which covers the period when the mezcal sector in San Juan grew and took off as it became integrated into national and international markets.

TABLE 3.4 LULC TRANSITION MATRIX 1993–2019.

	Pine/Oak (ha)	Tropical Dry Forest (ha)	Agave (ha)	Urban Zone (ha)	Total (ha) 1993
Pine/Oak (ha)	1500.12	251.1	122.04	0.99	1874.25
Tropical Dry Forest (ha)	19.98	3561.84	1242.54	16.29	4840.65
Agave (ha)	33.57	191.97	177.84	0.27	403.65
Urban Zone (ha)	0	0.18	0.63	1.98	2.79
Total (ha)2019	1553.67	4005.09	1543.05	19.53	7121.34

Figure 3.4 and Table 3.5 show the percentages of each LULC category for each year, with Figure 3.5 showing the extent of these changes via four LULC maps.

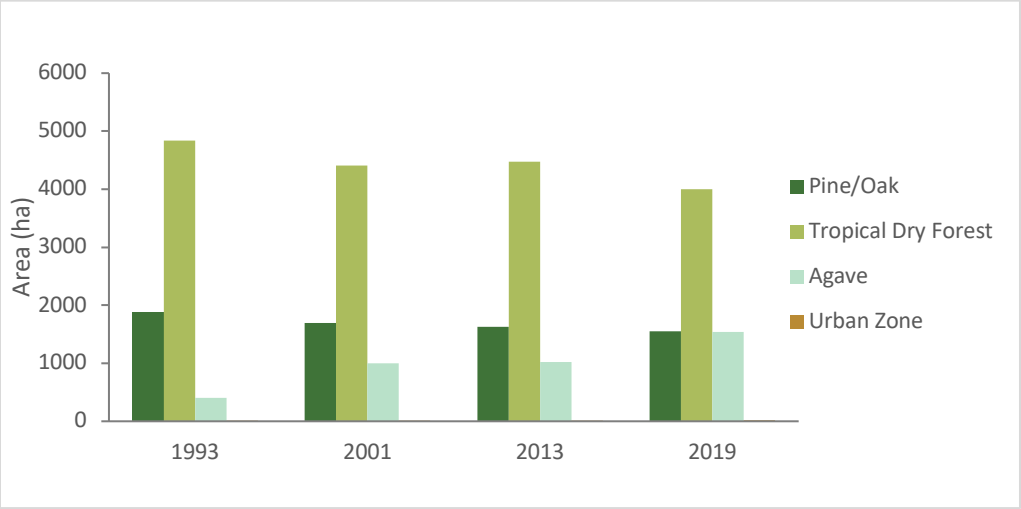

FIGURE 3.4 GRAPH SHOWING THE LULC AREA FOR EACH CATEGORY DURING THE STUDY PERIOD.

TABLE 3.5 TABLE SHOWING THE PERCENTAGES OF LULC FOR EACH YEAR OF STUDY.

LULC Category	1993 %	2001 %	2013 %	2019 %
Pine/Oak	26.3	23.9	22.8	21.8
Tropical Dry Forest	68.0	62.0	62.8	56.2
Agave	5.7	14.1	14.4	21.7
Urban Zone	0.0	0.1	0.1	0.3

For the period 1993–2001, my LULC analysis shows an expansion of agave crops leading to a reduction of TDF lands, with TDF lands reduced from 68% to 62% coverage of San Juan's

territory. Agave expanded from 6% to 14% territorial coverage, concentrated in the central and northwest parts of the community's territory.

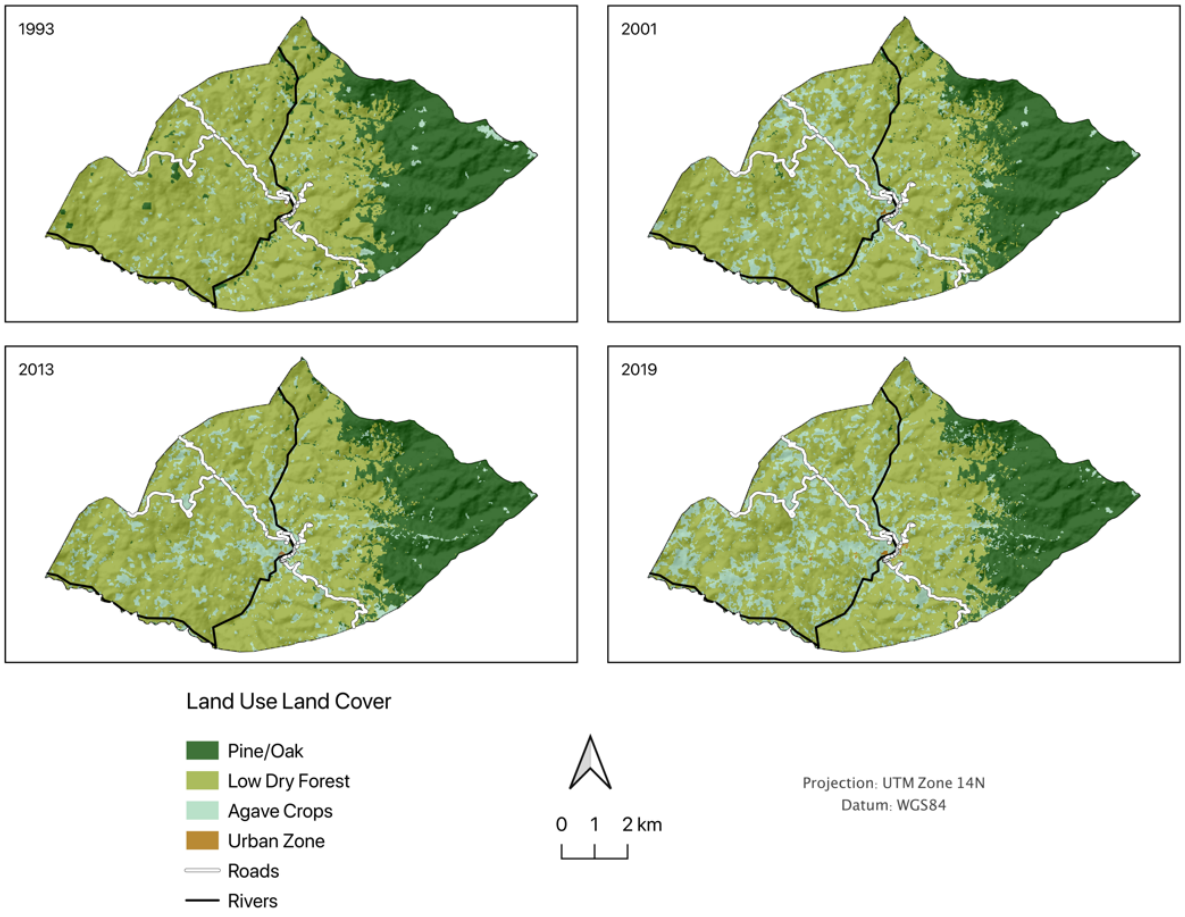

FIGURE 3.5 LULC MAPS SAN JUAN DEL RÍO.

The areas of agave crops and TDF remained stable for the period 2001–2013. The TDF area saw a slight expansion of 0.3%, while there was a 1% decrease in pine/oak forest coverage. The period 2001–2013 showed zero change rates for TDF and agave categories (Table 3.6). Note that a negative sign indicates increase in area while a positive sign denotes a decrease (see methods section for more details).

TABLE 3.6 LULC CHANGE RATES.

LULC Category	1993–2001	2001–2013	2013–2019	Overall (1993–2019)
Pine/Oak	0.01	0.00	0.01	0.01
Tropical Dry Forest	0.01	0.00	0.02	0.01
Agave	−0.12	0.00	−0.07	−0.05
Urban Zone	−0.14	0.03	−0.43	−0.12

Similar to the change observed during the first period of study (1993–2001), the last period in my LULC analysis (2013–2019) shows an expansion in agave cultivation, with territorial coverage increasing from 14% (1022.6 ha) to 22% (1543.3 ha) in just 6 years. However, this period shows a lower rate of change (−0.07) than the first period (−0.12). According to community members, the high demand for mezcal and agave, and rising agave prices (according to the Biocultural Protocol of San Juan del Río (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020), in 2013, there is a dramatic increase of the agave price from 0.50 MXN/Kg to 8.00 MXN/Kg), were the triggers for community members to invest once more in agave (Martínez, Rogelio., 2019. Interview with María Lira. Personal interview. San Juan del Río, Oaxaca, Mexico, April 13) (Abad, Karina (Los Danzantes), 2019. Interview with María Lira. Personal interview. Santiago Matatlán, Oaxaca, Mexico, April 17) (Martínez, Rodolfo. 2018. Interview with María Lira. Personal interview. Tlacolula, Oaxaca, Mexico, October 8). This resulted in more fields being opened for agave cultivation and more agaves being sold to intermediaries and to local (San Juan) and regional mezcal producers. Furthermore, this period coincided with community mezcal producers beginning to sell more unbottled mezcal to external brands.

3.3.3 Community Responses to LULC Change

It is important to recognize that LULC change has brought about some benefits but also some negative impacts. This has created a source of tension in the community as they consider how they should respond to the LULC they are observing. I explore the tension in this section to highlight the challenges communities face in trying to meet their development goals while doing so in a way that maximizes benefits and minimizes harms.

Interview data suggest that growth in the mezcal sector has improved the quality of life in San Juan and other Zapotec communities in the region, providing employment to community

members, as well as for laborers from neighboring communities, such as Tepuxtepec Mixes, who are hired to work in agave fields and local stills. The mezcal producers expressed contentment at being able to work and profit from an activity that is part of their identity and community tradition. Moreover, a revitalized mezcal sector has provided a source of income for young community members, allowing them to stay in the community, and encouraged some migrants to return to San Juan:

> *"I was working in Los Angeles for around 20 years. I came back and started planting agave, producing mezcal again. When I returned, I started building the still in this land plot and started producing mezcal again. Now, I want to start my own brand."* (Martínez, Rogelio., 2019. Interview with María Lira. Personal interview. San Juan del Río, Oaxaca, Mexico, April 13).

However, the rapid expansion of agave fields funded, in part, by external capital and the limited local benefits that that result, have become a source of concern for community authorities. Given the high prices of agave, external actors have attempted to invest in the production of agave by signing contracts with community members to plant agave at a large scale. This not only put pressure on the community's natural resources but also undermined the customary institutions in place to manage these (and other territorial) resources; it ignored community rules that forbid the use of external capital to work community resources (Lira et al., 2022).

> *"Back in the day, we used to plant 500 or 1000 agaves. The rich people would plant 2000 or 3000 and they were still able to weed with a shovel. Now, with this whole mezcal boom, people are going crazy. They start to slash and burn their land plots at a larger scale and then it is not going to be possible to weed them out with the shovel. People fall into the trap of using herbicides to weed their plots. The authorities are worried about this"* (President of the Commissioner of Communal Resources., 2018. Interview with María Lira. Personal interview. San Juan del Río, Oaxaca, Mexico, November 11).

During the period 2015–2017, an estimated 10 community members signed contracts with external companies or investors to grow agave on community lands and at a larger scale than had been the norm. When interviewed, community authorities explained that 40,000 agaves

were planted in 2017 alone, and contracts were being amended to increase this to 100,000 agaves for 2018 (President of the Commissioner of Communal Resources. 2018. Interview with María Lira. Personal interview. San Juan del Río, Oaxaca, Mexico, November 11). Companies paid for the agave seedlings and the nursery labor required (planting, weeding twice a year, and cultivating the agave), and in some cases, they paid producers a fee for overseeing the work. Following harvest, the company kept 75% of the agaves produced, with the remainder left to the community member to sell or to distill into mezcal. The community authorities in charge at the time allowed these contracts, failing to enforce the rules contained in the community statute. Community rules dictate that members can work their land plots and profit from them, but they cannot collaborate with people external to the community or bring in external capital. With a new administration in office, the issue became a source of contestation and conflict in the community, requiring much debate within the assembly throughout 2018.

The community responded by instituting improved enforcement of community rules and strengthening their dialogue on the issue (Lira et al., 2022). However, given continued demand for mezcal, the authorities remain worried about how ongoing market pressures might impact land use and the natural resource base and whether the community can implement effective institutional responses. Along with the expansion of agave fields, recent years have seen producers adopt new practices that include the planting of agave in vertical rows uphill (which farmers say reduces the need to weed) and increased use of chemical herbicides and pesticides. Anecdotal evidence suggests that this has exacerbated soil erosion and led to a localized decline in grasshoppers (commonly called chapulines), which are an important part of the local diet. In addition, while resource management rules restrict access to and harvesting of pine and oak forest, the clearing of TDF to grow agave is permitted, and community members are allowed to plant as much agave as they can (using their own capital). For most community members, agave expansion is seen as a positive and a path to economic prosperity. Local perceptions on conservation are focused on the community's pine and oak forest; tropical dry forest is considered for its productive (agricultural) potential rather than ecological or biodiversity value.

3.4 Discussion

By promoting concepts such as telecoupling, land system science is gradually adopting a more interdisciplinary approach that recognizes the complexity of land systems and the different components and interactions that they involve; furthermore, by incorporating a wider range of methods, such as qualitative and mixed-method approaches, it is possible to address social and economic issues around land changes (Turner et al, 2021). This research makes use of that integrative approach to combine spatial and qualitative methods to examine the LULC dynamics and its linkages to external markets through the growing demand of mezcal.

Past studies have assessed the sustainability of artisanal production systems from socio-cultural (Moscatelli et al., 2017; Capone et al, 2016), economic (Capone et al., 2016), or ecological perspectives (Capone et al., 2016; Bilali et al, 2020); however, there has been limited research addressing the LULC change dynamics linked to these production systems. LULC studies using remote sensing techniques have produced key information on the devastating effects that industrial export crops have caused to landscapes in tropical countries (Morton et al., 2006; Hansen et al., 2009 Persson, 2014), with recent studies addressing the links between consumption and distant land-use changes through supply chains (Green et al., 2019). LULC dynamics linked to production systems for artisanal products have been overlooked, with sustainable outcomes from such systems assumed rather than empirically proven (Tetreault et al., 2021).

Our case focused on LULC dynamics in an Indigenous territory in Oaxaca, Mexico, to show how these dynamics are shaped by growing markets and market demand for mezcal, a traditional spirit branded and sold as an artisanal product. Mezcal has gone through a process of commoditization started by urban elites in the main cities of Mexico and other countries in North America and Europe. Since the late 1990s, producers in San Juan have experienced first-hand the growing interest in the mezcal they produce and the traditional knowledge around craft production techniques that they hold. San Juan producers were among the first in the country to receive nationally recognized mezcal certification; they have experimented with forms of cooperative production within their community and have built relations with some of the most important and well-known brands selling mezcal nationally and abroad.

Such integration into a global value chain has subsequently driven important LULC change dynamics in recent years. My results show an overall expansion of agave crops from 5.7% to 21.7% in 26 years. In the first period of study (1993–2001), my results show an expansion of agave crops area from 6% to 14% and a 6% reduction of the TDF area. This is linked to the arrival of tequila producers from Jalisco looking to purchase high volumes of agave, which motivated local farmers to expand production. The second period of study shows a stable area percentage for agave crops and minor changes for the TDF area. My interview data show that this was linked to a crisis in the community that resulted from buyers from Jalisco not returning to buy the agave when it was ready to be harvested. The 2013–2019 period of analysis shows a similar dynamic as the first period, an expansion of agave crops from 14 to 22%, but this time because of the emerging markets for of mezcal and the associated growth in demand. Beyond the LULC dynamics, another source of concern is the growing adoption of agricultural practices that can be harmful to soil and local biodiversity, for example, the trend to plant agaves in vertical rows uphill and the use of chemical pesticides and herbicides. The introduction of these practices has resulted from a growing pressure to improve the efficiency of agave production given the high demand from external markets.

Although mezcal has been marketed under an alternative production narrative that promotes sustainability (Lira et al., n.d.), I see how consumption in distant areas has driven LULC changes in local production sites. This work contributes to building evidence that global value chains impact the landscapes, societies, economies, and cultures of rural and indigenous communities (Tetreault et al., 2021; Bowen, 2015; Hernández, 2013), adding to studies already published on artisanal fisheries (Kulmiye, 2010), traditional foods (Moscatelli et al., 2017; Capone et al, 2016; Gralton & Vanclay, 2009), and artisanal cheese (Ghadge et al., 2021). While such products are often presented as an alternative to industrially produced versions, their production systems and related processes are not immune to negative environmental impacts even when following a logic of production based on small-scale, family-based enterprises (Tetreault et al., 2021).

This is not to say that producer communities cannot act to negate any such negative impacts. As presented in Lira et al. (2022), locally crafted institutions have played a role in

mediating the relationship between San Juan del Río mezcal and agave producers — inserted in a commons governance system — and global markets. However, these institutions, which were not originally designed to face the challenges of global markets, still show deficiencies and are going through a process of continuous adaptation to ensure the enforcement of current rules, monitor rule compliance, and encourage dialogue among community members. The presence of commons institutions in San Juan del Río has allowed community members to work and profit from mezcal and agave, consider the sustainability of mezcal-based development given its impacts on natural resources and customary institutions, and maintain a level of autonomy from national and international markets. Nevertheless, several challenges remain with market volatility and possible contrasting scenarios for the future of demand around agave and mezcal. Therefore, community institutions not only need to be adaptable but also require recognition and support from actors in the value chain and the national and global institutions regulating the mezcal industry (Berkes, 2007).

Another dimension of LULC change I identified through my research is the conversion of TDF into agave fields. In San Juan, the expansion of agave crops drove an associated loss of TDF. Indeed, the LULC change patterns driven by agave demand for mezcal production show similar patterns to LULC change for a previous period when agave was bought up by tequila producers from Jalisco who operate under an industrial rather than artisanal system. While TDF is considered an important ecosystem in Mexico for biodiversity (Ceballos & García, 1995), ecosystem services (erosion prevention, habitat for wildlife, pollination, and temperature regulation) (Maass et al., 2005), and livelihood (Maass, 1995), it is threatened nationally, with more than 70% of its area converted to agricultural or urban uses (Portillo-Quintero & Sánchez-Azofeifa, 2010). Institutional and policy discourses, programs, and investments related to TDF in Mexico have largely focused on the potential of these areas for agriculture- or livestock-related activities, and it is likely that this has influenced the TDF-related use and management perceptions of people living in rural areas (Castillo et al., 2005; Tarrasón et al., 2010). In Mexico, only 0.2% of TDF is under protection (Portillo-Quintero & Sánchez-Azofeifa, 2010). Among San Juan community members, TDF was not seen as true “monte” or forest, unlike areas of pine-oak forest in the east of the communal territory, and this perception has likely had an

impact on efforts to protect or sustainably manage such ecosystems. While San Juan has enacted strict rules around how pine and oak forests are accessed and used by community members, this is not the case for areas of TDF, where land plots are assigned, and forest is cleared for agave production. Although the communal statute regulates hunting and limits external investment on community lands, protecting community autonomy and preventing a more intense expansion of agave crops (Lira et al., 2022), no rules address LULC change in TDF zones.

Further research is needed to build on limited previous work (Castillo et al., 2005; Tarrasón et al., 2010) and analyze the degree to which local perceptions shape how TDF-based ecosystems are used, managed, and protected (or not) from land-use change and activities (i.e., agricultural expansion, increased use of chemical pesticides and herbicides). Given growing mezcal markets, San Juan will most likely remain a center of agave and mezcal production in the region. Therefore, TDF will remain vulnerable to future market dynamics and price swings, and so action is required from institutions at multiple levels of government — such as SEMARNAT (Ministry of Environment and Natural Resources) at the federal level and SEDESO (Ministry of Environment, Energy, and Sustainable Development) at the state level — to increase the awareness on the importance of TDF and the best practices to enable sustainable management over time.

3.5 Conclusions

This paper adds to the existing literature on LULC through my focus on the telecoupling of artisanal products, global markets, and the resulting effects on LULC and customary institutions. Despite a narrative that such products offer a sustainable alternative to agro-industrial commodities, my results show how artisanal product value chains can not only drive LULC and modify landscapes but can also stress the territorial governance of Indigenous producer communities. My case study demonstrates how the value and perceptions around certain ecosystems, in this case, tropical dry forest, potentially have an impact on the general concern or implementation of local efforts for their protection and sustainable management. It also highlights the role that commons institutions play to mediate the relationship between local

producers and external markets to balance economic development with the sustainable management of community resources. My results show that telecoupling places stress on customary governance, a process I have described in more detail elsewhere (Lira et al., 2022). One of the key points made in that work is that the volatility of markets will require customary commons institutions to adapt to the changing strategies of market actors. A specific gap that was revealed was the lack of attention paid to such customary institutions by DO regulations and associated structures. This has led to the possibility of mezcal production systems that are certified for national and global markets to undermine these institutions and cause social and environmental harms, and points to the need for further research to encourage certification systems to incorporate Indigenous perspectives for artisanal products or even consider new types of certification systems governed by Indigenous producers themselves. Such research should be undertaken in partnership with Indigenous communities, respecting their autonomy and right to self-determination, to identify institutional innovations that ensure producer communities receive equitable benefits from the global value chains established to commodify their production knowledge and techniques.

3.6 References

Amilien, V. (1999). Is grandmother's cuisine traditional food? A concept definition in tourism research. *Proceedings of the 8th Nordic Symposium on Hospitality and Tourism Research, Alta, Norway*, 18–21.

Arfini, F., & Mora, C. (1998). Typical and traditional products: Rural effect and agro-industrial problems. *Proceedings of the 52nd Seminar of the European Association of Agricultural Economists.*

Barona, E., Ramankutty, N., Hyman, G., & Coomes, O. T. (2010). The role of pasture and soybean in deforestation of the Brazilian Amazon. *Environmental Research Letters*, *5*(2). https://doi.org/10.1088/1748-9326/5/2/024002

Bell, D., & Valentine, G. (1997). *Consuming geographies: We are where we eat*. London: Routledge.

Berard, L., & Marchenay, P. (1995). Lieux, temps, et preuves: La construction sociale des produts de terroir. *Terrain*, *24*, 153–164.

Berkes, F. (2007). Community-based conservation in a globalized world. *Proceedings of the National Academy of Sciences*, *104*(39), 15188–15193. https://doi.org/10.1073/pnas.0702098104

Bernard, H. R. (2017). *Research Methods in Anthropology: Qualitative and Quantitative Approaches*. Lanham: Rowman & Littlefield.

