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Family Name: Bowen

First Name: Sarah

Institution: Departments of Rural Sociology and Sociology, University of Wisconsin-Madison, United States

Name of the PhD supervisor: Jane Collins (University of Wisconsin-Madison, United States)

Title of the PhD work

Localizing Production: Geographical Indications and their Impact on Rural Development

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Research questions

This research examines the creation of geographical indications (GIs) for agricultural products as a means of "localizing production" within the framework of globalization. Because GIs root production in a particular place, they are framed as sources of resistance against the homogenizing effects of "placeless" food production systems. GI protection is promoted as increasing farm incomes, competitiveness, and spurring other local income-generating activities (e.g., agro-tourism), as well as helping to preserve local farmer knowledge and culture. However, although an emerging body of literature has documented the theoretical benefits of GI protection and the ways in which GIs constitute "short food supply chains" (Murdoch et al. 2000), providing an alternative to the industrial agricultural model, very little empirical research has considered the inequalities in the distribution of costs and benefits of GI protection, or the underlying power relations. The degree to which GI protection actually spurs rural development depends in large part on the structure of the GI legislation and the political-economic context in which protection is embedded. In my dissertation, I compare three GI production systems—tequila in Mexico, Antigua coffee in Guatemala, and Comté cheese in France—in order to develop a theory of the factors that contribute to more sustainable, equitable GI production systems.

My dissertation has three main components. First, I examine the distribution of the benefits associated with protection along each commodity chain, focusing in large part on the distribution of economic benefits (profits) but also looking at the distribution of what commodity chain actors perceive as the non-market (social, cultural, ecological) of protection. I adopt the "commodity chain" approach (Hopkins and Wallerstein 1986; Gereffi and Korzeniewicz 1994; Collins 2003; Talbot 2004), which takes the commodity chain as the unit of analysis and seeks to "follow the money" (Talbot 2004) in order to examine the struggles for power and profit that play out along a particular commodity chain. Furthermore, I use the comparative case study method (Ragin 1987) to identify the key processes and factors that influence the attribution and distribution of profit along the commodity chain.

Second, I investigate the power dynamics that are unfolding within the collective organization that regulates production and within each region. Here, I draw on work in institutional economics that has analyzed the new hybrid forms of governance that are emerging in the agro-food industry (Ménard 2000, Ménard and Valeschini 2005, Torre 2006). In the case of GIs, these new forms of governance, in which a large number of small enterprises produce the same foodstuff according to a common code of practice, have emerged as a way of guaranteeing the collective quality of the GI product while allowing for the survival of small, artisanal production units (Barjolle and Chappuis 2000). This framework will help me to compare the organizational structures of my three GI cases, to identify the strengths and weaknesses of the collective organizations that regulate production.

Finally, as the third component of my dissertation, I analyze in detail the ways in which commodity chain actors influence the maintenance of GI policy, examining the ways in which quality and certification policies have evolved with changing different power dynamics. In order to look at the ways in which quality standards are framed and used strategically by different commodity chains, and the way that theses standards vary, I employ conventions theory, first developed in France. Contrary to viewing economic activity as being regulated purely by price, conventions theory perceives quality as the fundamental concept for the analysis of economic life (Renard 2003, Sylvander 1995). Quality, furthermore, is not simply a element of competition, but an object of collective understanding and negotiation among supply chain actors (Valceschini and Nicolas 1995). In my dissertation, I examine the ways in which understandings of quality vary across GI protection schemes and according to different actors. I also look at the ways in which understandings of quality have changed over time and the effects of these changes on the region and on supply chain actors.

Methods and tools

My three cases have been selected to vary according to a number of criteria, including the geographic and economic scope of production, the level of concentration of the supply chain, and the strength and organizational capacity of the collective organization. As stated above, in order to link data with theory, I use the comparative case study method (Ragin 1987), in which several cases are compared in order to determine the causally decisive differences that contribute to varying outcomes among cases. Instead of viewing causal conditions as mutually exclusive, case-oriented methods provide a basis for examining the ways in which conditions combine in different ways to produce different outcomes.

My field research requires between four and six months in each country. I have already finished research for the tequila case (January 2006 – June 2006) and am in the middle of conducting fieldwork for the Comté cheese case (February 2007 – June 2007). I will begin research for the Antigua coffee case in September 2007. To answer my research questions, I rely on a combination of quantitative and qualitative methods. I take the entire commodity chain as my unit of analysis, considering not only the effects of GI protection on farmers, but will also the broader context in which farmers operate and the way in which the local and extralocal spheres interact. Therefore, a major component of my study is the interviews that I conducted with key supply chain actors (40-50 interviews for each case). Actors were asked to describe their perceptions of the factors that contribute to the quality of the GI product, the main problems associated with the supply chain, the relations between supply chain actors, and the effects that the GI has had on the region. Second, I conducted in-depth interviews with farmers (20-30 interviews for each case), to analyze the way in which farmers perceived the GI and the collective supply chain organization, and to determine the degree to which farmers were integrated into the supply chain. The first part of the farmer interviews was similar to the interviews conducted with other commodity chain actors; however, the interviews also included an in-depth discussion of farm practices. In addition, each household was also asked to estimate all sources of income for the previous calendar year, including: income from agricultural production, wages from formal employment, profits from family businesses, and governmental subsidies. Finally, I collected statistical data on trends in production and sales of the raw materials (agave, coffee beans, milk) and final products (tequila, coffee, cheese), as well as on the distribution of costs and profits within each supply chain.

Results (existing and/or expected)

Here, I offer a preliminary comparison of two of the cases in my dissertation, tequila in Mexico and Comté cheese in France. (My research on the Comté case is still in progress and I will not start my fieldwork for the Antigua coffee case until September 2007). In this section, I provide a description of each of the two supply chains, as well as a preliminary discussion of the primary socioeconomic and ecological effects of GI protection. Both of these production systems constitute the major economic activity in their region. However, the socioeconomic and ecological effects associated with the two cases are very different. The GI for Comté cheese contributes to the maintenance of small farms and cheese-producing factories, as well as a more extensive, grazing-based system of dairy production that has positive effects on the environment. The GI for tequila, on the other hand, effectively excludes the local farmers, as the tequila companies have begun producing their own agave (the main ingredient in tequila), adopting unsustainable, chemical-intensive production methods.

Description of Cases: Supply Chain Structures, Primary Actors, and GI Rules

Tequila

Considered by many to be Mexico's national drink, tequila is made by fermenting and distilling the roasted heart of the blue agave plant (*Agave tequilana Weber*). Due to several factors—including improved quality control and regulation of tequila production, a changing image that is more socially acceptable to upper-class consumers, the growing popularity of cocktails such as the margarita, and the international endorsement of the GI for tequila—in the last 15 years, the tequila industry has experienced substantial growth. In 2005, the National Chamber for the Tequila Industry estimated the production of tequila to be as high as 209.7 million liters of tequila (CNIT 2005). Despite its new status, however, tequila has a very long history. It is estimated that "agave liquor" was first distilled in the mid-1500s (Limón 2000), and the first documented reference to the production of "mescal wine" (essentially modern-day tequila) in Jalisco dates from 1608 (Muría 1996). The largest and most powerful tequila companies (Cuervo, Sauza, Herradura) were established by large hacienda owners in the 18th and 19th centuries (Limón 2000). Before the land reform that took place in Mexico between 1917 and 1940 (see Warman 2001