Bessiere, J. (1998). Local development and heritage: Traditional food and cuisine as tourist attractions in rural areas. *Sociologia Ruralis*, *38*(1), 21–34. https://doi.org/10.1111/1467-9523.00061

Bilali, H. E., Calabrese, G., Iannetta, M., Stefanova, M., Paoletti, F., Ladisa, G., Bottalico, F., & Capone, R. (2020). Environmental sustainability of typical agro-food products: A scientifically sound and user friendly approach. *New Medit*, *19*(2), 69–83. https://doi.org/10.30682/nm2002e

Boillat, S., Scarpa, F. M., Robson, J. P., Gasparri, I., Aide, T. M., Aguiar, A. P. D., Anderson, L. O., Batistella, M., Fonseca, M. G., Futemma, C., Grau, H. R., Mathez-Stiefel, S.-L., Metzger, J. P., Ometto, J. P. H. B., Pedlowski, M. A., Perz, S. G., Robiglio, V., Soler, L., Vieira, I., &

Brondizio, E. S. (2017). Land system science in Latin America: Challenges and perspectives. *Current Opinion in Environmental Sustainability*, *26–27*, 37–46. https://doi.org/10.1016/j.cosust.2017.01.015

Bollier, D., & Helfrich, S. (2014). *The Wealth of the Commons: A World Beyond Market and State*. Levellers Press. https://books.google.ca/books?id=vcOgAwAAQBAJ

Bowen, S. (2015). *Divided Spirits: Tequila, Mezcal, and the Politics of Production*. Berkeley: University of California Press.

Bowen, S., & Zapata, A. V. (2009). Geographical indications, terroir, and socioeconomic and ecological sustainability: The case of tequila. *Journal of Rural Studies*, *25*(1), 108–119. https://doi.org/10.1016/j.jrurstud.2008.07.003

Browder, J. O., Pedlowski, M. A., Walker, R., Wynne, R. H., Summers, P. M., Abad, A., Becerra-Cordoba, N., & Mil-Homens, J. (2008). Revisiting Theories of Frontier Expansion in the Brazilian Amazon: A Survey of the Colonist Farming Population in Rondônia's Post-Frontier, 1992–2002. *World Development*, *36*(8), 1469–1492. https://doi.org/10.1016/j.worlddev.2007.08.008

Capone, R., El Bilali, H., & Bottalico, F. (2016). Assessing the sustainability of typical agro-food products: Insights from Apulia Region, Italy. *New Medit*, *15*(1), 28–35.

Carmenta, R., Coomes, D. A., DeClerck, F. A. J., Hart, A. K., Harvey, C. A., Milder, J., Reed, J., Vira, B., & Estrada-Carmona, N. (2020). Characterizing and Evaluating Integrated Landscape Initiatives. *One Earth*, *2*(2), 174–187. https://doi.org/10.1016/j.oneear.2020.01.009

Castillo, A., Magaña, A., Pujadas, A., Martínez, L., & Godínez, C. (2005). Understanding the interaction of rural people with ecosystems: A case study in a tropical dry forest of Mexico. *Ecosystems*, *8*(6), 630–643. https://doi.org/10.1007/s10021-005-0127-1

Ceballos, G. & García, A. (1995) Conserving Neotropical Biodiversity: The Role of Dry Forests in Western Mexico. *Conserv. Biol.*, *9*, 1349–1356. https://doi.org/10.1046/j.1523-1739.1995.09061349.x.

Cohen, J. (1960). A Coefficient of Agreement for Nominal Scales. *Educational and Psychological Measurement*, *20*(1), 37–46. https://doi.org/10.1177/001316446002000104

Colchester, M. (1994). Sustaining the Forests: The Community-based Approach in South and South-East Asia. *Development and Change*, *25*(1), 69–100. https://doi.org/10.1111/j.1467-7660.1994.tb00510.x

Comunidad Indígena de San Juan del Río, & Hernández Márquez, G. Y. (2020). *Protocolo Comunitiario Biocultural de la comunidad agraria y municipio de San Juan del Rio, Oaxaca, Mexico*. https://absch.cbd.int/database/CPP/ABSCH-CPP-SCBD-253752?fbclid=IwAR3LDdXi-Sv0MC89fyfzbNX9tcFHl4nQ2vPIsHXOV0eZF3DmHXZZqWQitus.

Congedo, L. (2021) Semi-Automatic Classification Plugin: A Python Tool for the Download and Processing of Remote Sensing Images in QGIS. *Journal of Open Source Software*, 6(64), 3172. https://doi.org/10.21105/joss.03172

Consejo Regulador del Mezcal (CRM). (2020). *Informe Estadístico*. Oaxaca: Consejo Regulador del Mezcal, Oaxaca. http://www.crm.org.mx/PDF/ INF_ACTIVIDADES/INFORME2019.pdf

DeFries, R. S., Rudel, T., Uriarte, M., & Hansen, M. (2010). Deforestation driven by urban population growth and agricultural trade in the twenty-first century. *Nature Geoscience*, *3*(3), 178–181.

Dirzo, R. & Ceballos, G. (2010) Las Selvas Secas de México: Un Reservorio de Biodiversidad y Laboratorio Viviente. In *Diversidad, Amenazas y Áreas Prioritarias Para la Conservación de Las Selvas Secas del Pacífico de México*; FCE/CONABIO: Mexico City, Mexico, 13–17.

DOF/IMPI. (1994). *Resolución Mediante La Cual Se Otorga La Protección Prevista a La Denominación de Origen Mezcal, Para Ser Aplicada a La Bebida Alcohólica Del Mismo Nombre*. Mexico City: DOF/IMPI.

Dwyer, C., & Jackson, P. (2003). Commodifying difference: Selling eastern fashion. *Environment and Planning D: Society and Space*, *21*(3), 269–291. https://doi.org/10.1068/d349

Dwyer, L. (2018). Saluting while the ship sinks: The necessity for tourism paradigm change. *Journal of Sustainable Tourism*, *26*(1), 29–48.

Eakin, H., Defries, R., Kerr, S., Lambin, E., Liu, J., Marcotullio, P., Messerli, P., Reenberg, A., Rueda, X., Swaffield, S., Wicke, B., & Zimmerer, K. (2014). Significance of Telecoupling for Exploration of Land-Use Change. In Seto, K.C. & Reenberg, A. *Rethinking Global Land*

Use in an Urban Era (pp. 141–162). Cambridge: The MIT Press. https://doi.org/10.7551/mitpress/9780262026901.003.0008

Environmental Systems Research Institute (ESRI). (2020) *ArcGIS Version 10.8* [Computer software]. Redlands: ESRI. https://www.esri.com/en-us/home

FAO (1996). *Forest Resources Assessment 1990.* FAO Forestry Paper. Rome: FAO.

Gallardo-Cruz, J.A., Meave, J.A., & Pérez-García, E.A. (2017) Estructura, Composición y Diversidad de La Selva Baja Caducifolia Del Cerro Verde, Nizanda (Oaxaca), México. *Bot. Sci.*, *76*, 19–35. https://doi.org/10.17129/botsci.1701.

Gasparri, N. I. (2016). The Transformation of Land-Use Competition in the Argentinean Dry Chaco Between 1975 and 2015. In J. Niewöhner, A. Bruns, P. Hostert, T. Krueger, J. Ø. Nielsen, H. Haberl, C. Lauk, J. Lutz, & D. Müller (Eds.). *Land Use Competition: Ecological, Economic and Social Perspectives* (pp. 59–73). Switzerland: Springer International Publishing. https://doi.org/10.1007/978-3-319-33628-2_4

Gasparri, N. I., & Le Polain de Waroux, Y. (2015). The Coupling of South American Soybean and Cattle Production Frontiers: New Challenges for Conservation Policy and Land Change Science. *Conservation Letters*, *8*(4), 290–298. https://doi.org/10.1111/conl.12121

Gatrell, J., Reid, N., & Steiger, T. L. (2018). Branding spaces: Place, region, sustainability and the American craft beer industry. *Applied Geography*, *90*, 360–370. https://doi.org/10.1016/j.apgeog.2017.02.012

Ghadge, A., Er Kara, M., Mogale, D. G., Choudhary, S., & Dani, S. (2021). Sustainability implementation challenges in food supply chains: A case of UK artisan cheese producers. *Production Planning and Control*, *32*(14), 1191–1206. https://doi.org/10.1080/09537287.2020.1796140

González-M, R., García, H., Isaacs, P., Cuadros, H., López-Camacho, R., Rodríguez, N., Pérez, K., Mijares, F., Castaño-Naranjo, A., Jurado, R., Idárraga-Piedrahíta, Á., Rojas, A., Vergara, H., & Pizano, C. (2018). Disentangling the environmental heterogeneity, floristic distinctiveness and current threats of tropical dry forests in Colombia. *Environmental Research Letters*, *13*(4), 045007. https://doi.org/10.1088/1748-9326/aaad74

Gralton, A., & Vanclay, F. (2009). Artisanality and culture in innovative regional agri-food development: Lessons from the Tasmanian artisanal food industry. *International Journal of Foresight and Innovation Policy*, *5*(1–3), 193–204. https://doi.org/10.1504/IJFIP.2009.022106

Grau, H. R., & Aide, M. (2008). Globalization and Land-Use Transitions in Latin America. *Ecology and Society*, *13*(2). http://www.jstor.org/stable/26267952

Green, J. M. H., Croft, S. A., Durán, A. P., Balmford, A. P., Burgess, N. D., Fick, S., Gardner, T. A., Godar, J., Suavet, C., Virah-Sawmy, M., Young, L. E., & West, C. D. (2019). Linking global drivers of agricultural trade to on-the-ground impacts on biodiversity. *Proceedings of the National Academy of Sciences of the United States of America*, *116*(46), 23202–23208. https://doi.org/10.1073/pnas.1905618116

Hansen, M. C., & DeFries, R. S. (2004). Detecting long-term global forest change using continuous fields of tree-cover maps from 8-km Advanced Very High Resolution Radiometer (AVHRR) data for the years 1982-99. *Ecosystems*, *7*(7), 695–716. https://doi.org/10.1007/s10021-004-0243-3

Hansen, M. C., Stehman, S. V., Potapov, P. V., Arunarwati, B., Stolle, F., & Pittman, K. (2009). Quantifying changes in the rates of forest clearing in Indonesia from 1990 to 2005 using remotely sensed data sets. *Environmental Research Letters*, *4*(3). https://doi.org/10.1088/1748-9326/4/3/034001

Hernández, J. (2013). Paisajes vemos, de su creación no sabemos. El paisaje agavero patrimonio cultural de la humanidad. *Relac. Estud. hist. soc*. 34(136), 115-144. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-39292013000400006&lng=es&tlng=es.

Ilbery, B., & Kneafsey, M. (2000a). Producer constructions of quality in regional speciality food production: A case study from south west England. *Journal of Rural Studies*, *16*(2), 217–230. https://doi.org/10.1016/S0743-0167(99)00041-8

Ilbery, B., & Kneafsey, M. (2000b). Registering regional speciality food and drink products in the United Kingdom: The case of PDOs and PGIs. *Area*, *32*(3), 317–325. https://doi.org/10.1111/j.1475-4762.2000.tb00144.x

Instituto Nacional de Estadística, Geografía e Informática (INEGI) (1993). *Ortoimágenes* (E14d59a, E14d59b, E14d59c, E14d59d, E14d59e, E14d59f). https://www.inegi.org.mx/temas/imagenes/ortoimagenes/#Descargas (Accessed 13 June 2021).

Instituto Nacional de Estadística , Geografía e Informática (INEGI) (2013). *Conjunto de Datos Vectoriales de La Carta de Uso Del Suelo y Vegetación* (Escala 1:250 000. Serie, V). https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=702825007024 (Accessed 15 December 2021).

Instituto Nacional de Estadística , Geografía e Informática (INEGI) (2017). *Marco Geoestadístico*. https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=889463171829 (Accessed 14 November 2021).

Instituto Nacional de Estadística , Geografía e Informática (INEGI) (2020). *Censo de Poblacion y Vivienda*. https://www.inegi.org.mx/programas/ccpv/2020/ (Accessed 11 January 2022).

Janzen, D. H. (1988). Tropical dry forests: The most endangered major tropical ecosystem. In Wilson, E. O., & Peter, F. M. *Biodiversity* (pp. 130–137). Washington (DC): National Academy Press.

Jodha, N. S. (1985). *Market forces and erosion of common property resources. Agricultural Markets in the Semi-Arid Tropics*. Proceedings of an International Workshop held at ICRISAT Center, India.

Kulmiye, *A.J. (2010) Assessment of the Status of the Artisanal Fisheries in Puntland through Value-Chain Analysis.* http://shuraako.org/sites/default/files/documents/Assessment%20of%20the%20Status%20of%20the%20Artisanal%20Fisheries%20in%20Puntland%20Through%20Value%20Chain%20Analysis.pdf (accessed 21 October 2021).

Kupiec, B., & Revell, B. (1998). Speciality and artisanal cheeses today: The product and the consumer. *British Food Journal*, *100*(5), 236–243. https://doi.org/10.1108/00070709810221454

Lambin, E. F., Geist, H., & Rindfuss, R. R. (2006). Introduction: Local Processes with Global Impacts BT - Land-Use and Land-Cover Change: Local Processes and Global Impacts. In E.

F. Lambin & H. Geist (Eds.). *Land-Use and Land-Cover Change* (pp. 1–8). New York: Springer Berlin Heidelberg. https://doi.org/10.1007/3-540-32202-7_1

Laurance, W. F. (2007). Switch to Corn Promotes Amazon Deforestation. *Science*, *318*(5857), 1721 LP – 1721. https://doi.org/10.1126/science.318.5857.1721b

Le Polain de Waroux, Y., Garrett, R. D., Heilmayr, R., & Lambin, E. F. (2016). *Land-use policies and corporate investments in agriculture in the Gran Chaco and Chiquitano*. Proceedings of the National Academy of Sciences, 113(15), 4021. https://doi.org/10.1073/pnas.1602646113

Lira, M. G., Robson, J. P., & Klooster, D. J. (2022). Commons, global markets and small-scale family enterprises: The case of mezcal production in Oaxaca, Mexico. *Agriculture and Human Values*. https://doi.org/10.1007/s10460-021-10293-z

Lira, M.G.; Davidson-Hunt, I.J.; Klooster, D.J.; Peyton, J. (n.d.) *The Construction of Value around Mezcal and Its Impact on Indigenous Producer Communities in San Juan del Río, Oaxaca*. Unpublished manuscript**.**

Liu, J., Hull, V., Batistella, M., DeFries, R., Dietz, T., Fu, F., Hertel, T. W., Izaurralde, R. C., Lambin, E. F., Li, S., Martinelli, L. A., McConnell, W. J., Moran, E. F., Naylor, R., Ouyang, Z., Polenske, K. R., Reenberg, A., de Miranda Rocha, G., Simmons, C. S., … Zhu, C. (2013). Framing Sustainability in a Telecoupled World. *Ecology and Society*, *18*(2). http://www.jstor.org/stable/26269331

Maass, J. M. (1995). Conversion of tropical dry forest to pasture and agriculture. In Bullock, S. H., Mooney, H. A., & Medina, E. *Seasonally Dry Tropical Forests* (pp. 399–422). Cambridge: Cambridge University Press.

Maass, J.M.; Balvanera, P.; Castillo, A.; Daily, G.C.; Mooney, H.A.; Ehrlich, P.; Quesada, M.; Miranda, A.; Jaramillo, V.J.; García-Oliva, F.; et al. (2005) Ecosystem Services of Tropical Dry Forests: Insights from Long-Term Ecological and Social Research on the Pacific Coast of Mexico. *Ecol. Soc.*, *10*, 17. https://doi.org/10.5751/ES-01219-100117.

Meyfroidt, P., Roy Chowdhury, R., de Bremond, A., Ellis, E. C., Erb, K. H., Filatova, T., Garrett, R. D., Grove, J. M., Heinimann, A., Kuemmerle, T., Kull, C. A., Lambin, E. F., Landon, Y., Le Polain de Waroux, Y., Messerli, P., Müller, D., Nielsen, J., Peterson, G. D., Rodriguez

García, V., … Verburg, P. H. (2018). Middle-range theories of land system change. *Global Environmental Change*, *53*, 52–67. https://doi.org/10.1016/j.gloenvcha.2018.08.006

Miles, L.; Newton, A.C.; DeFries, R.S.; Ravilious, C.; May, I.; Blyth, S.; Kapos, V.; Gordon, J.E. (2006). A Global Overview of the Conservation Status of Tropical Dry Forests. *Proc. J. Biogeogr.*, *33*, 491–505.

Montanari, A., & Staniscia, B. (2009). Culinary tourism as a tool for regional re-equilibrium. *European Planning Studies*, *17*(10), 1463–1483. https://doi.org/10.1080/09654310903141656

Morton, D. C., DeFries, R. S., Shimabukuro, Y. E., Anderson, L. O., Arai, E., del Bon Espirito-Santo, F., Freitas, R., & Morisette, J. (2006). Cropland expansion changes deforestation dynamics in the southern Brazilian Amazon. *Proceedings of the National Academy of Sciences*, 103(39), 14637–14641.

Moscatelli, S., Gamboni, M., Dernini, S., Capone, R., Bilali, H. E., Bottalico, F., Debs, P., & Cardone, G. (2017). Exploring the Socio-cultural Sustainability of Traditional and Typical Agro-food Products: Case study of Apulia Region, South-eastern Italy. *Journal of Food and Nutrition Research*, *5*(1), 6–14. https://doi.org/10.12691/jfnr-5-1-2

Murdoch, J., Marsden, T., & Banks, J. (2000). Quality, Nature, and Embeddedness: Some Theoretical Considerations in the Context of the Food Sector*. *Economic Geography*, *76*(2), 107–125. https://doi.org/10.1111/j.1944-8287.2000.tb00136.x

Noojipady, P., Morton, C. D., Macedo, N. M., Victoria, C. D., Huang, C., Gibbs, K. H., & Bolfe, L. E. (2017). Forest carbon emissions from cropland expansion in the Brazilian Cerrado biome. *Environmental Research Letters*, *12*(2), 025004. https://doi.org/10.1088/1748-9326/aa5986

NORMA Oficial Mexicana NOM-070-SCFI-1994, Bebidas alcohólicas-Mezcal-Especificaciones.

NORMA Oficial Mexicana NOM-070-SCFI-2016, Bebidas alcohólicas-Mezcal-Especificaciones.

Nygard, B., & Storstad, O. (1998). De-globalization of food markets? Consumer perceptions of safe food: The case of Norway. *Sociologia Ruralis*, *38*(1), 35–53. https://doi.org/10.1111/1467-9523.00062

Ostrom, E. (1990). *Governing the Commons*. Cambridge: Cambridge University Press.

Palma, F., Pérez P., and Meza, V. (2016). *Diagnóstico de La Cadena de Valor Mezcal en las Regiones de Oaxaca*. COPLADE. http://www.coplade.oaxaca.gob.mx/wp-content/uploads/2017/04/Perfiles/AnexosPerfiles/6. CV MEZCAL.pdf.

Paloviita, A. (2010). Consumers' sustainability perceptions of the supply chain of locally produced food. *Sustainability*, *2*(6), 1492–1509. https://doi.org/10.3390/su2061492

Pendrill, F., Persson, U. M., Godar, J., & Kastner, T. (2019a). Deforestation displaced: Trade in forest-risk commodities and the prospects for a global forest transition. *Environmental Research Letters*, *14*(5). https://doi.org/10.1088/1748-9326/ab0d41

Pendrill, F., Persson, U. M., Godar, J., Kastner, T., Moran, D., Schmidt, S., & Wood, R. (2019b). Agricultural and forestry trade drives large share of tropical deforestation emissions. *Global Environmental Change*, *56*, 1–10. https://doi.org/10.1016/j.gloenvcha.2019.03.002

Persson, U. M., Henders, S., & Cederberg, C. (2014). A method for calculating a land-use change carbon footprint (LUC-CFP) for agricultural commodities — Applications to Brazilian beef and soy, Indonesian palm oil. *Global Change Biology*, *20*(11), 3482–3491. https://doi.org/10.1111/gcb.12635

Portillo-Quintero, C. A.; Sánchez-Azofeifa, G.A. (2010) Extent and Conservation of Tropical Dry Forests in the Americas. *Biol. Conserv.*, *143*, 144–155. https://doi.org/10.1016/j.biocon.2009.09.020.

QGIS.org. *QGIS Geographic Information System* [Computer software]. http://www.qgis.org (Accessed 24 November 2021).

QSR International. (1999) *NVivo Data Analysis Software*. https://qsrinternational.com/nvivo/nvivo-products/ (accessed on 23 August 2020).

Robinson, D. T., Brown, D. G., French, N. H. F., & Reed, B. C. (2013). Linking Land Use and the Carbon Cycle. In Reed, B. C., Brown, D. G., Robinson, D. T., & French, N. H. F. (Eds.). *Land Use and the Carbon Cycle: Advances in Integrated Science, Management, and Policy* (pp. 3–23). Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511894824.003

Sikor, T., Auld, G., Bebbington, A. J., Benjaminsen, T. A., Gentry, B. S., Hunsberger, C., Izac, A.-M., Margulis, M. E., Plieninger, T., Schroeder, H., & Upton, C. (2013). Global land governance: From territory to flow? *Current Opinion in Environmental Sustainability*, *5*(5), 522–527. https://doi.org/10.1016/j.cosust.2013.06.006

Tarrasón, D., Urrutia, J. T., Ravera, F., Herrera, E., Andrés, P., & Espelta, J. M. (2010). Conservation status of tropical dry forest remnants in Nicaragua: Do ecological indicators and social perception tally? *Biodiversity and Conservation*, *19*(3), 813–827. https://doi.org/10.1007/s10531-009-9736-x

Terrio, S. J. (1996). Crafting Grand Cra Chocolates in Contemporary France. *American Anthropologist*, *98*(1), 67–79. https://doi.org/10.1525/aa.1996.98.1.02a00070

Terzi, F., & Bolen, F. (2009). Urban Sprawl Measurement of Istanbul. *European Planning Studies*, *17*(10), 1559–1570. https://doi.org/10.1080/09654310903141797

Tetreault, D., McCulligh, C., & Lucio, C. (2021). Distilling agro-extractivism: Agave and tequila production in Mexico. *Journal of Agrarian Change*, *July 2020*, 219–241. https://doi.org/10.1111/joac.12402

Tregear, A., Kuznesof, S., & Moxey, A. (1998). Policy initiatives for regional foods: Some insights from consumer research. *Food Policy*, *23*(5), 383–394. https://doi.org/10.1016/S0306-9192(98)00044-X

Turner, B. L., Lambin, E. F., & Reenberg, A. (2007). The emergence of land change science for global environmental change and sustainability. *Proceedings of the National Academy of Sciences*, *104*(52), 20666–20671.

Turner, B. L., Lambin, E. F., & Verburg, P. H. (2021). From land-use/land-cover to land system science: This article belongs to Ambio's 50th Anniversary Collection. Theme: Agricultural land use. *Ambio*, *50*(7), 1291–1294. https://doi.org/10.1007/s13280-021-01510-4

United States Geological Survey (USGS), Department of the Interior. (2001) *Landsat-7 Image* (Scene ID: LE70240482001101EDC00). https://landsatlook.usgs.gov/bundle/LE07_L2SP_024048_20010411_20200917_02_T1.tar?requestSignature=eyJjb250YWN0SWQiOjI2MzMwMTg0LCJkb3dubG9hZElkIjoxMzc1NzExNTYsImRhdGVHZW5lcmF0ZWQiOiIyMDIyLTAzLTAzVDE3OjI5OjE1LTA2OjAwIiwic2lnb

mF0dXJlIjoiJDUkJGIyU0ZcL0dyTnlKVzh2dmtsN1VVQ3Q3ZXBDLkt4Qkc1VnFTb1plcXlCeTI5In0= (Accessed 15 November 2021).

United States Geological Survey (USGS), Department of the Interior. (2013). *Landsat-8 Image*. (Scene ID: LC80240482013078LGN02). https://landsatlook.usgs.gov/bundle/LC08_L1TP_024048_20130319_20200913_02_T1.tar?requestSignature=eyJjb250YWN0SWQiOjI2MzMwMTg0LCJkb3dubG9hZElkIjoxMzc1Nzc2NzksImRhdGVHZW5lcmF0ZWQiOiIyMDIyLTAzLTAzVDE3OjM5OjUzLTA2OjAwIiwic2lnbmF0dXJlIjoiJDUkJDJUUkJ5clltMFNFcFJVRDdqNlNJT2dJTnRDM2V5OHUwYm9DSlhOUzdld0IifQ== (Accessed 15 November 2021).

United States Geological Survey (USGS), Department of the Interior. (2019). *Landsat-8 Image* (Scene ID: LC80240482019047LGN00). https://landsatlook.usgs.gov/bundle/LC08_L1TP_024048_20190216_20200829_02_T1.tar?requestSignature=eyJjb250YWN0SWQiOjI2MzMwMTg0LCJkb3dubG9hZElkIjoxMzc1Nzg4NTgsImRhdGVHZW5lcmF0ZWQiOiIyMDIyLTAzLTAzVDE3OjQ0OjUyLTA2OjAwIiwic2lnbmF0dXJlIjoiJDUkJGkydWczTG5pNUh6bEVHTW51TXVrRUxHWEtcL25uUmswVmpSNTZlb0w3U0I0In0= (Accessed 15 November 2021).

Vasta, A., Figueiredo, E., Valente, S., Vihinen, H., & Nieto-Romero, M. (2019). Place-based policies for sustainability and rural development: The case of a Portuguese village “spun” in traditional linen. *Social Sciences*, 8(10), 1-17. https://doi.org/10.3390/socsci8100289

Vega Vera, N.V.; Pérez Akaki, P.P. (2017). Oaxaca y Sus Regiones Productoras de Mezcal: Un Análisis Desde Cadenas Globales de Valor. *Perspect. Rural. Nueva Época*, *15*, 103–132.

Verburg, P. H., Crossman, N., Ellis, E. C., Heinimann, A., Hostert, P., Mertz, O., Nagendra, H., Sikor, T., Erb, K.-H., Golubiewski, N., Grau, R., Grove, M., Konaté, S., Meyfroidt, P., Parker, D. C., Chowdhury, R. R., Shibata, H., Thomson, A., & Zhen, L. (2015). Land system science and sustainable development of the earth system: A global land project perspective. *Anthropocene*, *12*, 29–41. https://doi.org/10.1016/j.ancene.2015.09.004

Verhaegen, I., & Van Huylenbroeck, G. (2001). Costs and benefits for farmers participating in innovative marketing channels for quality food products. *Journal of Rural Studies*, *17*(4), 443–456. https://doi.org/10.1016/S0743-0167(01)00017-1

Wiskerke, J. S. C. (2009). On places lost and places regained: Reflections on the alternative food geography and sustainable regional development. *International Planning Studies*, *14*(4), 369–387. https://doi.org/10.1080/13563471003642803

CHAPTER 4. Commons, global markets and small-scale family enterprises: the case of mezcal production in Oaxaca, Mexico[7]

Interconnections among chapters

Chapter 4 presents the pressures of the growing mezcal markets to the governance of producer communities' territories. This is closely linked to Chapter 2 which presents the narratives, associated with artisanal, small-scale and sustainable production, used to encourage the demand of mezcal in distant markets and how these contrast with the situation in producer communities that are experiencing a growing pressure on their community lands and the local institutions in charge of its management. The conflicts and challenges that commons institutions are experiencing — detailed in Chapter 4 — are directly linked to the LULC (Land Use and Land Cover) processes described and analyzed in Chapter 3.

ABSTRACT

Interactions with global markets offer development opportunities for Indigenous communities. They also place pressure on the natural resources that communities depend upon for their livelihood and, in many cases, their political and cultural autonomy. These markets often interact with family-based enterprises embedded within commons, with important implications for the social relationships and shared territorial resources that characterise such regimes. In this paper, I analyse the relationships that exist between commons, global markets, and small-scale family enterprises, using the case of mezcal production — an alcoholic beverage made from agave — in an Indigenous community in Oaxaca, Mexico. Most mezcal production is organized at the family level; yet the raw materials and inputs (land, wild agave, firewood, water) necessary for making mezcal are held communally and regulated by locally-crafted institutions. Empirical data show that as family enterprises engage with an emergent global market for mezcal, the commons become essential for not only protecting territorial resources but also maintaining a degree of autonomy from powerful global markets and value chains.

[7] A version of this chapter was published as: Lira, M. G., Robson, J. P., & Klooster, D. J. (2022). Commons, global markets and small-scale family enterprises: The case of mezcal production in Oaxaca, Mexico. Agriculture and Human Values. https://doi.org/10.1007/s10460-021-10293-z

However, this requires substantial investment in monitoring and enforcement, and for community members to value sustainable commons management over short-term economic self-interest. To seek autonomy while participating in global markets, producer families also join together to develop cooperative strategies to access markets on better terms.
Keywords: *Commons; Mezcal; Indigenous communities; Oaxaca; Global markets; Agave; Land use land cover.*

4.1 Introduction

In interacting with global markets, Indigenous and local communities are presented with a range of economic development opportunities that can challenge their autonomy and the sustainability of local resources important for subsistence. Scholarship on the commons exhibits an uneasy relationship with the market, focusing on relatively undifferentiated communities "distant" from, or not heavily influenced, by market processes and machinations (Agrawal, 2001; Sengupta, 2004), or where resource use is destined for local consumption only (Bray, 2020). For some, markets are viewed with open hostility; with commoners encouraged to reject the market and "build their own worlds without the [problem of] bureaucratic procedures or confining social roles" (Bollier & Helfrich, 2015). Such views are predicated on the idea that market integration delivers largely negative consequences for commoners and common property resources alike (McKean, 2000) — from depletion of shared resources (Jodha, 1985; Bollier & Helfrich, 2014) to the weakening of foundational social relationships and institutions (Agrawal, 2001). Market principles (of efficiency, competitiveness and profit maximization) can lead users to overexploit resources for cash income (Jodha, 1985; Ostrom, 1990; Colchester, 1994), create problematic alliances between community members and external actors (Azhar, 1993 as cited in Agrawal 2001), and trigger internal power struggles as subgroups move to consolidate access and influence over decision-making (Agrawal, 1999; Fernandes et al., 1988). Market integration may also drive a "specialization of tasks" that negates the need for collective action and collective work arrangements (Agrawal 2001). Such impacts and changes can concentrate benefits in the hands of a few, leading to a process of "decommonisation" (Nayak & Berkes 2011).

Yet, explore a little deeper and evidence of commons interacting in important ways with external markets emerges, both past and present. Market exchange has been and continues to be a major reason why rural communities are established and settled in the first place (Sengupta, 1995, 2004). Market incentives can motivate resource users to collectively solve issues around access rules, harvest or withdrawal rules and boundary conflicts (Acheson, 2003; Bray, 2020). Recent empirical work shows commoners participating in market exchange relationships through cooperatives, and community-based or social enterprises to collectively work either in production or marketing (Berkes & Davidson-Hunt, 2010; Davidson-Hunt & Turner, 2012; Nigh, 1997; Antinori & Bray, 2005; Vázquez Maguirre et al., 2018; Garibay Orozco, 2008; King et al., 2013; McCay et al., 2014; Crespo-Guerrero & Jiménez-Pelcastre, 2018) — often supported by peasant unions (see Mutersbaugh, 2002; Aranda & Morales, 2002 for good examples from Mexico).

While such cases show commoners engaging in marketbased relationships, many involve or address commonsmarket interactions based upon collective arrangements for the production and distribution of commodities. Limited attention is given to individual or family-level interactions, despite rural livelihoods being increasingly defined by 'nonagrarian' sources of income (Barkin, 2002; Kearney, 1996; Klooster, 2005), where integration into the global marketplace is based on the mobilization of resources, the conversion of those resources into products, and then the marketing and reuse of what is produced (van der Ploeg, 2008). For van der Ploeg (2008), the 'peasant condition'[8] is dynamic, and people living in rural communities will (indeed, should) seize opportunities that the market provides. In this way, the commoditization process is understood as both significant and necessary in agrarian societies; through (appropriate) market relationships, peasants gain control of the resource base and secure or maintain (relative) autonomy (van der Ploeg, 2008).

The challenge (for rural producers) is to strike an appropriate balance between the commoditization and noncommoditization of relationships (Henderson, 2017) so that they, and their communities, can resist the privatization (enclosure) of communal lands, diversify what

[8] The peasant condition is defined by nine elements (van der Ploeg, 2008): co-production (production and reproduction of the resource base), resource base, relations with markets, survival, further strengthening of the resource base, reducing dependency, striving for autonomy, pluriactivity and patterns of cooperation.

commodities they exchange into markets, gain a fair share of the value chain, and protect or even improve their resource base (van der Ploeg, 2010). When able to do this, rural producers and producer communities can better manage (and potentially reduce) dependencies (van der Ploeg, 2010), practice agency, and build "capacity to process social experiences and to devise ways of coping with life" (Long & Long, 1992, pp. 22–23). Thus, the question of how producers situate themselves in commodity value chains is an important one, since value chains can deliver an unbalanced distribution of benefits, whereby powerful actors monopolize highvalue activities, receive more economic benefits, and leave others unable to compete and move beyond low value-added activities (Gereffi & Fernandez-Stark, 2016; Barrientos & Gereffi, 2011; McMichael, 2013), especially in labour exporting regions (Barrientos, 2013).

This paper investigates how rural community interactions with an emergent global (commodity) market unfold in instances where rural production and its usufruct is organized into small units — i.e., family enterprises — but where the land and resources upon which production is dependent are collectively owned and managed through jointly-crafted institutions. The mediating role of such institutions may be challenged under conditions of rapid market integration and require measures to manage the evolving rights and responsibilities of community members. My case study is that of family-based mezcal production, embedded in an Indigenous commons regime in Oaxaca, southern Mexico. Mezcal is a craft spirit produced in Mexico from multiple varieties of the agave plant. Using cultivated or wild agave,[9] mezcal has long been produced at a small-scale in Jalisco, Oaxaca, Guerrero, Zacatecas, and Durango, among other states. Up until the turn of the century, most mezcal was "local"; consumed by the people living in these producer regions. But over the past 15–20 years, the global popularity of mezcal has grown and it is increasingly consumed by national and international urban elites (Bowen, 2015). Figure 1 shows how

[9] Agave plants that are not cultivated but grow naturally in portions of the landscape.

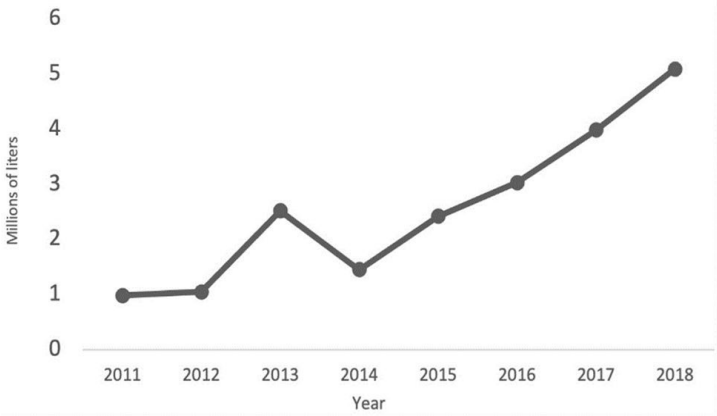

FIGURE 4.1 MEZCAL PRODUCTION IN MEXICO 2011–2018. (CREATED BY M. LIRA WITH DATA FROM CRM 2018).

demand has changed, with national production increasing from 980,375 L in 2011 to 5,089,667 L in 2018 (Figure 4.1), and the number of brands for export increasing from 68 to 240 over the same period (CRM, 2018).

In a context where production remains rooted in family distilleries (many using traditional, labour-intensive processes, tools and techniques[10]), how can 'producer' families and the communities they belong to, navigate the pressures of rapid market integration and, specifically, ensure that key production inputs (agave, land, firewood, and water) are sustainably managed? Especially in settings where these raw materials are held under community (not producer) control and ownership.

In the next section, I describe my case community — San Juan del Río — and study methods. I then present my findings, organized into four analytical areas or themes: overview of San Juan del Río commons; organization of mezcal production; market pressures; and, community responses to change. In my discussion, I critically reflect on the role of commons institutions in negotiating the growing pressures from the global mezcal market. I end with some brief conclusions.

[10] Such as in-ground ovens, mallets*, tahonas* (heavy stone wheels), clay-pot distillers, and wood fermentation containers.

4.2 Study community and methods

4.2.1 Study community

San Juan del Río is an Indigenous Zapotec community and municipality (of the same name), located 82 km from Oaxaca City (Fig 4.2). Situated in the foothills of the Sierra Norte (northern highlands), at the northern edge of Oaxaca's Central Valleys region, San Juan del Río holds title to a communal territory of 6948.4 hectares[11] of hilly terrain, with large expanses of tropical dry forest (TDF) and smaller areas of mixed oak/pine forest. It was home to 1,372 inhabitants in 2020, of which 82% were Zapotec speakers (INEGI, 2020). Its main locality stands at 1180 m.a.s.l.[12]

In most rural Oaxacan communities, including San Juan del Río, local governance combines long-held values and customs (*usos y costumbres*) with normative structures influenced by the State (Carrasco, 1961; Cancian, 1965; Recondo, 2007). Community members are self-governed by customary practices, legislated by a general community assembly, and enforced through three primary institutions: the Municipal Executive, or *Cabildo*; the Commissioner for Common Property (*Comisariado de Bienes Comunales*); and the Surveillance or Oversight Council (*Consejo de Vigilancia*). These bodies administer and oversee most civic and communal activities, services and infrastructure projects that take place within the localities where resident community members live and on the lands that the community holds title to (their 'territory'). Community members staff the above-mentioned administrative positions through a specific social institution known as the *cargo* system — a hierarchical structure of posts or tasks designed to underpin the functioning, cohesion, and harmony of community life, and the main mechanism by which members offer forms of civil, communal, and religious service to their community. Traditionally, all cargos are unpaid. In areas of civic and communal duty, cargo positions are held for a set period of time, generally ranging from 12

[11] This is the area noted in San Juan del Río's Community Statute (2013). However, the most updated version of the National Agrarian Registry records San Juan del Río's territory as covering 7121.41 hectares (RAN, 2021).

[12] San Juan del Río has three localities: the main village/town of San Juan del Río, and two much smaller localities of Tierra Morada and Daañ Viciaa Duun. While San Juan del Río registered 1372 inhabitants in 2020, Tierra Morada was unpopulated at the time of the most recent census, while Daañ Viciaa Duun had only two inhabitants (INEGI, 2020).

to 36 months in duration. At the end of their term, outgoing incumbents are replaced by the candidates newly elected by the community assembly. The assembly constitutes the formal space that brings community members together to make important decisions that affect their lives as individuals and as a collective. It is here that members discuss, debate, consider, and decide between courses of action and to elect peers to perform cargos within governance authorities and the various committees by which other community projects and initiatives are carried out (Hernández-Díaz & Robson, 2019).[13] It is also the space through which communities develop internal rules — often but not always captured in an *Estatuto Comunal* (community statute) — to govern access, use, and management of the community's collectively owned territory.

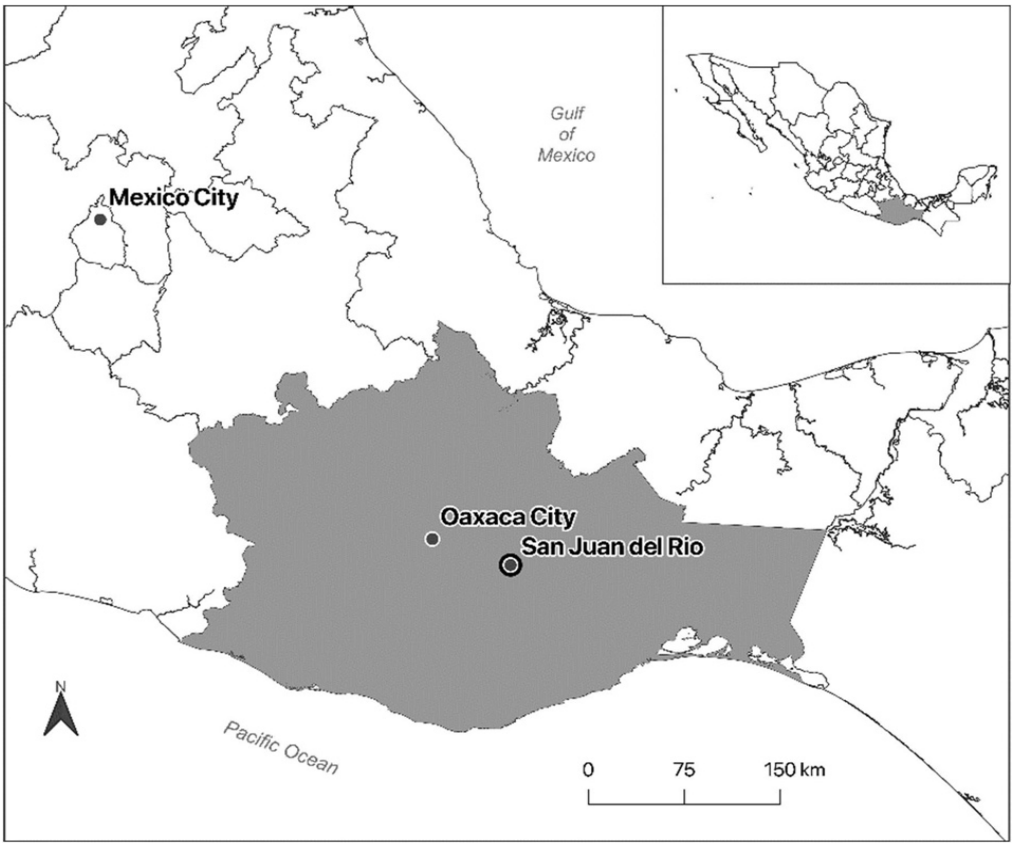

FIGURE 4.2 LOCATION OF SAN JUAN DEL RÍO, OAXACA, MEXICO.

[13] Reforms in the 1990s to officially recognize community election processes by the Oaxacan state government inspired subsequent recognition of usos y costumbres by governments across Mexico at federal and state levels (for more details, see Recondo, 2007).

(CREATED BY M. LIRA WITH DATA FROM INEGI. MARCO GEOESTADÍSTICO. 2017).

We worked in San Juan del Río for several reasons: its location in Oaxaca's so-called "mezcal region"; its status as an Indigenous (Zapotec) community[14] with a communally held territory; because agave cultivation and mezcal production are organized primarily at the family or household level; and, because mezcal produced locally is being sold to both national and international markets.

4.3 Methods

Primary field research took place over an 8-month period, from September 2018 to May 2019, and included data collection in San Juan del Río and the state capital, Oaxaca City. The first 2 months were spent observing the different stages of the mezcal production process in a family distillery that produced artisanal mezcal. This was a distillery where at least one family member was actively participating as a member of the community assembly during the period of the research. This initial period of participant observation and informal interviews was followed by an extended period of fieldwork during which in-depth, semi-structured interviews were conducted with key actors in San Juan's mezcal sector, current incumbents (cargo-holders) of the communal authorities, and representatives from some of the brands that source mezcal from producers in the community. In total, 24 interviews were conducted: 3 with community authorities, 16 with agave growers and mezcal producers, and 5 interviews with mezcal brand representatives.

The 3 community authority representatives were interviewed at length. These individuals were all male and in the 55–64 age range. Topics covered included: rules for accessing and using resources within the communal territory (namely, wild agaves, water and firewood); the enforcement of rules and sanctions; mezcal production process and community resources use; demand growth and impacts in community resources; relationship of producers with external market actors.

[14] This research formed part of a larger project on emergent markets for artisanal products — not only mezcal but also cacao and wild rice — where the selection of Indigenous communities as case studies was deliberate, to understand how biocultural heritage is often linked to artisanal production.

At the time of the research, San Juan del Río had around 25 mezcal producers with their own distilleries. The exact number of agave growers in the community is more difficult to determine (since the number can go up or down quite quickly in response to agave demand and price swings), but I estimated between 350 and 400 growers, with most cultivating at least 2 hectares. Agave growers and mezcal producers from San Juan were selected as research participants through a snowball sampling technique. Sixteen individuals were interviewed; 10 who both grow agave and produce mezcal (with their own distillery), and 6 who just grow agave. Fourteen of the 16 interviewees were male. Ten producers were in the 55–64 age range, three in the 40–54 age range, and three in the 25–40 age range. In the interviews, producers were asked about agave cultivation and the mezcal production process; the challenges and opportunities they face given increased market demand; the rules around access and use of territorial resources; and, the meanings and values attached to mezcal and agave within the community.

All interviews were audio recorded and transcribed. Following Bernard (2002), different key topics were identified and used as 'nodes' to code the data using qualitative data analysis software (NVivo 11) (QSR International, 1999), enabling associations to be identified between different themes and sources of data.

Finally, in this article I also make use of spatial data collected for a LULC analysis of San Juan del Río's territory for the periods 1993–2001, 2001–2013, 2013–2019 (see Lira et al., n.d.). These data are used on occasions to help illustrate the LULC change dynamics in San Juan del Río territory.

4.4 Results

4.4.1 San Juan del Río commons

As mentioned, San Juan del Río is an Indigenous community where village and territorial governance is structured according to a long-standing system known as usos y costumbres and where community members are elected to fulfil unpaid posts (or cargos) to staff municipal and agrarian (communal) authorities. While the municipal authorities take on civic (village) governance duties and responsibilities, the agrarian authorities (Commissioner of Communal

Resources and the Oversight Council) oversee territorial (land and natural resource) governance. In San Juan del Río, the cargos that comprise these authorities last for 36 months, at which point incumbents are replaced by a new set of elected officials (or cargo-holders). The Commissioner of Communal Resources is responsible for managing common property lands (*area de reserva comunal*), allocating plots of land for individual usufruct, extracting construction materials from a local riverbed for sale or local use, and addressing conflicts among community members regarding the use of lands and resources within the community's territory. Although community members can hold possession rights to individual plots of land, all lands and natural resources within the community's territory are communally owned and usufruct rights can be revoked. The main role of the Oversight Council is three-fold: to monitor territorial borders and maintain good territorial relations with the neighbouring communities of San Pedro Quiatoni, Santa Ana del Rio, San Lorenzo Albarradas, Santa Maria Albarradas, and Tepuxtepec Mixes; to report any local practices that might violate community law or threaten community resources; and provide a check and balance (oversight) to the actions and decisions of the *Comisariado*. Community members — men or women — over the age of 18 can hold possession rights of lands for individual usufruct, which are either assigned by the Commissioner or inherited from family members. Upon receiving these rights, community members are bestowed the title of *comunero* (commoner or common property rights-holder).

The central and western portions of San Juan del Río's territory are covered by tropical-dry forest (56% of land cover) interspersed with patches of agave crops (22%), while the eastern portion is dominated by pine/oak forest (22%). The main urban area is located in the centre of the community's territory and accounts for just 0.3% of land cover (Figure 4.3) (Lira et al. n.d.).

In San Juan del Río, rules around natural resources management are found within a written communal statute, which is approved by the community's assembly of commoners and recognized by Mexico's National Agrarian Registry (RAN). The statute explains the rights and responsibilities of individual comuneros, the roles and responsibilities of the communal authorities, and rules around the use and management of territorial resources, which include timber, firewood, water, lands, and fruit trees (San Juan del Río 2013). To maintain rights,

comuneros must comply with their obligations; for example, to serve in authority positions (servicios or cargos) or participate in community work (*tequios*). The communal authorities are tasked with applying these rules, enforcing the statute, and reporting to the membership-at large during community assemblies (*asambleas*).

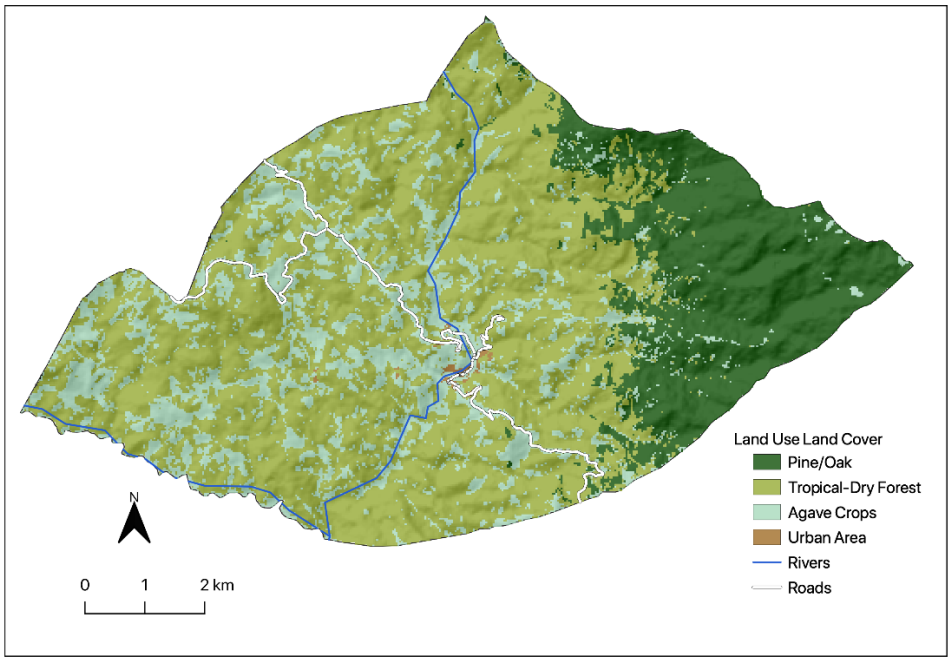

FIGURE 4.3 SAN JUAN DEL RÍO LAND USE AND LAND COVER 2019
SOURCE: LIRA ET AL. 2022.

The take-home message here is that mezcal and agave producers are also community members, most if not all are comuneros, and so, like other rights-holders, they are expected to participate in community assemblies and thus community-level decision-making processes. They can also be elected periodically to perform cargos within the civic and communal authorities, including positions of leadership. For instance, when the fieldwork was being conducted, at least two of the office-holders in San Juan's communal authorities were mezcal producers. Like all members, when participating in the assembly and making decisions, all hold equal rights regardless of their work or status as agave growers, mezcal producers, or whether they associated (or not) with any established production group. Although the statute indicates that women can hold rights and be part of the assembly, at the time of the research it was rare

for women to participate in assembly meetings, decision making or to hold authority positions in the community.

4.4.2 Organization of mezcal production in San Juan del Río

The mezcal produced in San Juan del Río falls into the category of artisanal mezcal, according to the official classification system laid out by national mezcal regulations (NOM-070-SCFI-2016). Although San Juan del Río producers occasionally use wild agaves, most mezcal is produced using the cultivated agave espadín (*A. angustifolia*). The elaboration of artisanal mezcal involves the baking of agave pineapples in an underground oven for 2 or 3 days (Figure 4.4), the chopping of agave using a machete, the crushing of agave pieces using a 400- or 500-kg stone wheel pulled by a horse, the fermentation of crushed agave mixed with water in large wooden vats (1 to 2-week process), and its double distillation in copper stills.

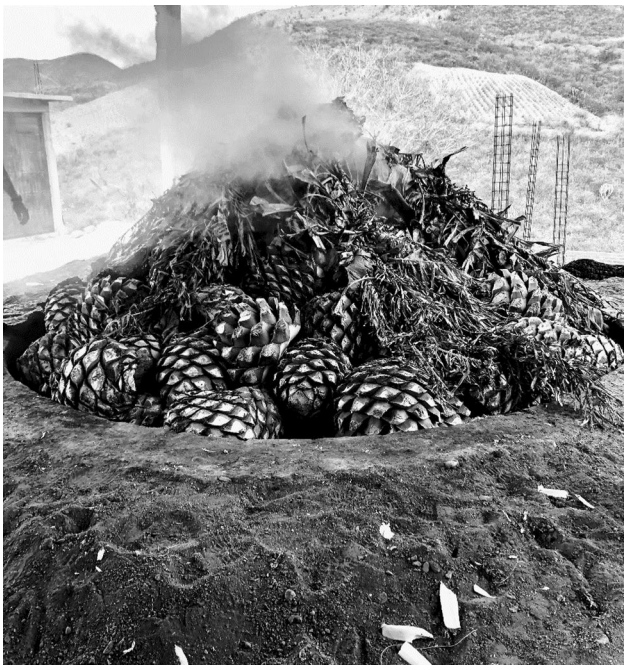

FIGURE 4.4 AGAVE PINEAPPLES BEFORE BAKING. PHOTOGRAPH BY LIRA.

The production of 1 L of mezcal requires between 6 and 10 kg of agave (depending on the species used and its sugar contents). Baking and distillation processes use from 6 to 8 kg of firewood per liter of mezcal produced. Baking usually requires oak firewood and distillation,

pine firewood. The producers interviewed for this research all purchased their firewood from neighbouring communities. Fermentation and distillation require anything from 18 to 25 L of water for each liter of mezcal produced. Water is typically sourced from the local river or nearby springs. The agave used to produce mezcal is cultivated and harvested in the community; however, when scarce locally, agave is sourced from outside vendors.

Mezcal production in San Juan del Río has traditionally been organized as a family-based activity. Male family members tend to be involved in the planting, harvesting, cooking, crushing and distillation stages of the production process, while women play important supporting roles during the distillation process, they work in the agave fields (planting and weeding), and prepare food for the distillery workers. In many cases, distilleries are located close to the family home, which provide opportunities for younger family members to get involved in associated activities.

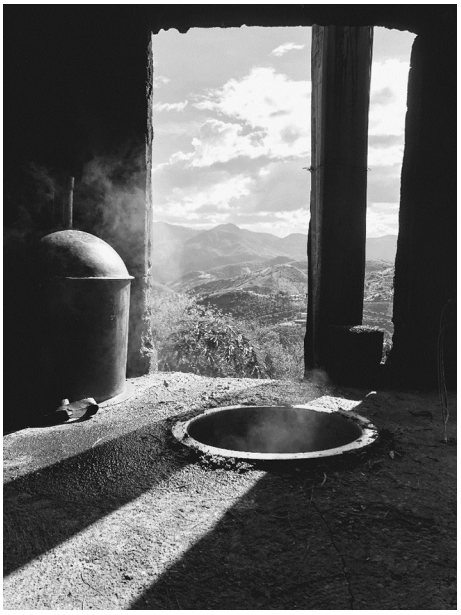

FIGURE 4.5 COPPER STILL IN SAN JUAN DEL RÍO.
PHOTOGRAPH BY LIRA.

Although communities like San Juan del Río have produced agave and mezcal for several generations, the scale of production has increased significantly in recent years. Two decades ago, producers were distilling 20 to 40 L of mezcal per month to sell locally or to other communities in the Sierra Norte Region of Oaxaca. Today, many producers receive orders from

external companies that bottle the mezcal under their own brand. Such orders amount to 5000 to 10,000 L annually, most with tight delivery deadlines (Figure 4.5). The largest mezcal still in the village produces up to 20,000 L per year.

Several mezcal brands (based in Oaxaca or Mexico City) are or have been supplied by producers from San Juan del Río; for example, Alipús (Los Danzantes), Mezcales de

FIGURE 4.6 AGAVE FIELDS IN SAN JUAN DEL RÍO. PHOTOGRAPH BY LIRA.

Leyenda, Unión, Sombra, and Atenco. These are companies which bottle mezcal under their own brands and sell and export thousands of bottles of mezcal per year, to both national and international buyers. For example, the brand 'Los Danzantes' first bought mezcal (20 L) from a family in San Juan del Río twenty years ago (Interview with Joel Antonio, mezcal producer in San Juan del Río, Oaxaca on 31 January 2019; Interview with Karina Abad, Los Danzantes in Matatlán, Oaxaca on 17 April 2019). As of 2018, it was producing over 200,000 bottles of mezcal per year, which it sells in Mexico, United States, Germany, Italy, Spain, Singapore, and Canada (Interview with Karina Abad, Los Danzantes in Matatlán, Oaxaca on 17 April 2019).

In San Juan del Río, partnering and interacting with external companies is normally structured around the company's needs and preferences. For some, supply contracts are used that specify very clear production volumes, deadlines and price points. Other companies prefer to avoid such contracts, instead placing orders as and when needed. In some cases, external buyers will keep placing orders with the same producer over a long period of time. For

example, three of the companies interviewed have maintained the same suppliers for over two decades. Some of these have built a brand and marketing image based on the name of the community, the name of the family, and even the faces of the producers. Although each have engaged in different ways with their suppliers, a relationship of trust has survived over many years in spite of market growth and associated challenges. In other cases, companies will replace their local producers if they find others, whether in San Juan del Río or elsewhere, offering lower prices or better able to meet company needs. For some mezcal producers, uncertainty around the availability of raw materials and labour make it preferable not to engage in long term contracts but rather meet orders from multiple external companies and brands.

In the case of agave cultivation (Figure 4.6), companies have signed contracts with local producers — with special permission from the communal authorities that were in office at that time — in which the company pays for inputs and labor (at scale) and receives a percentage (70 to 75%) of the harvest. Some growers will sign these kinds of contracts in order to secure a regular annual income. Given competition among growers, contracts can provide a degree of job security. In other cases, growers choose not to engage in contracts but sell their agave to intermediaries who buy as and when they need it.

4.4.3 Market pressures on the community

Mezcal and agave producers see the growing demand for mezcal as an economic development opportunity. Among other benefits, it has enabled a traditional activity and important source of cultural identity to be maintained. It has created employment and development opportunities in a relatively impoverished and marginalized rural region:

> *"Yes, now we have a source of work here. In the past, we did not sell much mezcal, we got no income from it and now we do, we earn enough to keep working and we can have some capital*" (Interview with Isaias, mezcal producer in San Juan del Río, Oaxaca on 20 January 2019).

Demographic data (INEGI 1990, 2000, 2010, 2020) shows San Juan's population fell from 1990 to 2010 but began to rebound from 2010 onwards (Table 4.1).

TABLE 4.1 POPULATION IN SAN JUAN DEL RÍO 1990–2020.

Year	Resident population
1990	1509
2000	1350
2010	1231
2020	1372

These trends are supported in my interview data that refer to periods of intense out-migration (to Oaxaca City, Mexico City and the USA) during the 2000's followed by reduced out-migration and notable return migration over the past decade.[15] In San Juan del Río, increased demand for mezcal was cited as one of the factor influencing the retention of community members and the decision of some migrants to return. More broadly in Oaxaca, growth in the mezcal industry has created an estimated 19,000 direct and 85,000 indirect jobs. (CRM 2018).

However, in San Juan del Río, community members and communal authorities spoke about the downside to growth associated with mezcal; with concerns about attendant pressures placed on local natural resources, especially land and wild agave species. This has focused increased attention among the community on how they regulate territorial access and use.

4.4.3.1 Wild agave

Most mezcal in Oaxaca, and also in San Juan del Río, is produced using cultivated Agave espadín (*A. angustifolia* with a life cycle of 4 to 8 years). But with the popularization of mezcal, consumers have started to appreciate and demand new varieties of this spirit, such as those made from wild agave species. In San Juan, mezcal made with wild agaves, such as Tepeztate (*A. marmorata*) (up to 25 years to maturation), Jabalí (*A. convalis*) (up to 12 years for maturation), Arroqueño (*A. americano*) (up to 25 years for maturation) and Cuish (*A. karwinskii*) (12–15 years to maturation), has become an added value product in an increasingly

[15] According to Passel et al. (2012), the reduced rates of migration to the USA and the return of Mexican migrants was the result of a combination of factors: US job and construction market crisis, more risks when crossing the Mexico-US border, increased border enforcement and deportations, broader economic conditions and the birth rate decline in Mexico.

competitive market. While production in San Juan continues to be dominated by cultivated espadín, some people in the community are producing wild agave mezcal, albeit at a smaller scale. Compared to espadín, the sugar content of wild agaves is significantly lower; thus, a larger number of individual plants are needed to produce the same amount of mezcal. According to the authorities in San Juan, rising market demands for new varieties of mezcal led to the depletion of some species of wild agave in neighbouring communities (*A. marmorata*, *A. convallis*, and *A. karwinskii*). The authorities made clear that local populations of wild agave (*A. marmorata*, *A. convallis*, and *A. karwinskii*) have been affected, with individual agaves becoming harder to find:

> *"We used to have much more [wild agave] and now it is starting to become scarcer because of the growing sales of mezcal"* (Interview with Surveillance Council President, in San Juan del Río, Oaxaca on 20 November 2018).

Although wild agave populations have not yet been depleted in San Juan, authorities are concerned that this could happen in the future.

4.4.3.2 Farmed agave

As part of a larger research project, I carried out a LULC analysis in San Juan for the periods 1993–2001, 2001–2013, 2013–2019. The results of this analysis, presented in Lira et al. (n.d.), show how the percentage cover of four different categories (Oak/Pine Forest, Tropical-Dry Forest, Agave Crops and Urban) has changed over that 26-year period. From 1993 to 2019, the area of Tropical-Dry Forest underwent a 12% reduction in territorial coverage, driven mostly by the expansion of cultivated agave. However, there was some variation in trends across the three sub-periods. Agave expansion (from 6 to 14% of the community's territory) between 1993 and 2001 was followed by a sudden slow-down in agave cultivation from 2001 to 2013 and a 1% recovery in Tropical-Dry Forest, before renewed expansion saw agave cultivation account for 22% of the community territory by 2019.

According to interview data, agave expansion in the first period of study was not linked to local mezcal production but driven by demand from tequila producers in Jalisco. Agave scarcity at that time, coupled with rising demand for tequila, encouraged community members to plant

large extensions of agave, mostly agave espadín, but also blue agave (*A. tequilana*). However, when this agave was ready to be harvested, the volumes purchased by buyers in Jalisco were lower than expected. This created an acute economic crisis in the community, forcing many to abandon their agave fields and out-migrate for work. In support of my LULC change data, interviewees stated that agave expansion stopped for the best part of a decade, until the popularization of mezcal led to renewed demand in the 2010's. Rising prices motivated producers in San Juan del Río to put more lands under agave cultivation. Furthermore, some people who had not previously grown agave started to do so. According to producers, steep slopes, dry weather, and local soils provide ideal conditions to grow good quality (high sugar content) agave espadín:

> *"Agave from here is sweeter, I trust more buying my agave from here than from outside. Sometimes, agave from outside is less sweet and the one from here is sweeter"* (Interview with Luis, mezcal producer in San Juan del Río, Oaxaca on 6 March 2019).

The opening up of so many new plots, however, was a cause for concern:

> *"Back in the day, we used to plant 500 or 1000 agaves. The rich people would plant 2000 or 3000 and they were still able to weed with a shovel. Now, with this whole mezcal boom, people are going crazy. They start to slash and burn their land plots at a larger scale and then it is not going to be possible to weed them out with the shovel. People fall into the trap of using herbicides to weed their plots. The authorities are worried about this"* (Interview with Rogelio Juan, President of the Commissioner of Communal Resources in San Juan del Río, Oaxaca on 11 November 2018).

In recent years, a number of community members have signed contracts with outside companies to grow agave, and at a larger scale than has been the norm. Authorities report that in 2017, 40,000 agaves were planted, with plans to plant a further 100,000 in 2018. These contracts see companies cover the labour costs (for planting, weeding twice a year and cultivating the agave) and provide a base salary of sorts for growers. When the agave is ready to be cultivated, the company keeps 75% of the harvest and the producer 25% (with the company buying up any unwanted surplus). These contracts were signed during an earlier administration of the Commissioner of Communal Resources without the knowledge of most

community members. The contracts contradict what is permitted by the communal statute, which makes clear that community members can only work their lands by themselves or in collaboration (sharecropping or renting) with other community members, but not in collaboration with external actors or people from outside the community.

> *"This [rule] is included in our statute, but I do not know if they [past administrations] never had the curiosity of review it and read the articles that are part of it. When we had our first assembly meeting, we read it [the statute] to all the rest of the assembly members and they liked that"* (Interview with Surveillance Council President, in San Juan del Río, Oaxaca on 20 November 2018).

The Commissioner of Communal Resources in place at the time of my research reported that they did not know why the previous administration allowed these contracts to be developed. They became a highly controversial and contested issue, requiring much debate and dialogue in the assembly throughout 2018.

4.4.3.3 Mezcal producers

Supplying batches of mezcal to external companies that bottle it under their own brand names has been a source of income for some mezcal producers in San Juan del Río. However, it can have drawbacks. Chief among them are the (low) prices that these companies pay to producers for unbottled mezcal (approximately 6 to 9 USD per liter), which does not properly compensate for the time, labour, knowledge, skills and resources invested in making that mezcal. Furthermore, the tight deadlines that brands impose make the production process complicated and stressful for producers, especially because of uncertainties around the availability of labour and raw materials. Moreover, local producers often felt uneasy about the relationship they have with external brands, which is often abused by the brands demanding large volumes of mezcal with extremely tight deadlines and then threatening to go to other producers or other communities if these are not met.

4.4.4 Community responses

4.4.4.1 Formal rules governing communal resources in mezcal production

San Juan del Río's statute contains the rules pertaining to the community's territorial (communal) resources. This statute was officially registered and updated in the RAN (National Agrarian Registry) on January 27, 2013. While I were given access to this current statute, I were not able to see the version it replaced. However, data obtained from RAN archives and interviews with current authorities suggests no significant changes from the pre-2013 version. Analysis of the current statute shows the varied rules in place to regulate access to (and use of) territorial resources. I focus on the most relevant ones (for this study) here.

As previously noted, community members are forbidden from collaborating with external actors or using external capital to work communal lands or extract communal resources. Community members can burn plots in order to ready the soil for cultivation but must first notify the authorities of their intention to do so. They can extract dead, old or diseased trees from communal areas (for domestic use, including in their distilleries), but cannot collect wood for private sale. It is strictly forbidden to fell trees from the forest located in the eastern portion of the communal territory, which is the community's only area of pine-oak forest. Community members can collect rocks, gravel and sand from the local river (with permission) for the construction or renovation of their own properties or distilleries. While permitted by the authorities, it is not explicitly mentioned in the statute.

There are rules specific to territorial resources used in agave cultivation and mezcal production processes. There are restrictions on the amount of firewood that people can take from common use areas, with a special permit required. In the past, when agave was produced at a smaller scale, mezcal producers were allowed to extract firewood — dead trees — from all such areas. Over the past twenty years, increased demand for firewood has seen further regulations and restrictions imposed. As a consequence, most mezcal producers in San Juan currently buy firewood from nearby communities, such as Tepuxtepec Mixes. Rules around land use show that community members are free to cultivate as much agave — or any other crop — as they would like on their own individual plots. But they must use their own monies and capital to do so. While community members can work together to grow agave, they are

expected to share the fruits of those labours. Community members are only allowed to grow agave in their individual plots and not in common use areas. Several rules are in place to regulate access to and use of water. During the long dry season — typically November to May — domestic (household) use is prioritized. During the rainy season (June to September), if water is not scarce, it can be used for productive activities, including mezcal production and agave cultivation. If a natural spring is located on a comunero's plot of land, they have the right to use it. If somebody else wants to use it, they need the permission of both the authorities and the landowner in question.

Developed through a participatory process,[16] San Juan del Río established a Biocutural Protocol in 2020 (Comunidad Indígena de San Juan del Río & Hernández Márquez, 2020), which comprised a set of expressions, rules and practices intended to frame how community members interact with external actors to protect and manage the community's biocultural heritage — from its natural resources (including plant diversity, water, forest and wildlife) to the traditional knowledge needed to grow agave and produce mezcal, to cultural heritage sites, customs and traditions (such as town festivities), traditional foods, handicrafts, and language. The protocol document makes note, on several occasions, about rising demand for mezcal and attendant pressures on local natural resources and traditional knowledge. It does not mention past problems related to external companies signing contracts with community producers to grow agave at scale. The protocol reproduces many of the rules contained in San Juan's most recent statute and introduces some "new" elements such as genetic resources, cultural heritage, and traditional knowledge yet to be enshrined in community law. It makes clear that the statute will be updated in due course to reflect these additional areas of concern and interest. The authors are unaware as to when that update might be realized.

4.4.4.2 Institutional responses to market pressures

Faced with pressures and impacts associated with rising market demand for agave and mezcal, the community has made a number of institutional responses, both formal and informal (Table 4.2).

[16] In collaboration with a private consultant and the support of a technical team from UNDP-GEF.

Wild agave: As mentioned, increased demand for mezcal made from wild agave, coupled with evidence of depletion of wild agave in neighbouring communities, is an issue of concern. This has prompted action by the communal authorities in San Juan:

TABLE 4.2 ISSUES RELATED TO MARKET INTEGRATION AND COMMUNITY RESPONSES IN SAN JUAN DEL RÍO.

Focus of impact	Change	Response
Wild agave	Growing market demand and related pressure on wild agave populations	• Verbal recommendations from authorities to community members to limit its extraction • Sought technical support from government authorities • Sought support for a wild agave nursery • Biocultural Protocol
Land	Contracts with external companies for cultivating espadín agave (contravening the community statute)	• Community dialogue • Enforcement of internal rules to impede the renovation of contracts • Sanctions on commoners • Biocultural Protocol
Commons institutions	Change in social relationships (within the commons), through alliances between market actors and community members (contracts for the production of agave at scale)	• Community dialogue
Mezcal production	Disadvantageous position in the value chain Precarious relationship with external companies that buy unbranded mezcal Uncertainty about resource and labour availability Low prices of unbranded mezcal Strict supply deadlines	• Collective initiatives for production and commercialization of mezcal to scale up in the value chain by adding value to their product, have more certainty about the raw materials and labour availability, and have more control on the production and distribution process

"Yes, they cannot cut wild agave if it is young. They can cut agave when it has its scape (quiote). Now, we have started to plant wild agave, but we just started this year. We do not want to lose our wild magueys. There are communities where they started cutting them non-stop and they never planted any. Now, these wild agaves are extinct in those areas. We do not want that to happen in our community. We asked SAGARPA (Secretariat of Agriculture and Rural Development) for their support to start an agave nursery. We already have the support of COMERCAM (Mexican Council for the Regulation of the Mezcal Quality) that is advising us on that matter" (Interview with Rogelio Juan, President of the Commissioner of Communal Resources in San Juan del Río, Oaxaca on 11 November 2018).

Although comuneros are being told in assembly meetings to limit the extraction of wild agaves, this has yet to be formalised through an update to the community statute; such that there are no rules or mechanisms in place to enforce compliance and sanction those who do not comply. Although the harvesting of wild agave is not yet widespread in San Juan itself, the authorities are worried what will happen if demand for such mezcal varieties continues to grow, especially for species such as tepeztate (*A. marmorata*), which take up to 25 years to mature. Demand for wild agave may create an unprecedented challenge for the community; it is uncertain whether people will follow the current recommendations given the economic gains on offer.

The previously mentioned biocultural protocol does not specifically mention wild agaves but does outline rules for the use of genetic resources — that could extend to agave — by community members and external actors. It states that projects involving access to genetic resources require authorization from the community authorities and supporting documentation that clearly outlines how these resources will be protected. The protocol does not regulate the sale of agave but does require buyers to declare in writing that said agave will be used to produce mezcal and not medications or cosmetics.[17] The penalty for failing to comply with these rules will be determined by the assembly.

Farmland: When the authorities (in place during the fieldwork) began their term in January 2018, they called a general meeting to discuss the issue of contracts with external companies. After much discussion, it was decided to allow existing (signed) contracts to continue but to stop new contracts from being signed and existing ones from being renewed:

> *"The good thing is that we have our internal rules, the community statute, where it is only allowed for community members to plant agave on their lands and collaborate with other community members, but not with outsiders. So, they came into the office saying that they had permission from the previous authorities. We told them that it is not possible to keep doing that because our rules forbid it. If they [previous administration] allowed [them] to plant 40,000 agave plants, we will respect that. For*

[17] According to this protocol, the use of agave for the elaboration of medications and cosmetics require further (access to the community genetic resources) discussion and negotiation that includes the agreement on mutual benefits and a fair and equitable participation of the community.

> *good or bad, they were also the authorities, but from now on we will not allow it. The reason is the same, we want to take care of our lands for our kids, these people [the companies] just want to take advantage of it, they will wear out our lands and leave* (Interview with Rogelio Juan, President of the Commissioner of Communal Resources in San Juan del Río, Oaxaca on 11 November 2018).

The companies involved insist that current contracts be honoured and be open to renewal. Although they promised benefits to the community, such as a new school, the authorities stood firm, and the previous administration and community members who signed contracts were fined for violating community laws. Those sanctioned were not happy but had to accept a decision supported by the community-at-large.

Interview data suggest that since the changeover of communal authorities, more attention has been paid to issues concerning land use and resource harvesting, with a willingness to invest in monitoring for changes and impacts. Interviewees made clear that the majority of community members respect the job that the current authorities have been doing, and that this has helped people come together to discuss appropriate rules to manage the growth of San Juan's mezcal sector. Community authorities noted how dialogue remains the most effective tool for conflict resolution among community members. As the incumbent President of the Commissioner of Communal Resources explained:

> "*It happens everywhere, even among family members there are disagreements, but when there are big problems that affect the family and the community, that is when we come together. The whole community is one voice. That is the beautiful thing about the community, we still have unity. That unity is what is helping us a lot […]. Maybe it would be something similar to the time when people wanted to work with the company, that was an issue we had but we brought it to the assembly. We talked to the people who were involved and other community members about the short- and long-term consequences that could bring. It was through dialogue that we did not allow these companies to stay in the community […] It is the perfect formula to solve issues here in the community. When we have any problem, we start a dialogue in the*

assembly and the presence of a group of distinguished citizens18 is key" (Interview with Rogelio Juan, President of the Commissioner of Communal Resources in San Juan del Río, Oaxaca on 11 November 2018).

However, the authorities still suspect that some individuals continue to break rules; for example, contracts with third parties being set up in secret, leading to additional agave cultivation on community lands. Furthermore, the authorities struggle to effectively monitor rule compliance; they monitor what they can with their limited resources (a single off-road vehicle) or rely on community members to tell them about infringements. The fear is that the profits that agave and mezcal can generate will lead some in the community to turn a blind eye to non-adherence to community laws. Offenders can be sanctioned with fines or even jail time for breaking rules, but they need to be identified first. When people reoffend, the communal authorities can ask for SEMARNAT (Secretariat of Environment and Natural Resources) to step in, but this has yet to happen in San Juan. Effective surveillance and monitoring are also affected by the community's extensive territory and hilly terrain, which make regular patrolling difficult. The authorities said that they needed advanced tools and technology, such as satellite imagery or even drones, to be able to monitor effectively.

Collective responses: Over the past 20 years, and in response to growing demand, the community has begun to see more group initiatives emerge as a way to scale up production and commercialization. One such group started as a collective in 2004, obtaining the first mezcal certification in the country. Despite internal conflicts, this group remains active with 4 members selling unbottled mezcal to external brands. A second group "Los Sanjuaneros", with 10 members, began in 2017 as a Rural Production Society (*Sociedad de Producción Rural*); the name given to associations of two or more rural producers under Mexican Agrarian Law. While they currently sell unbottled mezcal, their long-term goal is to have their own brand of mezcal to sell in Mexico and, eventually, to export to other countries. Their proposed brand has been registered under the name *Paar Lhií*, which means "for you" in the Zapotec language. Working together helps them navigate the challenge(s) of gaining access to an emergent global market. It lets them pool capital, increases their production capacity, and have a greater set of

[18] Trusted community members that already served as part of the community authorities.

knowledges and skills to deal with bureaucratic and market barriers. This makes the investment of time, money and energy (to form and maintain the collective) worthwhile. As well as producing for the group they belong to, most members also produce mezcal in their family distilleries to sell directly to regular clients.

Nine of 25 local distilleries in San Juan were not part of any group or cooperative, preferring to own distilleries, with family members only. In some cases, this was due to negative past experiences of being a part of producer collectives. In other cases, producers have never worked collectively and do not plan to. They prefer working with family to reduce the chance of conflicts — thereby work in their helping to maintain good relations with other community members, which underpin sustainable communal governance and key community celebrations and festivities.

4.5 Discussion

Scholars have reported on the negative consequences that market integration delivers for commons regimes — from encouraging unsustainable resource use to altering social relationships that benefit certain subgroups or individuals over others and the privatization of common resources (Jodha, 1985; Ostrom, 1990; Bollier & Helfrich, 2014; Agrawal, 2001; Azhar, 1993 as cited in Agrawal, 2001; Fernandes et al., 1988). The study we present here contributes to my understanding of Indigenous producers embedded in commons governance systems and their responses to significant market opportunities. The case of San Juan del Río points to increasing pressure on community lands due to growing demand (for agave and mezcal) from national and global markets, which in turn facilitates interactions between market actors and some community members to scale up agave cultivation. To date, this has not depleted the resource base or led to enclosure. Yet communal authorities are concerned about this happening if market demand continues to grow.

In rural Oaxaca, the rules, monitoring strategies, and conflict resolution mechanisms of current common institutions were not designed with a global mezcal market (and subsequent demand) in mind. The pace and scale of change in production in recent years has meant that San Juan has had to respond quickly to mediate relations between the market, agave and

mezcal producers, community resources, and the environment. This process of institutional change and adaptation is ongoing and has consisted (to date) of enforcing current rules (especially those tied to external capital and contracts), monitoring for rule-breaking, and encouraging continuous dialogue among community members. These steps resonate with some elements of van der Ploeg's (2008) concept of the peasant condition and the repeasantization process, described as the strengthening and improvement of peasant practices through defence of the resource base, to create agency and a degree of autonomy from the market. As argued by Van der Ploeg (2008), the relationship with markets is inherent to the peasant condition, but the collective and individual aspects of this relationship must be balanced by the existing patterns of cooperation — among other elements- which are the mutual arrangements that seek to improve the resource base and help in the struggle for autonomy. Contrary to observations elsewhere (Agrawal, 1999, 2001; Fernandes et al., 1988; Nayak and Berkes, 2011), commons institutions in San Juan del Río have not become obsolete nor seen a sustained concentration of power through market integration. Rather, they remain critical tools available to communities to help regulate, or at least shape, the relationship between the market, rural production systems, and communal governance. To date, the presence of these institutions, and mechanisms for institutional change, have enabled San Juan del Río to actively manage for resource sustainability, while allowing its members to work and profit from growing agave and producing mezcal.

However, my work also points to deficiencies in current collective action arrangements, especially the risks associated with limited dialogue (at a community level) and ineffective monitoring of actions and decisions taken by the communal authorities. Past incumbents of the Oversight Council failed to ensure that the Commissioner of Communal Resources complied with community-set rules, such that the issue of producers entering into contracts with outside companies was not raised and discussed until years after those contracts had been signed. In the meantime, some agave production lands were alienated from collective control — a possibility that exists in places where the resources necessary for rural production are governed communally, but production itself is organized and operated at the level of individuals or households. Espinosa Meza et al. (2017) have written about the advantages that

such production arrangements offer to participating families; in particular, facilitating the transfer of skills and knowledge that younger generations need to maintain practices and livelihoods across generations, as well as allowing for cost-effective labour because, in most cases, the work of family members is unpaid (see also Espinosa & Ramos, 2015). But they can also create the conditions for rapid market integration to bring about change at a scale and pace that (mediating) community institutions can struggle to control. The experience of San Juan points to the importance of contemporary commons regimes adopting a more proactive (adaptive) governance approach that can be positioned to anticipate the evolving rights and responsibilities of community members in response to changes in market-based relationships.

So, how does the experience of mezcal production in rural Oaxaca compare with other contexts where rural communities, through different forms of cooperative production, have sought to interact with global markets to reach economic goals while sustaining their resource use? In the Mexican context, forest communities have been among the more successful to organize and operate collective enterprises with different levels of success in global markets (Klooster, 1999, 2000; Garibay Orozco, 2008; Berkes & Davidson-Hunt, 2010; Davidson-Hunt & Turner, 2012; Nigh, 1997; Antinori & Bray, 2005; Klooster & Mercado-Celis, 2016). Work on community forest enterprises (CFEs) (Antinori & Bray, 2005; Bray, 2020) show how traditional governance institutions have been amalgamated with emergent collective enterprise structures to potentially offer wide-ranging benefits (from sources of employment to profit sharing, sustainable forest management, investment in public goods, and welfare programs) and a balance between economic equity and environmental stewardship. Likewise, communities producing agricultural commodities under collective schemes of organization have also shown a degree of success in balancing market access with sustainability in their production system (King et al., 2013; Crespo-Guerrero & Jiménez-Pelcastre, 2018; McCay et al., 2014). Such cases further suggest that collective forms of production can be a viable alternative for Indigenous and rural communities in dealing with global markets.

In San Juan, it was notable how many mezcal producers were reluctant to enter into collective production agreements with others in the community, with trust a key barrier. Yet, despite reservations, the challenges associated with marketing and selling their mezcal to

national and international buyers (lack of capital and labour, low production capacity, lack of marketing knowledge and skills) have prompted others to join forces to scale up production. This has led to a new production model that combines individual (family based) with collective production; that allows long-standing family production dynamics to persist while pooling the resources, knowledge and skills needed to interact with a global commodity market. Such a hybrid approach may see producers reaching a balance between commoditization and non-commoditization of relationships (Henderson 2017) which allows them to meet their economic goals, while also helping themselves and the communities they belong to, to maintain a sense of control over the resource base and some level of autonomy (Van der Ploeg 2008).

In summary, the commoditization of mezcal in Oaxaca, Mexico, is an example of how global market integration might allow producer communities the opportunity to pursue rural development goals without necessarily jeopardising sovereignty and control over local territorial resources. This resonates with van der Ploeg's (2008) characterization of the peasant condition, in which markets play a role in both delivering development opportunities and potentially strengthening the resource base (co-production). However, given periodic surges in demand for both mezcal and agave, risks remain. One obvious danger is that relationships struck up between family distilleries and external companies might see producers disregard or find ways to negate commons management institutions and pursue strategies that deplete communally-held resources (Jodha, 1985; Fernandes et al., 1988; Ostrom, 1990; Agrawal, 1999, 2001; Nayak & Berkes, 2011). San Juan has experienced this first-hand and debate whether local development needs can be reconciled with environmental sustainability in the individual and collective response to market opportunities. But the important lesson here is that they have not been powerless to react. That experience has been instructive and highlights (to producers) the value of being embedded within a territorial commons, which offers an institutional structure and set of mechanisms by which control of the resource base, and thus a degree of social-political-economic autonomy, can be sought and exercised. And recognizing the value of the commons and customary patterns of cooperation is fundamental if producers, and the communities they belong to, are to carve out a space in the market that meets

individual and family needs (and aspirations) while securing collective control over territorial resources.

4.6 Conclusions

Entering global commodity markets poses risks and challenges to rural communities. In Oaxaca, Mexico, mezcal production has traditionally been organized as a family activity based on family members' interactions, strong relationships, and the preservation of techniques and knowledge that have spanned generations. My research shows how growing market demand for agave and mezcal, and higher commodity prices, have led to changes in land use and social relationships that pose a threat to common property and natural resources in producer communities. However, the presence of locally-crafted institutions provides a means for communities to mediate relationships between family-based distilleries and external actors, and govern how producers respond to new market opportunities. This requires institutions that are flexible and adaptable — to ensure adequate monitoring of resources, enforcement when rules around resource access and use are broken, and healthy dialogue among community members to allow changes to be enacted when and where needed.

Challenges, however, remain. As the market delivers or promises opportunity, and producers look to eke out value from what they produce, so pressures on the commons emerge or increase. Communities and producers must respond in kind; the former by reworking commons management strategies to safeguard critical natural resources, and the latter experimenting with hybrid models of family collective production to scale up operations and navigate bureaucratic and marketing challenges. At the same time, markets can be fickle or volatile, with multiple potential scenarios possible for producer resulting from availability of agave and demand fluctuations of mezcal. Therefore, community institutions will need to learn (from past experiences) and become fully adaptive in order to manage for an uncertain future.

4.7 References

Acheson, J.M. (2003). *Capturing the commons: Devising institutions to manage the Maine lobster industry*. Hanover: University Press of New England.

Agrawal, A. (1999). *Greener pastures: Politics, markets, and community among a migrant pastoral people*. Durham: Duke University Press.

Agrawal, A. (2001). Common property institutions and sustainable governance of resources. *World Development*, 29 (10): 1649–1672. https:// doi. org/ 10. 1016/ S0305- 750X(01) 00063-8.

Antinori, C., & Bray, D. B. (2005). Community forest enterprises as entrepreneurial firms: Economic and institutional perspectives from Mexico. *World Development*, 33 (9): 1529–1543. https:// doi. org/ 10. 1016/j. world dev. 2004. 10. 011.

Aranda, J., & Morales, C. (2002). *Poverty Alleviation through Participation in Fair Trade Coffee Networks: The Case of CEPCO, Oaxaca, Mexico* (Unpublished Report). CEPCO. https://cfat.colostate.edu/wp-content/uploads/sites/63/2009/09/Case-Study-CEPCO-Oaxaca-Mexico.pdf

Azhar, R. (1993). Commons, regulation, and rent-seeking behavior: The dilemma of Pakistan's Guzara forests. *Economic Development and Cultural Change*, 42 (1): 115–128. https://doi.org/1 0 .1086/4 5206 7.

Barkin, D. (2002). The reconstruction of a modern Mexican peasantry. *Journal of Peasant Studies*, 30 (1): 73–90. https://d oi.org/1 0 .1080 / 03066 15041 23313 33242.

Barrientos, S.W. (2013). 'Labour chains': Analysing the role of labour contractors in global production networks. *The Journal of Development Studies* 49 (8): 1058–1071. https://doi.org/1 0 .1080/0 022 0 388. 2013. 780040.

Barrientos, S.W., & Gereffi, G. (2011). Economic and social upgrading in global production networks: A new paradigm for a changing world. *International Labour Review* 150 (3–4): 319–340. https:// doi.org/ 10.1111/j.1564-913X.2011.00119.x.

Berkes, F., & Davidson-Hunt, I. J. (2010). Innovating through commons use: community-based enterprises. *International Journal of Commons,* 4 (1): 1–7. https://doi.org/10.18352/ijc.206.

Bernard, H.R. (2002). *Research methods in anthropology: Qualitative and quantitative approaches*. Lanham: Altamira Press.

Bollier, D., & Helfrich, S. (2014). *The Wealth of the Commons: A World Beyond Market and State*. Amherst: Levellers Press. https://www.wealthofthecommons.org

Bollier, D., & Helfrich, S. (Eds.). (2015). *Patterns of commoning.* CSG-Commons Strategies Group. https://patternsofcommoning.org

Bowen, S. (2015). *Divided Spirits: Tequila, Mezcal, and the Politics of Production*. Berkeley: University of California Press.

Bray, D. (2020). *Mexico's community forest enterprises: Success on the commons and the seeds of a good anthropocene*. Tucson: The University of Arizona Press.

Cancian, F. (1965). *Economics and prestige in a Maya community: The religious cargo system in Zinacantan*. San Francisco: Stanford University Press.

Carrasco, P. (1961). The civil–religious hierarchy in Mesoamerican communities: Pre-Spanish background and colonial development. *American Anthropologist,* 63 (1961): 486–497.

Colchester, M. (1994). Sustaining the forests: The community-based approach in south and south-east Asia. *Development and Change,* 25 (1): 69–100. https:// doi. org/ 10. 1111/j. 1467- 7660. 1994. tb005 10.x.

Comunidad Indígena de San Juan del Río, & Hernández Márquez, G. Y. (2020). *Protocolo Comunitiario Biocultural de la comunidad agraria y municipio de San Juan del Rio, Oaxaca, Mexico*. https://absch.cbd.int/database/CPP/ABSCH-CPP-SCBD-253752?fbclid=IwAR3LDdXi-Sv0MC89fyfzbNX9tcFHl4nQ2vPIsHXOV0eZF3DmHXZZqWQitus.

Consejo Regulador del Mezcal. (CRM). (2018). *Informe estadístico*. http://www.crm.org.mx/PDF/INF_ ACTIV IDADES/INFORME2018.pdf.

Crespo-Guerrero, J.M., & Jiménez-Pelcastre, A. (2018). Orígenes y procesos territoriales del cooperativismo pesquero en la zona Pacífico Norte de Baja California Sur, México, 1850–1976. *America Latina En La Historia Económica,* 25 (1): 196–238. https://doi.org/10.18232/alhe.v25i1.841.

Davidson-Hunt, I.J., & Turner, K.L. (2012). Indigenous communities, the bioeconomy and natural resource development. *Journal of Enterprising Communities: People and Places in the Global Economy*. https://doi.org/10.1108/JEC.2012.32906CAA.001.

Espinosa, D., & Ramos, A. (2015). La informalidad de las MiPyMes del mezcal en el estado de Oaxaca. *Revista De Difusión Vía Red De Cómputo,* 1 (1): 716–731. https:// doi. org/ 10. 24836/ es. v27i50.465.

Espinosa Meza, D.E., Rivera González, G., & Maldonado Ángeles, B.E. (2017). Caracterizando la producción y organización de los mezcaleros en Matatlán, México "Capital mundial del mezcal." *Estudios Sociales*. https://doi.org/10.24836/es.v27i50.465.

Fernandes, W., Menon, G., & Viegas, P. (1988). *Forests, environment, and tribal economy*. New Delhi: Indian Social Institute.

Garibay Orozco, C. (2008). *Comunalismos y liberalismos campesinos*. Zamora: El Colegio de Michoacán.

Gereffi, G., and Fernandez-Stark, K. (2016). *Global value chain analysis: A primer*, 2nd ed. Durham: CGGC Duke University. https://hdl.handle.net/10161/12488

Henderson, T.P. (2017). Struggles for autonomy from and within the market of southeast Mexico's small coffee producers. *The Journal of Peasant Studies,* 46 (2): 400–423. https://doi.org/10.1080/03066150.2017.1382478.

Hernández Díaz, J., & Robson, J. (2019). Population, territory, and governance in rural Oaxaca. In Robson, J.P., Klooster, D.J. & Hernández Díaz, J. (Eds.). *Communities surviving migration: Village governance, environment, and cultural survival in indigenous Mexico*. Oxon: Routledge Taylor & Francis Group.

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (1990). XI Censo general de población y vivienda 1990. [Database]. https://www.inegi.org.mx/programas/ccpv/1990/ (Accessed 12 Mar 2020).

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (2000). XII Censo general de población y vivienda 2000. [Database]. https://www.inegi.org.mx/programas/ccpv/2000/ (Accessed 25 Mar 2020).

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (2010). Censo de población y vivienda 2010. [Database]. https://www.inegi.org.mx/programas/ccpv/2010/ (Accessed 12 Mar 2020).

Instituto Nacional de Estadística, Geografía e Informática (INEGI). (2020). Censo de población y vivienda 2020. [Database]. https://www.inegi.org.mx/programas/ccpv/ 2020/ (Accessed 25 Mar 2020).

Jodha, N. S. (1985). *Market forces and erosion of common property resources. Agricultural Markets in the Semi-Arid Tropics*. Proceedings of an International Workshop held at ICRISAT Center, India.

Kearney, M. (1996). *Migration, the new Indígena, and the formation of multi-ethnic autonomous regions in Oaxaca*. In Paper Distributed at the American Anthropological Association Annual Meeting, Riverside.

King, R., Adler, M.A., & M. Grieves. (2013). Cooperatives as sustainable livelihood strategies in rural Mexico. *Bulletin of Latin American Research* 32 (2): 163–177. https:// doi. org/ 10. 1111/j. 1470- 9856. 2012. 00796.x.

Klooster, D. (1999). Community-based forestry in Mexico: Can it reverse processes of degradation? *Land Degradation and Development,* 10 (4): 363–379. https://doi.org/10.1002/(SICI)1099-145X(199907/08)10:4%3c365:AID-LDR360%3e3.0.CO;2-T.

Klooster, D. (2000). Institutional choice, community, and struggle: A case study of forest co-management in Mexico. *World Development,* 28 (1): 1–20. https://doi.org/10.1016/S0305-750X(99)00108-4.

Klooster, D. (2005). Producing social nature in the Mexican countryside. *Cultural Geographies (formerly Ecumene),* 12: 321–344. https://doi.org/10.1191/1474474005eu334oa.

Klooster, D., & Mercado-Celis, A.. (2016). Sustainable production networks: Capturing value for labour and nature in a furniture production network in Oaxaca, Mexico. *Regional Studies,* 50 (11): 1889–1902. https://doi.org/10.1080/00343404.2015.1071915.

Lira, M.G., Davidson-Hunt, I.J., & Robson, J. P. (2022). Artisanal products and land use land cover change in Indigenous communities: The case of mezcal production in Oaxaca. *Land,* 11(3), 387. https://doi.org/10.3390/land11030387

Lira, M.G.; Davidson-Hunt, I.J.; Klooster, D.J.; Peyton, J. (n.d.) The Construction of Value around Mezcal and Its Impact on Indigenous Producer Communities in San Juan del Río, Oaxaca. Unpublished manuscript**.**

Long, N., & Long, A.. (1992). *Battlefields of knowledge: The interlocking of theory and practice in social research and development*. London: Routledge.

McCay, B.J., Micheli, F., Ponce-Díaz, G., Murray, G. , Shester, G., Ramirez-Sanchez, S., & Weisman, W. (2014). Cooperatives, concessions, and co-management on the Pacific Coast of Mexico. *Marine Policy,* 44: 49–59. https://doi.org/10.1016/j.marpol.2013.08.001.

McKean, M. A. (2000). *Community governance of common property resources.* Panel on "Governance and Civil Society," at the Fifth Annual Colloquium on Environmental Law and Institutions, Sustainable Governance, 1–7.

McMichael, P. (2013). Value-chain agriculture and debt relations: Contradictory outcomes. *Third World Quarterly,* 34 (4): 671–690. https://doi.org/10.1080/01436 597.2013.786290.

Mutersbaugh, T. (2002). Building co-ops, constructing cooperation: Spatial strategies and development politics in a Mexican village. *Annals of the Association of American Geographers,* 92 (4): 756–776. https://doi.org/10.1111/1467- 8306.00315.

Nayak, P., & Berkes, F. (2011). Commonisation and decommonisation: Understanding the processes of change in the Chilika Lagoon, India*. Conservation and Society* 9 (2): 132–145. https://doi.org/10.4103/0972-4923.83723.

Nigh, R. (1997). Organic agriculture and globalization: A Maya associative corporation in Chiapas, Mexico. *Human Organization,* 56 (4): 427–436.

Norma Oficial Mexicana NOM-070-SCFI-2016. Bebidas alcohólicas -Mezcal- Especificaciones. https://dof.gob.mx/nota_detalle.php?codigo=54727 87& fecha=23/02/2017.

Ostrom, E. (1990). *Governing the commons*. Cambridge: Cambridge University Press.

Passel, J.J.S., D'Vera, C., & Gonzalez-Barrera, A. (2012). Net migration from Mexico falls to zero- and perhaps less. *Pew Hispanic Center* 202: 1–41.

QSR International. (1999). *NVivo qualitative data analysis software* [Computer software]. https://qsrinternational.com/nvivo/nvivo-products/.

Recondo, D., (Ed.) (2007). *La política del gatopardo: Multiculturalismo y democracia en Oaxaca*. Mexico City: Centro de estudios mexicanos y centroamericanos. https://doi.org/10.4000/books.cemca.2066.

Registro Agrario Nacional (RAN). (2021). Padrón e historial de núcleos agrarios (PHINA). Ficha del núcleo agrario: San Juan del Río, Oaxaca. www.phina.ran.gob.mx (Accessed 18 Jan 2021).

San Juan del Río. (2013). *Estatuto comunal del Núcleo Agrario de San Juan del Río, Tlacolula, Oaxaca.* Internal, unpublished community document. Community of San Juan del Río, Tlacolula, Oaxaca.

Sengupta, N. (1995). Common property institutions and markets. *Indian Economic Review,* 30 (2): 187–201.

Sengupta, N. (2004). *Common mistakes about common property*. In Paper prepared for the IASCP Tenth Biennial Conference, Oaxaca.

van der Ploeg, J.D. (2008). *The new peasantries: Struggles for autonomy and sustainability in an Era of Empire and Globalization*. London: Routledge.

van Der Ploeg, J.D. (2010). The peasantries of the twenty-first century: The commoditisation debate revisited. *The Journal of Peasant Studies,* 37 (1): 1–30. https://doi.org/10.1080/03066150903498721.

Vázquez Maguirre, M., L. Portales, and I. Velásquez Bellido. (2018). Indigenous social enterprises as drivers of sustainable development: Insights from Mexico and Peru. *Critical Sociology,* 44 (2): 323–340. https://doi.org/10.1177/0896920516688757.

CHAPTER 5. Conclusions

5.1 Introduction

This research analyzes the mezcal commoditization process, the impact on local land use dynamics and Indigenous commons, and the institutional responses that communities make as they integrate into global value chains. I did this by looking at the case of mezcal production in San Juan del Rio, an Indigenous Zapotec community in Oaxaca, southern Mexico. The recent boom in demand for mezcal, previously a "local" spirit that was primarily consumed in producer regions, has enabled an examination of the actors and institutions involved in its value chain, and an analysis of the interconnections among different elements that comprise the chain. I know that the creation of value through narratives is essential to marketing commodities at a national and global scale, facilitating upticks in demand. Yet, at the same time, value creation can obscure the relationships of production and the varied impacts at the site or sites at which these products are produced. This creates a tension that must be critically analyzed to understand who is benefiting from the growing demand of mezcal and how rural and Indigenous producers are trying to resist impacts to their common territories and livelihoods and at the same time attempting to capture more benefits from being part of this value chain.

Chapter 1 of this thesis introduced a theoretical framework that was developed to help identify the nature of these interactions and processes and their impacts locally. It was informed by Appadurai's theory of value creation, the idea of manufacturing meaning, the Marxist concept of commodity fetishization, the emergent field of land systems science, and scholarship on the commons and New Peasantries. Separately and together, these works have helped me to identify and understand the commoditization of mezcal, how it impacts the commons of Indigenous producer communities, and the community-level responses to these impacts and associated changes. This chapter provides a comprehensive overview of the empirical research I have conducted. It begins with a summary of key findings for each of my three research objectives. It then details the main theoretical contributions of my study, acknowledges important research limitations, and concludes by reflecting on future research priorities.

5.2 Research objectives, main findings, and their relevance

Objective 1. Examine how Indigenous producers are integrated into the mezcal value construction process and the barriers they face to capture more value and meet their development goals.

This objective was addressed by Chapter 2 of this thesis. Framed by Appadurai's theory of value creation around commodities, the concepts of manufacturing meaning and commodity fetishization, this work analyzed the main actors, institutions and narratives that participate in the process of value creation, the role of Indigenous producers, and the barriers that these actors face to capture value in the emergent value chain for mezcal.

The commoditization of artisanal products has been suggested as a potential contributor to rural development, based on the idea that wide-ranging benefits such as new jobs (Tregear, 2001; Ventura & Milone, 2000), skills enhancement (Tregear, 2001), community vibrancy (Ray, 1998; Tregear, 2003), environmental sustainability (Vasta et al., 2019) and the production of healthy food (Nygard & Storstad, 1998) will flow to communities involved in their production. This idea has influenced rural development programs and policies (Barca et al., 2012; Bentley & Pugalis, 2014; Celata & Coletti, 2014; Hildreth & Bailey, 2014; Horlings, 2018; Pugalis & Bentley, 2014; van der Ploeg, 2008), which promote the revalorization of rural resources and cultures (De Jong et al., 2018; Rinaldi, 2017). Artisanal products such as mezcal have become a cornerstone of such revalorization. They espouse qualities of authenticity, uniqueness, specialty and originality, as well as the products' links to the territories and cultures of origin, and the traditional techniques of production, that embed them (Harvey, 2002; Hull, 2016). Yet increased interactions with external markets brings with it risks and challenges for producer communities, ranging from dependency relationships (Hudson & Hudson, 2003; McMichael, 2013) to the weakening of social capital, unfair competition, and the realities of inherent inequalities in global value chains (Goodman et al., 2012). Given the risks rural and Indigenous producers can face in global markets and the irreparable damage that can result to their resource base, common institutions and internal social dynamics, this analysis was important to know whether rural and Indigenous producers can truly benefit from participating in global markets.

My work under this objective described the historical process, actors and institutions that have enabled mezcal to become a globally demanded commodity. I found a process led by powerful elites (from entrepreneurs to NGO's, promotors, and artists), who have constructed institutions to govern mezcal production and trade at the national and global levels (OD and Official Norm NOM-070-SCFI-2016) that bolster their own interests. This process has largely neglected the role of rural and Indigenous producers, including the traditional knowledge they hold as distillers. Furthermore, the creation of value for mezcal has emerged less from the rural regions where mezcal is produced, and more from urban centres, driven by a narrative controlled by urban elites. The process of manufacturing meaning for mezcal has been based on narratives of non-mass production, links to the natural and cultural elements of mezcal production sites, association with Oaxaca and Mexico, uniqueness of flavour, sustainability, and social justice principles of production. These narratives have been used to position mezcal as a global commodity by responding to, as well as shaping, the values and demands of consumers far removed from mezcal production regions, adding powerful new actors to the value chain. As the value chain has grown and become more complex, I begin to see a production and distribution model emerge in which rural and Indigenous producers occupy a position that is far less central than the one that branding and marketing narratives portray.

In this model, I see 'artisanal mezcal' lean towards a production logic of mass-produced commodities, with dramatic increases in production, the standardization of techniques that threaten agave diversity and mezcal flavors, and arguably unsustainable territorial practices that drive not insignificant land use and land cover (LULC) change processes. The rural and Indigenous producers of mezcal are left disadvantaged through an unequal distribution of value along the value-chain resulting in their increased dependence on external market processes and actors, higher debt loads, and impacts on their local commons that they are required to manage themselves. Therefore, a power imbalance inherent in the design of mezcal certification and associated regulations functions to inhibit producers from gaining a more equitable foothold in these value chains. My study shows that participating in markets was not a straightforward path for mezcal producer communities' rural development; in fact, power imbalances in global-value chains put small-scale rural and Indigenous producers in

disadvantageous positions with a high risk of the emergence of dependency relationships with more powerful actors in the value chain.

Objective 2. Analyze how mezcal markets impact LULC dynamics in the producer community's territory.

In tropical country contexts, the impacts of agricultural production on LULC dynamics have been largely studied for industrially produced crops such as soybean and palm oil — showing how global markets for these crops are linked to dramatic deforestation and land cover conversion in South America and Asia in particular (Bilali et al., 2020; Bowen & Zapata, 2009; Capone et al., 2016; Moscatelli et al., 2017). For artisanal products, work has been limited to date and focused more on the cultural, social, economic, and broad environmental sustainability impacts of emergent linkages to global markets (Bilali et al., 2020; Bowen & Zapata, 2009; Capone et al., 2016; Moscatelli et al., 2017) with LULC dynamics in producer territories not a priority area of study.

Chapter 3 analyzed LULC dynamics in San Juan del Rio's communal territory, linking these dynamics to the emergence and trajectory of national and global mezcal markets. The importance of this analysis lies in the potential of markets to undermine producer communities' environment and their resource base to the point of making production unsustainable as demand grows.

For the first period of study (1993–2001), I saw how agave crops expanded from 6% to 14% of territorial land use, coinciding with the establishment of the mezcal DO and the Official Norm, and the arrival of agave buyers from tequila companies in Jalisco state — actors already well established within a global commodity market. The second period of study, 2001–2013, saw a pause in agave expansion process, attributed to a drop in prices and a lack of buyers for previously planted agave. This period saw a slight increase in TDF cover, while agave crops remained stable. During this same period, San Juan del Rio experienced an intense economic crisis due to the fall in demand for agave, forcing many community members to migrate to the USA and other cities in Mexico for work. The third period under study, 2013 — 2019, saw a return to agave expansion (from 14% to 22% of territorial land cover), underpinned by

increases in market demand and prices. In 2015, external mezcal companies entered into contractual agreements with local producers to plant large extensions of agave.

These findings show the extent of the LULC changes that unfold in places that (largely) maintain small-scale, craft production, and continue to use sustainability narratives to underpin the marketing of locally produced mezcal. It emphasizes the importance and relevancy of telecoupling as an emergent concept in land system science (Liu et al., 2013); showing how demand for artisanal products intimately links distant markets with "local" production sites, driving LULC change most often associated with industrially produced commodities. And these changes not only impact and modify ecosystems — such as tropical dry forest (TDF) in the case of Oaxaca's mezcal-producing region — but, in doing so, shape community development trajectories through the territorial goods and services accessible and available to producer communities. In the case of San Juan del Rio, the work also showed how local people's perceptions in relation to different types of natural vegetation cover inform how commodity production is allowed (or not) to alter LULC dynamics, prioritizing the protection of certain territorial resources over others. This research showed how LULC dynamics in an artisanal production site largely responds to global demand. While local commons have functioned to maintain a balance between profit from artisanal production and sustainable use of community resources, these have shown deficiencies that lead to LULC changes and conflicts in the local commons institutions. This leads to uncertainty about the effectiveness of these institutions in future scenarios in which demand grows leading to unsustainable production for the environment and resources of producing regions.

Objective 3. Examine how mezcal markets impact the commons of the producer community, including institutional responses to change.

Research on local commons highlights the myriad risks and challenges that global markets can bring to rural and Indigenous communities (McKean, 2000), such as the depletion of their shared resources (Colchester, 1994; Jodha, 1985; Ostrom, 1990), problematic associations between community members and external actors (Agrawal, 2001; Azhar, 1993) that create internal power struggles among subgroups (Agrawal, 1999; Fernandes et al., 1988), and a specialization of tasks that weakens the need for collective governance arrangements

(Agrawal, 2001). However, other work studying commons regimes has pointed to important interactions with markets that can facilitate and maintain important collective arrangements (Acheson, 2003; Bray, 2020), with plentiful examples from Mexican commons regimes (Antinori & Bray, 2005; Crespo-Guerrero & Jiménez-Pelcastre, 2018).

This final research objective on the relationship between the market and the commons was tackled in Chapter 4 of the thesis. Mezcal production offered an ideal and interesting case to investigate this, because while most mezcal production takes place at the individual and family level, these small-scale production systems are embedded within larger commons regimes, where land and other environmental resources and materials upon which production is dependent are managed and owned under collectively crafted institutions. Growing demand for agave and mezcal from national and global markets has placed multiple pressures on San Juan's community lands (as seen in Chapter 3, under Objective 2) and associated governance institutions. Such institutions were not designed necessarily to face the scale or pace of change that integration into a global commodity market can trigger. Institutions can be slow to respond; it takes time to for them to find their feet (as it were) and adapt to deliver improved enforcement of existing rules, the crafting (and formalisation) of new rules, enhanced monitoring, and the constant dialogue (among community members) needed to keep on top of things.

Despite the difficulties San Juan faced in responding quickly and appropriately to the pressures and changes evident at a landscape scale, my analysis makes clear that rather than being rendered obsolete by fast-paced change, local common institutions, with some failings, have functioned to help mediate the interaction between producers and the market and maintain an uneasy balance between profit generation (from mezcal) and the sustainable management of community resources. I say 'uneasy' because I found deficiencies in the community's collective arrangements, including the problems that emerge during periods of limited dialogue among community members, and how insufficient oversight of community authorities (and the decisions they take) leads to problems that take a long time to resolve or reverse. In San Juan, a previous common property commissioner broke community rules, and authorized contracts between local producers and external actors. This ushered in a period of

agave expansion, which led to both tensions and conflicts among community members and changes in the landscape. The eventual institutional responses to these issues have been controversial; many community members are also mezcal and agave producers and they can see their economic opportunities being limited by these responses. For the time being, collective investment in the commons has enabled an important check and balance to be in play. Although commons institutions were not originally designed to deal with global markets, these have shown a degree of adaptability to the current challenges that producer communities face in the presence of global markets. But it is not clear whether a communalist ethic and associated institutional arrangements can effectively govern this balancing act between the commons and the market if demand for mezcal continues to grow; furthermore, it is not clear if commons institutions can be sufficiently resilient to manage the growing pressures and challenges as more powerful actors get involved in the value-chain. The findings from Chapter 3 around LULC change in San Juan del Rio are testament to the pressures that can accrue.

Some structural changes have begun to emerge, such as how producers on the ground can deviate in how they approach and consider modes of production. Some mezcaleros in San Juan were adamant that they would remain family-based in their form of production and not partner up with others in the community. Others, however, were opting for or contemplating a hybrid model that combines family based with collective production — based on the rationale that organizing in this way would allow individual producers to maintain family production dynamics while being able to access a larger pool of resources, knowledge, and skills to successfully compete in global markets. If this trend continues, it will likely inform how commoners who are also producers act, voice their opinions, and are dealt with on the community stage.

5.2.1 Interconnections between research objectives

The three different objectives of this thesis, presented in chapters 2, 3 and 4 of this thesis have different points of connection among them. Figure 5.1 is a version of the theoretical framework (first presented in Chapter 1 of this thesis) that has been modified to show the specific results from my work in some of the white boxes, framed by the theories presented in the introduction

of this thesis (green, orange and red boxes), and the relationships between the different objectives and results of the thesis are shown with arrows.

The linkage between Objective 1 — addressed in Chapter 2 — and Objective 2 — addressed in Chapter 3 — lies in the value creation process, whereby the manufacturing of meaning around mezcal drives the demand that, in turn, triggers the expansion (or stabilisation or contraction) of agave crops. Simultaneously, the process of LULC change triggers conflicts and tensions in the commons institutions that govern the use and management of shared territorial resources (Objective 3, presented in Chapter 4). Furthermore, commodity fetishization (Chapter 2) links to both LULC impacts (Chapter 3) and commons impacts (Chapter 4), since the problems associated with mezcal production don't appear in the narratives used to market that mezcal; rather, they remain hidden from consumers in distant areas.

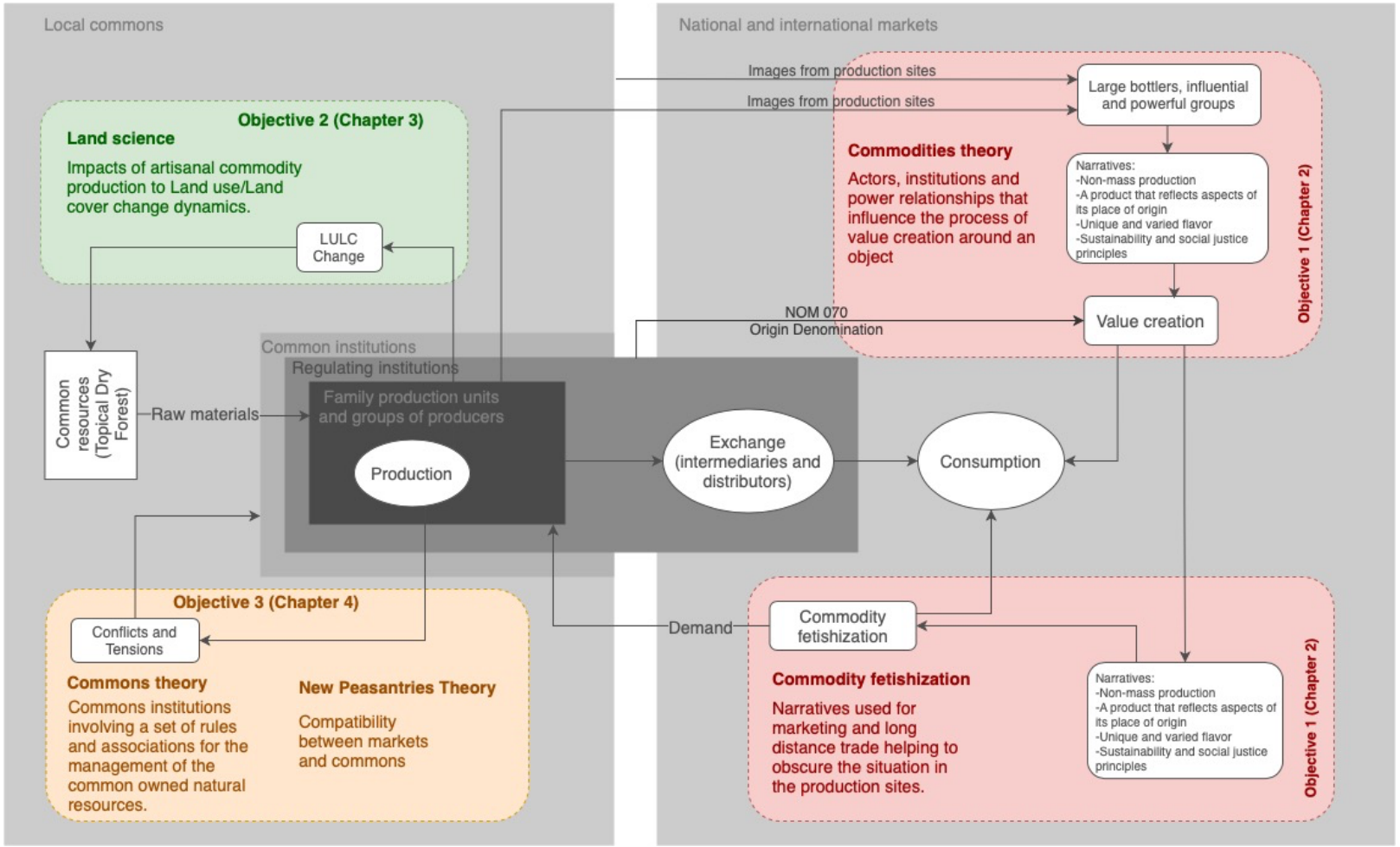

FIGURE 5.1 DIAGRAM SHOWING THE INTERCONNECTIONS AMONG RESEARCH OBJECTIVES AND CHAPTERS OF THE THESIS.

5.3 Theoretical contributions

My theoretical framework helped me (and, hopefully, the reader!) to consider, explore, and analyze the multitude of processes and realities at work in the integration or intersection of rural production, commodity markets and values, commons institutions, and sustainable land use. The commodities theory, manufacturing of meaning and fetishization concepts helped to frame the creation of value around mezcal and the implications for rural development (Chapter 2). Insights and lessons from Land Systems Science were used to consider LULC dynamics in rural and Indigenous territories linked to the emergence of global commodity markets and associated demand (Chapter 3). Scholarship on the commons and the New Peasantries were brought together to make sense of the impacts of global mezcal markets on Indigenous commons, and where contemporary commons regimes fit within this brave new world of globalised change. Thus, the thesis can contribute to multiple areas of theory and conceptual work. In this section, I unpack each in turn.

5.3.1 The commoditization of artisanal commodities

Framed by Appadurai's commodities theory (Appadurai, 1986) and the concept of manufacturing of meaning, my research shows how the process of value construction for artisanal commodities can be determined by powerful elites in the value chain who also design the institutions that rule and manage how the commodity is inserted in global markets (commodity context) and define the standards, criteria, and narratives (commodity candidacy) that give the commodity status to artisanal objects. By bringing the commodities' theory and the manufacturing meaning concept together with the Marxist concept of fetishization, the thesis contributes to my understanding of the narratives and actors that drive the commoditization of artisanal products, and goes beyond that to consider how messages, images and symbols — that build a narrative that associates a product with a particular culture, locality, tradition, collective memories and local history — function to hide or obscure from the consumer (located in some distant place) the negative outcomes impacting producer communities and their members.

These findings challenge the view that artisanal products are a net boon for rural development. They support the work of others (Barrientos & Gereffi, 2011; Goodman et al., 2012; McMichael, 2013; van der Ploeg et al., 2000; Ventura & Milone, 2000) who have previously questioned whether Indigenous and rural producers can benefit from integration into global markets, given how that typically involves insertion into a foreign production and distribution model. Furthermore, it highlights how the presence and influence of rural and Indigenous producers in the commodity context (the actors and institutions that determine if a product becomes a global commodity or not) defines the terms in which they will interact with markets, their position in the value chain, and the opportunities for them to meet their development goals. Therefore, my research highlights the need for Indigenous producers to participate in the design and operation of the mezcal regulatory institutions to take part of the commodity context that determines the commoditization of mezcal, therefore, improve the conditions in which they participate and capture benefits from this value-chain.

5.3.2 Lessons for land system science

The thesis contributes to the Land Systems Science literature by addressing the emergent market of artisanal products and how these are linked to LULC processes in rural and Indigenous territories. This expands the established focus on agro-industrial commodities (Browder et al., 2008; Gasparri, 2016; Hansen et al., 2009; Le Polain de Waroux et al., 2016; Morton et al., 2006; Persson et al., 2014) to consider other ways in which LULC change dynamics in tropical regions are shaped by global market demands.

It also builds on recent trends in Land Systems Science that adopt an interdisciplinary approach to better reflect the growing complexity of land systems, through the use of concepts such as 'telecoupling' (Liu et al., 2013; Pendrill et al., 2019). My work brought together spatial and qualitative data to examine LULC dynamics in Indigenous territories driven by the global demand for artisanal commodities from distant consumers. The work shows that despite the sustainability-infused narratives used to market artisanal commodities — promoted as an alternative to agro-industrial schemes of production — the production of such commodities can also drive important processes of LULC change in the biodiverse landscapes of rural and Indigenous territories. While local commons can help to balance the production and the

protection of the resource base, there is no certainty that the growing global demand of artisanal commodities cannot lead local production to become unsustainable. These LULC change dynamics pose challenges for territorial governance and impact the local ecosystems that provide important services and goods to these communities.

5.3.3 The commons and the market

Chapter 4 addressed the interaction of Indigenous commons with global markets. This is a relationship that has been a focus of attention in past scholarly work, either warning against the dangers of market integration for commons regimes — based on the idea that the logic of the commons and the logic of the market are incompatible — or providing evidence of commons interacting in important ways with markets through cooperatives and community-based enterprises that can support and benefit production systems (Antinori & Bray, 2005; Berkes & Davidson-Hunt, 2010; Davidson-Hunt & Turner, 2012; Klooster, 1999, 2000; Klooster & Mercado-Celis, 2016; Nigh, 1997).

My work was important because, to date, limited attention has been paid to settings where you have family-based enterprises embedded within commons interacting with global markets, with implications for those commons regimes. It thus had the potential to contribute to our understanding of such relationships and interactions and think through lessons for commons theory. While studies had suggested that markets weaken the commons through the depletion of resources (Bollier & Helfrich, 2014; Jodha, 1985), the breakdown of internal social relationships and institutions (Agrawal, 2001), the creation of problematic alliances with external actors (Azhar, 1993; cited in Agrawal, 2001) and power struggles among internal subgroups (Agrawal, 1999; Fernandes et al., 1988), my work found that global market demand for mezcal may place important pressures on community resources, but commons institutions are also capable of tempering rates of resource depletion and to “manage” market pressures and processes. The mediating role of common institutions in the interaction with markets aligns with the approach of authors such as van der Ploeg (2008) who view market relationships as inherent to the peasant condition, supported by collective arrangements such as common institutions.

My work suggests that despite sometimes significant pressures being placed on local environmental resources, communities are not powerless to act or react. The commons provide an institutional structure and set of mechanisms through which communities can respond and exercise a degree of socio-political-economic autonomy. Yet it is also apparent that global demand and value chain complexity will require commons institutions to adapt to improve monitoring and rule enforcement, and the nature and frequency of community dialogue and deliberations, while recognizing that their ability to influence the commoditization processes that drive changes at the local (production site) level is limited.

Furthermore, the model of family-based production can provide advantages in terms of knowledge and skills transfer to younger generations and the provision of cost-effective labour (Espinosa Meza et al., 2017). But it does make it very hard for producers to manage the demands of the market, and so despite the reluctance of some community members for more cooperative forms of production and marketing, my work is interesting for having illustrated how a hybrid model might emerge that combines individual (family-based production) with collective production — to allow producers to maintain family production dynamics while benefiting from pooled resources, skills, and knowledge. This development points to possible future pathways that producer communities might take to help them wrestle more control over the mezcal production process. What is harder to see is how collective or hybrid models of production can help producer communities can gain more presence among the actors and institutions that determine the creation of value around artisanal products. This is one of several areas that future work will need to coalesce around.

5.4 Market and communities' development

This research contributes to the discussion around the relationship between Indigenous communities and markets, often viewed as an alternative for rural development but also criticized given the potential risks for communities. In line with authors in gastronomy tourism (Ray, 1998; Ventura & Milone, 2000; Tregear, 2001; Tregear, 2003), Chapter 4 documents the benefits that markets can bring to producer communities such as the creation of employment opportunities and a source of income — inside the community — that improves the wellbeing

of local people and prevents out-migration; or the opportunity to preserve traditional activities (the fabrication of artisanal products) that are important sources of cultural identity for the community and revitalize community vibrancy.

Nevertheless, —and in accordance with some critics (Goodman & Goodman, 2009)—this research also shows that the relationship between markets and Indigenous producer communities can be complex, not always allowing producers to capture benefits or avoid the risks for their communities and shared resources. Chapter 2 shows how power imbalances often put Indigenous produces in disadvantageous positions in the value-chain, in which they perform low-value activities and have limited influence in the regulating institutions' decision-making. This situation reduces their opportunities to capture benefits and receive full credit from their artisanal production.

Furthermore, this study shows how markets and the fluctuating demand of artisanal products can put pressure on producer communities' common resources and institutions. In contrast to Vasta et al. (2019), Chapter 3 shows how artisanal production linked to global markets, rather than contributing to environmental sustainability, impacts LULC dynamics and agricultural practices, affecting local ecosystems; therefore, creating intra-community tensions and pressures on commons institutions. Nevertheless, my study is not consistent with the idea (Jodha, 1985; Bollier & Helfrich, 2014; Agrawal, 2001) that markets will necessarily lead to the depletion of shared resources and the weakening of commons institutions, given the evidence presented in Chapter 4 indicating how participation in global markets might allow producer communities to pursue their development goals without necessarily threatening the community's control over their shared territorial resources; yet the presence of locally-crafted institutions is key to mediate communities' relationship with markets as long as they are flexible and adaptable enough to face emerging challenges from growing market demand.

My findings indicate that participating in global markets, through the commoditization of artisanal products, is not a straightforward path for Indigenous communities to meet their development goals. Flexible and adaptable locally-crafted institutions are necessary to mediate the relationship with markets and to protect the autonomy and territorial resources of producer communities. In regards to global value chains, government and non-government

structures — designed with the participation of producer communities— are required to set the mechanisms (for example, including traditional distillers and the mezcal diversity in the DO and Standard) to help mitigating their vulnerabilities in the value chain and allow them to capture more benefits and recognition from their artisanal production.

5.5 Research limitations

Due to the lack of sources and informants, one of the limitations of this research was scarce information on the development of agave and mezcal production in the community pre-1990s, which would have helped to contextualise subsequent events. A further limitation was the lack of informants from the mezcal certification institution, the Mezcal Regulatory Council, which did not respond to my requests to talk with one of their representatives. This precluded me from learning about their perspective and experiences regarding the evolution of mezcal regulation and the role played by small-scale Indigenous producers. This would have been particularly helpful for work around Objective 1 (Chapter 2). Another limitation was the absence of LULC field data —to help verify the LULC supervised classification— due to the difficulty in accessing large areas of San Juan's territory and the lack of available local guides. Fortunately, the LULC participatory interpretation sessions with community authorities — who held extensive knowledge of LULC change across the territory— provided important data for this purpose and thus mitigated the extent of this limitation.

5.6 Directions for future research

As mezcal markets evolve, with attendant impacts on production, distribution and consumption, several lines of potentially important and fruitful inquiry present themselves. If market growth trends continue and producers respond in kind, there are resources (as key inputs to the production process) that are particularly vulnerable, such as water and firewood. Future research could help to track the use and management of these resources. In San Juan, the pressure on local water resources is of particular concern, given the large volumes of water required for mezcal production, the increasing demand of mezcal and the central role of water availability in securing local livelihoods. Firewood use is another problem or issue set to become more acute in time. Whether firewood is sourced locally or from neighbouring

communities, unsustainable harvesting threatens the integrity of pine and oak forests across the Central Valley and surrounding regions. This is a regional, inter-community issue that demands a similar pan-community approach to regulation and monitoring, presenting the possibility of very interesting community-to-community agreements which are not common in the Oaxacan context, and would add a layer of complexity to how commons management is traditionally understood and practiced. Such arrangements may become a necessary part of future adaptive strategies. Again, something for researchers to monitor and track.

In Chapter 3 of this thesis, local perceptions around the value of certain ecosystems, such as tropical dry forest (TDF), were seen to inform local efforts to manage agave expansion, and whether to scale back expansion to reduce "negative" impacts on natural vegetation cover. Further research is needed to understand local perceptions of TDF and whether (and how) a revaluation of underappreciated forest types is possible. This would be of interest not only in the Oaxacan context, but in rural Mexico and Latin America more broadly.

Chapter 2 discusses the need for rural and Indigenous producers to have more influence in the context that defined the commoditization of mezcal. Therefore, future research should address the best mechanisms by which rural and Indigenous producers from different regions can participate in the design, decision making and operation of institutions that regulate the production and trade of mezcal.

Lastly, given the volatility of supply and demand, and the price swings affecting agave, there would be some value in assessing community adaptive capacity under different growth (and contraction) scenarios and how well the institutions in place can manage with an oscillating relationship between producers and markets. As Chapter 2 made clear, producers are looking for opportunities to raise their position within the value chain to gain more economic benefits, more say in the narratives used to market mezcal, and to increase their profile within the institutions and among the actors that determine the commoditization process. Future research can track the evolution of these strategies in places like San Juan del Rio to examine their level of success, particularly as more powerful actors get involved in the value-chain. Furthermore, it is important to know the influence that producers gain from hybrid models of organization for mezcal production or the creation of their own brands. Such work

would help to construct a more complete understanding of the strategies by which mezcal regulating institutions can effectively support Indigenous producers and producer communities in their interactions with global markets.

5.7 Concluding remarks

Markets for artisanal commodities promise not only unique products sustainably crafted but also sustainable rural development for the producing regions. This research shows that the narratives used to market artisanal products do not guarantee rural sustainable development; in fact, these narratives can help to hide the negative impacts of artisanal production on producer communities' autonomy, territories, and commons institutions. Commons institutions have proven to attenuate the negative impacts of markets on producer communities and collective production and promise to mitigate the vulnerabilities of rural and Indigenous producers in global value-chains; however, this research shows that global markets do not guarantee sustainable rural development for producer communities. A successful integration to markets depends on the creation of mechanisms that allow rural and Indigenous producers more participation in the value-chain regulating institutions; the strengthening of producer communities' commons and the increase of collective or hybrid initiatives for branding and marketing.

5.8 References

Acheson, J.M. (2003). *Capturing the commons: Devising institutions to manage the Maine lobster industry*. Hanover: University Press of New England.

Agrawal, A. (1999). *Greener pastures: Politics, markets, and community among a migrant pastoral people*. Durham: Duke University Press.

Agrawal, A. (2001). Common Property Institutions and Sustainable Governance of Resources. *World Development*, 29(10), 1649–1672.

Antinori, C., & Bray, D. B. (2005). Community Forest Enterprises as Entrepreneurial Firms: Economic and Institutional Perspectives from Mexico. *World Development*, 33(9), 1529–1543. https://doi.org/10.1016/j.worlddev.2004.10.011

Appadurai, A. (1986). *The social life of things: Commodities in cultural perspective.* Cambridge: Cambridge University Press.

Azhar, R. A. (1993). Commons, Regulation, and Rent-Seeking Behavior: The Dilemma of Pakistan's "Guzara" Forests. *Economic Development and Cultural Change*, 42(1), 115–129.

Barca, F., Mccann, P., & Rodríguez-Pose, A. (2012). The case for regional development intervention: Place-based versus place-neutral approaches. *Journal of Regional Science*, 52(1), 134–152. https://doi.org/10.1111/j.1467-9787.2011.00756.x

Barrientos, S., & Gereffi, G. (2011). Economic and social upgrading in global production networks: A new paradigm for a changing world. *International Labour Review*, 150(3–4), 319–340.

Bentley, G., & Pugalis, L. (2014). Shifting paradigms: People-centred models, active regional development, space-blind policies and place-based approaches. Local Economy, 29(4–5), 283–294.

Berkes, F., & Davidson-Hunt, I. J. (2010). Innovating through commons use: Community-based enterprises. *International Journal of Commons*, 4(1), 1–7.

Bilali, H. E., Calabrese, G., Iannetta, M., Stefanova, M., Paoletti, F., Ladisa, G., Bottalico, F., & Capone, R. (2020). Environmental sustainability of typical agro-food products: A

scientifically sound and user friendly approach. *New Medit*, 19(2), 69–83. https://doi.org/10.30682/nm2002e

Bollier, D., & Helfrich, S. (2014). *The Wealth of the Commons: A World Beyond Market and State*. Amherst: Levellers Press. https://www.wealthofthecommons.org

Bowen, S., & Zapata, A. V. (2009). Geographical indications, terroir, and socioeconomic and ecological sustainability: The case of tequila. *Journal of Rural Studies*, 25(1), 108–119. https://doi.org/10.1016/j.jrurstud.2008.07.003

Bray, D. (2020). *Mexico's community forest enterprises: Success on the commons and the seeds of a good anthropocene*. Tucson: The University of Arizona Press.

Browder, J. O., Pedlowski, M. A., Walker, R., Wynne, R. H., Summers, P. M., Abad, A., Becerra-Cordoba, N., & Mil-Homens, J. (2008). Revisiting Theories of Frontier Expansion in the Brazilian Amazon: A Survey of the Colonist Farming Population in Rondônia's Post-Frontier, 1992–2002. *World Development*, 36(8), 1469–1492. https://doi.org/10.1016/j.worlddev.2007.08.008

Capone, R., El Bilali, H., & Bottalico, F. (2016). Assessing the sustainability of typical agro-food products: Insights from Apulia Region, Italy. *New Medit*, 15(1), 28–35.

Celata, F., & Coletti, R. (2014). Place-based strategies or territorial cooperation? Regional development in transnational perspective in Italy. *Local Economy*, 29(4–5), 394–411. https://doi.org/10.1177/0269094214533903

Colchester, M. (1994). Sustaining the Forests: The Community-based Approach in South and South-East Asia. *Development and Change*, 25(1), 69–100. https://doi.org/10.1111/j.1467-7660.1994.tb00510.x

Crespo-Guerrero, J. M., & Jiménez-Pelcastre, A. (2018). Orígenes y procesos territoriales del cooperativismo pesquero en la zona Pacífico Norte de Baja California Sur, México, 1850-1976. *América Latina En La Historia Económica*, 25(1), 196–238. https://doi.org/10.18232/alhe.v25i1.841

Davidson-Hunt, I. J., & Turner, K. L. (2012). Indigenous communities, the bioeconomy and natural resource development. *Journal of Enterprising Communities: People and Places in the Global Economy*, 6(3). https://doi.org/10.1108/jec.2012.32906caa.001

De Jong, A., Palladino, M., Puig, R. G., Romeo, G., Fava, N., Cafiero, C., Skoglund, W., Varley, P., Marcianò, C., Laven, D., & Sjölander-Lindqvist, A. (2018). Gastronomy Tourism: An Interdisciplinary Literature Review of Research Areas, Disciplines, and Dynamics. *Journal of Gastronomy and Tourism*, 3(2), 131–146. https://doi.org/10.3727/216929718X15281329212243

Espinosa Meza, D. E., Rivera González, G., Maldonado Angeles, B. E., Espinosa Meza, D. E., Rivera González, G., & Maldonado Ángeles, B. E. (2017). Caracterizando la producción y organización de los mezcaleros en Matatlán, México "Capital mundial del mezcal." *Estudios Sociales*, 27(50), 0–0. https://doi.org/10.24836/es.v27i50.465

Fernandes, W., Menon, G., & Viegas, P. (1988). *Forests, Environment, and Tribal Economy: Deforestation, Impoverishment, and Marginalisation in Orissa.* New Delhi: Indian Social Institute.

Gasparri, N. I. (2016). The Transformation of Land-Use Competition in the Argentinean Dry Chaco Between 1975 and 2015. In Niewöhner, J., Bruns, A., Hostert, P., Krueger, T., Nielsen, J. Ø., Haberl, H. Lauk, C., Lutz, J., & Müller, D. (Eds.), *Land Use Competition: Ecological, Economic and Social Perspectives* (pp. 59–73). New York: Springer International Publishing. https://doi.org/10.1007/978-3-319-33628-2_4

Goodman, D., DuPuis, E. M., & Goodman, M. K. (2012). *Alternative food networks: Knowledge, practice, and politics*. New York: Routledge.

Goodman, D. & Goodman, M. K. (2009). Alternative Food Networks. In Kitchin, R. & Thrift, N. (Eds.) International Encyclopedia of Human Geography. Amsterdam: Elsevier.

Hansen, M. C., Stehman, S. V., Potapov, P. V., Arunarwati, B., Stolle, F., & Pittman, K. (2009). Quantifying changes in the rates of forest clearing in Indonesia from 1990 to 2005 using remotely sensed data sets. *Environmental Research Letters*, 4(3). https://doi.org/10.1088/1748-9326/4/3/034001

Harvey, D. (2002). The art of rent: Globalization, monopoly and the commodification of culture. *Socialist Register*, 38, 93–110.

Hildreth, P., & Bailey, D. (2014). Place-based economic development strategy in England: Filling the missing space. *Local Economy*, 29(4–5), 363–377. https://doi.org/10.1177/0269094214535712

Horlings, L. G. (2018). Politics of Connectivity: The Relevance of Place-Based Approaches to Support Sustainable Development and the Governance of Nature and Landscape. In T. Marsden (Ed.), *The SAGE Handbook of Nature: Three Volume Set* (pp. 304–324). SAGE Publications Ltd. https://doi.org/10.4135/9781473983007.n17

Hudson, I., & Hudson, M. (2003). Removing the veil? Commodity fetishism, fair trade, and the environment. *Organization and Environment*, 16(4), 413–430. https://doi.org/10.1177/1086026603258926

Hull, G. (2016). Cultural Branding, Geographic Source Indicators and Commodification. *Theory, Culture & Society*, 33(2), 125–145. https://doi.org/10.1177/0263276415583140

Jodha, N. S. (1985). *Market forces and erosion of common property resources. Agricultural Markets in the Semi-Arid Tropics*. Proceedings of an International Workshop held at ICRISAT Center, India.

Klooster, D. (1999). Community-based forestry in Mexico: Can it reverse processes of degradation? *Land Degradation & Development*, 10(4), 365–381. https://doi.org/10.1002/(SICI)1099-145X(199907/08)10:4<365::AID-LDR360>3.0.CO;2-T

Klooster, D. (2000). Institutional Choice, Community, and Struggle: A Case Study of Forest Co-Management in Mexico. *World Development*, 28(1), 1–20. https://doi.org/10.1016/S0305-750X(99)00108-4

Klooster, D., & Mercado-Celis, A. (2016). Sustainable Production Networks: Capturing Value for Labour and Nature in a Furniture Production Network in Oaxaca, Mexico. *Regional Studies*, 50(11), 1889–1902. https://doi.org/10.1080/00343404.2015.1071915

Le Polain de Waroux, Y., Garrett, R. D., Heilmayr, R., & Lambin, E. F. (2016). Land-use policies and corporate investments in agriculture in the Gran Chaco and Chiquitano. *Proceedings of the National Academy of Sciences*, 113(15), 4021. https://doi.org/10.1073/pnas.1602646113

Liu, J., Hull, V., Batistella, M., DeFries, R., Dietz, T., Fu, F., Hertel, T. W., Izaurralde, R. C., Lambin, E. F., Li, S., Martinelli, L. A., McConnell, W. J., Moran, E. F., Naylor, R., Ouyang, Z., Polenske, K. R., Reenberg, A., de Miranda Rocha, G., Simmons, C. S., … Zhu, C. (2013). Framing Sustainability in a Telecoupled World. *Ecology and Society*, 18(2). http://www.jstor.org/stable/26269331

McKean, M. A. (2000). Community governance of common property resources. Panel on "Governance and Civil Society," at the Fifth Annual Colloquium on Environmental Law and Institutions. *Sustainable Governance*, 1–7.

McMichael, P. (2013). Value-chain Agriculture and Debt Relations: Contradictory outcomes. *Third World Quarterly*, 34(4), 671–690.

Morton, D. C., DeFries, R. S., Shimabukuro, Y. E., Anderson, L. O., Arai, E., del Bon Espirito-Santo, F., Freitas, R., & Morisette, J. (2006). Cropland expansion changes deforestation dynamics in the southern Brazilian Amazon. *Proceedings of the National Academy of Sciences*, 103(39), 14637–14641.

Moscatelli, S., Gamboni, M., Dernini, S., Capone, R., Bilali, H. E., Bottalico, F., Debs, P., & Cardone, G. (2017). Exploring the Socio-cultural Sustainability of Traditional and Typical Agro-food Products: Case study of Apulia Region, South-eastern Italy. *Journal of Food and Nutrition Research*, 5(1), 6–14. https://doi.org/10.12691/jfnr-5-1-2

Nigh, R. (1997). Organic Agriculture and Globalization: A Maya Associative Corporation in Chiapas, Mexico. *Human Organization*, 56(4), 427–436. https://doi.org/10.17730/humo.56.4.w761q3q1h4h8m247

Nygard, B., & Storstad, O. (1998). De-globalization of food markets? Consumer perceptions of safe food: The case of Norway. *Sociologia Ruralis*, 38(1), 35–53. https://doi.org/10.1111/1467-9523.00062

NORMA Oficial Mexicana NOM-070-SCFI-2016, Bebidas alcohólicas-Mezcal-Especificaciones.

Ostrom, E. (1990). *Governing the Commons*. Cambridge: Cambridge University Press.

Pendrill, F., Persson, U. M., Godar, J., & Kastner, T. (2019). Deforestation displaced: Trade in forest-risk commodities and the prospects for a global forest transition. *Environmental Research Letters*, 14(5). https://doi.org/10.1088/1748-9326/ab0d41

Persson, U. M., Henders, S., & Cederberg, C. (2014). A method for calculating a land-use change carbon footprint (LUC-CFP) for agricultural commodities — Applications to Brazilian beef and soy. *Indonesian palm oil. Global Change Biology*, 20(11), 3482–3491. https://doi.org/10.1111/gcb.12635

Pugalis, L., & Bentley, G. (2014). (Re)appraising place-based economic development strategies. *Local Economy*, 29(4–5), 273–282. https://doi.org/10.1177/0269094214541357

Ray, C. (1998). Culture, intellectual property and territorial rural development. *Sociologia Ruralis*, 38(1), 3–20. https://doi.org/10.1111/1467-9523.00060

Rinaldi, C. (2017). Food and Gastronomy for Sustainable Place Development: A Multidisciplinary Analysis of Different Theoretical Approaches. *Sustainability*, 9(10), 1748–1748. https://doi.org/10.3390/su9101748

Tregear, A. (2001). *Speciality Regional Foods in the UK: an Investigation from the Perspectives of Marketing and Social History* [Unpublished doctoral dissertation]. University of Newcastle.

Tregear, A. (2003). From Stilton to Vimto: Using Food History to Re-think Typical Products in Rural Development, 43(2), 91-107.

van der Ploeg, J. D. (2008). The New Peasantries. In The New Peasantries: Struggles for Autonomy and Sustainability in an Era of Empire and Globalization. London: Routledge.

van der Ploeg, J. D., Renting, H., Brunori, G., Knickel, K., Mannion, J., Marsden, T., de Roest, K., Sevilla-Guzman, E., & Ventura, F. (2000). Rural Development: From Practices and Policies towards Theory. *Sociologia Ruralis*, 40(4), 391–408. https://doi.org/10.1111/1467-9523.00156

Vasta, A., Figueiredo, E., Valente, S., Vihinen, H., & Nieto-Romero, M. (2019). Place-based policies for sustainability and rural development: The case of a Portuguese village "spun" in traditional linen. *Social Sciences*, 8(10), 1-17. https://doi.org/10.3390/socsci8100289

Ventura, F., & Milone, P. (2000). Theory and practice of multi-product farms: Farm butcheries in Umbria. *Sociologia Ruralis*, 40(4), 452–465. https://doi.org/10.1111/1467-9523.00160

Appendices

APPENDIX 1 CONFUSION MATRIX LULC SUPERVISED INTERPRETATION 2001.

	Pine/Oak	Tropical Dry Forest	Agave	Urban Zone	Total	User Accuracy	
Pine/Oak	80.00	10.00	0.00	0.00	90.00	0.89	
Tropical Dry Forest	0.00	192.00	36.00	0.00	228.00	0.84	
Agave	0.00	9.00	56.00	1.00	66.00	0.85	
Urban Zone	0.00	1.00	2.00	7.00	10.00	0.70	
Total	80.00	212.00	94.00	8.00	394.00	0.00	
Producer Accuracy	1.00	0.91	0.60	0.88	0.00	0.85	
Kappa							0.75

APPENDIX 2 CONFUSION MATRIX LULC SUPERVISED INTERPRETATION 2013.

	Pine/Oak	Tropical Dry Forest	Agave	Urban Zone	Total	User Accuracy	
Pine/Oak	52.00	22.00	0.00	0.00	74.00	0.70	
Tropical Dry Forest	0.00	209.00	5.00	0.00	214.00	0.98	
Agave	0.00	16.00	79.00	2.00	97.00	0.81	
Urban Zone	0.00	0.00	0.00	10.00	10.00	1.00	
Total	52.00	247.00	84.00	12.00	395.00	0.00	
Producer Accuracy	1.00	0.85	0.94	0.83	0.00	0.89	
Kappa							0.80

APPENDIX 3 CONFUSION MATRIX LULC SUPERVISED INTERPRETATION 2019.

	Pine/Oak	Tropical Dry Forest	Agave	Urban Zone	Total	User Accuracy	
Pine/Oak	63.00	9.00	0.00	0.00	72.00	0.88	
Tropical Dry Forest	3.00	206.00	18.00	0.00	227.00	0.91	
Agave	1.00	14.00	68.00	0.00	83.00	0.82	
Urban Zone	0.00	0.00	1.00	9.00	10.00	0.90	
Total	67.00	229.00	87.00	9.00	392.00	0.00	
Producer Accuracy	0.94	0.90	0.78	1.00	0.00	0.88	
Kappa							0.80

APPENDIX 4 LULC TRANSITION MATRIX 1993–2001.

	Pine/Oak (ha)	Tropical Dry Forest (ha)	Agave (ha)	Urban Zone (ha)	Total 1993 (ha)
Pine/Oak (ha)	1647.99	184.41	41.76	0.09	1874.25
Tropical Dry Forest (ha)	16.02	4061.97	757.08	5.58	4840.65
Agave (ha)	34.56	165.87	202.68	0.54	403.65
Urban Zone (ha)	0	0.18	0.63	1.98	2.79
Total 2001 (ha)	1698.57	4412.43	1002.15	8.19	7121.34

APPENDIX 5 LULC TRANSITION MATRIX 2001–2013.

	Pine/Oak (ha)	Tropical Dry Forest (ha)	Agave (ha)	Urban Zone (ha)	Total 2001 (ha)
Pine/Oak (ha)	1555.38	84.96	58.23	0	1698.57
Tropical Dry Forest (ha)	43.92	3825.45	543.06	0	4412.43
Agave (ha)	24.03	558.54	418.68	0.9	1002.15
Urban Zone (ha)	0	0.72	2.61	4.86	8.19
Total 2013 (ha)	1623.33	4469.67	1022.58	5.76	7121.34

APPENDIX 6 LULC TRANSITION MATRIX 2013–2019.

	Pine/Oak (ha)	Tropical Dry Forest (ha)	Agave (ha)	Urban Zone (ha)	Total 2013 (ha)
Pine/Oak (ha)	1514.07	43.47	65.52	0.27	1623.33
Tropical Dry Forest (ha)	22.5	3872.07	571.95	3.15	4469.67
Agave (ha)	17.1	89.55	905.31	10.62	1022.58
Urban Zone (ha)	0	0	0.27	5.49	5.76
Total 2019 (ha)	1553.67	4005.09	1543.05	19.53	7121.34

APPENDIX 7 INTERVIEW GUIDES

Extensive work with producers (family still) to map the production system of mezcal. Semi-structured interviews guide

This guide contains questions that will be used to elicit specific information about the production system. They are divided in three phases: appropriation, transformation and exchange.

Appropriation

1. Where do you obtain your resources from?
   a. Agave

   Cultivation (time of growth and labor) of purchase (from where?).

   b. Water

   From where, labor required, infrastructure required.

   c. Firewood

   Species, from where, labor required.
2. Volume required of each resource/month
   a. Agave (per specie)
   b. Water (in each step of the process)
   c. Firewood (per specie in each step of the process)
3. Do you have a stable supply of these resources throughout the year?

a. Agave
b. Water
c. Firewood

4. How much community land do you think is used to cultivate agave? What species are most commonly grown?
5. What do you think about the amount of land used to cultivate agave? Has it increased in the past 15 years?
6. What are the dominant wild agave species in the community? What is the time of growth of each agave species??
7. Do you think the populations of wild agaves have reduced during the last 15 years or as far back as your memory can go?
8. Which species do you think have reduced more? Why do you think this specie has reduced more than others?
9. Are agave, water and firewood important for you? Why?
10. Do you think water is scarcer than 15 years (or as far back as your memory can go) ago or is it more difficult to obtain it? Why?
11. Do you think there is less firewood available than 15 years ago (or as far back as your memory can go) or is it more difficult to obtain it? Why?
12. How do you think the popularization of mezcal has impacted agaves, water and firewood?

Transformation

13. When and how did you build your palenque?
14. How do you maintain it?
15. How many people work here? Family members? Salaries? Female or male?
16. What are their roles?
17. Explain the process, tools (materials) and techniques that you use for:
    a. Baking
    b. Fermentation
    c. Distillation

d. Packing

4. Where and how did you learn these techniques?
5. How long have you been doing it for?
6. What are the advantages of each technique and tool?
7. Would you change any of them?
8. How have regulations (certification) around mescal production impacted the tools and techniques you use?
9. Do you think they have affected some producers different than others?

Exchange

10. Who do you sell your product to?
11. Do you have a brand of your own?
12. Was it challenging for you to sell your product?
13. How have mezcal regulations impacted your access to clients and new markets?
14. What are other obstacles for you to commercialize your product at a national and international level?
15. Which producers have more access to markets?
16. Who benefits more from the regulations and certification processes?
17. What is the role of mezcal association producers?
18. How this association impacts producers (members and not members)?
19. How do you feel about selling your product at a national and/or international level?
20. How do you feel about mezcal becoming popular at a national and international level?

Semi-structured interviews with producers

1. When did you or your family start producing mezcal?
2. Was mezcal the only source of income for your family?
3. Why do you and your family keep producing it?
4. Is it your only source of income?

5. Are you a regular participant in the assembly of the community?
6. How often do you attend to the assembly?
7. How mezcal was perceived in the community when you family started producing it? How has it changed?
8. How has demand and revenue changed since you started?
9. Have you changed the way you produced mezcal due to increase in demand?
10. Why do you think mezcal has become popular at national and international scale?
11. Do you think government policies have helped to mezcal becoming more popular? Which policies? 12. Do you think these policies have benefited some producers more than others?
12. What do you think is the role of mezcal producers associations? Are you part of any of these associations? If so, what are the benefits and costs to be part of these associations?
13. Do you think some of the producers in the community have advantages over others? What advantages?
14. Who do you think are the most important actors (individuals, groups, associations or institutions) in the mezcal production business in the community? 16. Do you think producers have to build a relationship with these actors in order to succeed or get more benefits?
15. Do you think that there are some producers that have more benefits from having a stronger relationship with these actors or associations?
16. Do you think there is corruption among the government institutions and associations related to the production of mezcal? 19. Who does it get benefit from this corruption?
17. What is the process to follow if a producer wants to sell its product at a national and international level (regulations, certifications and other procedures)?

18. Have you gone through these procedures? Can you sell your product at a national and/or international level? What is the category of your product (ancestral, artisanal or mezcal)?
19. Do you have any certifications?
20. What has been the most challenging part of the processes to get a certification?
21. What are the benefits and disadvantages of certifications?
22. Do you think some producers have more disadvantages (illiteracy, no access to computers and internet, remoteness) than others when trying to go through these procedures?
23. What are the rules regarding access to land, agave species, water and firewood (who can access? How much can each community member extract or cultivate?)
24. How old are these rules?
25. Do you think rules have changed in the last 15 years (or as far back as your memory can go)?
26. Do you think rules have changed in response to mezcal popularization?
27. Do you think mezcal producers in general or some mezcal producers have privileges or disadvantages in the assembly decision-making?
28. Are any of the rules and regulations, sanctions regarding access to resources producing benefits and disadvantages to mezcal producers more than other community members that are not producers?
29. Are there any divisions among community members in the assembly?
30. Are those divisions related to the production of mezcal? How are these tensions solved?

Semi-structured interviews with community authorities

1. What is your role in the assembly?
2. What are your responsibilities?
3. Are you a mezcal producer?
4. What are your main sources of income?

5. How many active members are there in the assembly? How many of them are mezcal producers?
6. Do you think producers are seen or treated differently than other community members in the assembly? In what way?
7. How producers access resources (water, wild agaves, firewood, and land)? Are there rules in place? What are they?
8. Have these arrangements changed with the popularization of mezcal? In what way?
9. How do you perceive the availability of resources agave species populations now compared to 10 years ago (or as far back as your memory can go)?
10. How do you perceive the availability of water now compared to 15 years ago (or as far back as your memory can go)?
11. How do you perceive the availability of the trees that provide firewood now compared to 15 years ago (or as far back as your memory can go)?
12. How do you perceive the land uses in the community territory now compared to 15 years ago (or as far back as your memory can go)?
13. Are there any sanctions to community members if they break the rules of the assembly in terms of access to resources? Do these rules applie equally to producers and non-producers?
14. Have you perceived any tensions or divisions between producers and not producers that are in the assembly?
15. Have you perceived any groups of producers that have more influence in the decisions that are made in the assembly?
16. Have you perceived any conflict among different producers that are part of the assembly?
17. How the assembly addresses these conflicts and tension? Is it effective?
18. Do you think the popularization of mezcal has caused an increase of conflicts and tensions in the assembly or has unified the community in a certain way?
19. How these divisions and tensions affect the assembly?

Semi-structured interviews with distributors

1. When did you first try mezcal? When did you start your business or started working here?
2. What does mezcal mean to you? What do you associate the product with?
3. Do you see mezcal the same as Tequila? In what way?
4. What is the volume of mezcal that you buy for your business every month? Has it changed from when you started buying? Have the prices changed??
5. Where do you buy mezcal from? Why? How did you find out about that brand?
6. Why do you sell mezcal and why do you think people consumes mezcal?
7. What other drinks do you sell?
8. How do you compare mezcal to those drinks?
9. How do you think mezcal consumption was perceived in the past (10 to 15 years ago or as far back as your memory can go)?
10. How do you think mezcal consumption is perceived now?
11. Is it easy for you to find mezcal providers?
12. Do you think mezcal perception has changed among certain social groups in the last 15 years (or as far back as your memory can go)?
13. What kind of people are usually your clients (age range, socio-economic status, maximum grade of studies, occupation, ethnicity)?
14. Do you know if the mezcal that you buy is certified or is produced in a particular way (organic, artisanal, ancestral, industrial, etc.)?
15. Would it be important to you to know how the mezcal you buy is produced? Why? How would you like to think the mezcal you drink is produced? 1. 16. Does that mean any additional value for consumers?
16. Would you be willing to pay more for mezcal produced that way? How much more?
17. is it more available now than it was?

Semi-structured interviews with actors in mezcal value-chain

1. How your initiative started?
2. Issues observed that led you to this initiative
3. Sustainability and production of agave and mezcal

- Issues linked to water
- Issues linked to firewood
- Issues linked to LULC change
- Issues linked to social justice
- Issues linked to labor

4. How is the current situation compared to the situation 15-20 years ago?
5. Local and national perceptions around mezcal 15-20 years ago
6. Current perception of mezcal
7. Own perception of mezcal
8. Reasons behind the popularization of mezcal at a global scale
9. Characteristics of mezcal consumers
10. Compare mezcal with other beverages (flavor, culture around it , consumers)
11. Power balance among actors in the mezcal industry
12. Key actors in the mezcal industry
13. Disadvantaged actors in the mezcal industry

APPENDIX 8 LETTER OF AGREEMENT WITH THE CASE STUDY COMMUNITY.

San Juan del Río, Oaxaca a 22 de septiembre de 2018.

Por medio de la presente me dirijo a usted para informar que María Guadalupe Lira Ledesma, estudiante de doctorado en el Natural Resources Institute – University of Manitoba, Canadá, estará realizando su trabajo de campo en San Juan del Río, Oaxaca de septiembre de 2018 a abril de 2019.

El proyecto de tesis doctoral de la Srta. Lira se titula "La comoditización del mezcal y su impacto en comunidades indígenas de Oaxaca, México". Los objetivos de esta investigación son: 1) describir el sistema productivo del mezcal; 2) analizar cómo se ha construido valor alrededor del mezcal a nivel global y cómo esto ha impactado el valor en las comunidades productoras; 3) analizar cómo el valor del mezcal ha beneficiado o perjudicado a las comunidades productoras, particularmente en su organización comunal y el manejo de sus recursos.

En concordancia con los objetivos, la metodología de este proyecto también incluye tres áreas principales:

1) Descripción del sistema productivo del mezcal a través de observación participativa y aplicación de entrevistas a miembros de un palenque previamente seleccionado en San Juan del Río. Esta descripción será complementada con entrevistas posteriores a productores de otros palenques en la comunidad.

2) Entrevistas a productores y otros miembros de la comunidad para entender cómo el creciente valor global del mezcal ha tenido efectos positivos y negativos en su valor local dentro de San Juan del Río. Esta parte estará relacionada a los valores histórico-culturales y los significados del agave y mezcal a través de distintas generaciones en la comunidad.

3) Entrevistas a productores, miembros de la comunidad y autoridades comunales para analizar los impactos a la organización comunal y los recursos de San Juan del Río. Además de observación, análisis y verificación en campo de cubiertas vegetales, utilizando imágenes de satélite, mapas y conocimiento local.

Cabe destacar que esta investigación incluye un componente importante de diseminación de resultados, mediante el cual se pretende beneficiar a la comunidad haciendo visible su caso no solo mediante publicaciones y presentaciones académicas, también se planea difundir los resultados en foros locales accesibles a diferentes actores involucrados en los temas del mezcal (autoridades, organizaciones no gubernamentales, consumidores y asociaciones de productores).

Como una propuesta preliminar, se pretende elaborar una guía de palenques y mezcales de San Juan del Río, en donde se incluyan información de los productos y palenques interesados. Esta guía se elaborará en el formato que la comunidad elija (folletos, blog de internet, un pequeño libro, etc.).

Es importante mencionar que los detalles metodológicos de esta investigación han sido aprobados por el Consejo de Ética para la Investigación (Joint-Faculty Research Ethics Board) de la Universidad de Manitoba. Por lo tanto, todas las actividades de colección de datos están apegadas a los principios de confidencialidad, consentimiento informado, y mitigación de riesgos para cada uno de los participantes de esta investigación. Cualquier solicitud o sugerencia por parte de los participantes o de la comunidad será considerado y atendido dentro de las posibilidades del proyecto.

Sin más por el momento, agradezco de antemano su atención y quedo a sus órdenes para cualquier aclaración.

Atentamente

[redacted]

Presidente del comisariado

APPENDIX 9. ETHICS CERTIFICATE

UNIVERSITY OF MANITOBA | Research Ethics and Compliance

Human Ethics
208-194 Dafoe Road
Winnipeg, MB
Canada R3T 2N2
Phone +204-474-7122
Email: humanethics@umanitoba.ca

PROTOCOL APPROVAL

TO: **Maria Guadalupe Lira Ledesma** **(Advisor: Iain Davidson-Hunt)**
Principal Investigator

FROM: **Kevin Russell, Chair**
Joint-Faculty Research Ethics Board (JFREB)

[redacted]

Re: **Protocol J2018:036 (HS21856)**
The Commoditization of Mezcal and its Impact on Indigenous Commons in Oaxaca, Mexico

---

Effective: August 17, 2018 **Expiry:** August 17, 2019

Joint-Faculty Research Ethics Board (JFREB) has reviewed and approved the above research. JFREB is constituted and operates in accordance with the current *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans.*

This approval is subject to the following conditions:

1. Approval is granted only for the research and purposes described in the application.
2. Any modification to the research must be submitted to JFREB for approval before implementation.
3. Any deviations to the research or adverse events must be submitted to JFREB as soon as possible.
4. This approval is valid for one year only and a Renewal Request must be submitted and approved by the above expiry date.
5. A Study Closure form must be submitted to JFREB when the research is complete or terminated.
6. The University of Manitoba may request to review research documentation from this project to demonstrate compliance with this approved protocol and the University of Manitoba *Ethics of Research Involving Humans*.

Funded Protocols:
- **Please mail/e-mail a copy of this Approval, identifying the related UM Project Number, to the Research Grants Officer in ORS.**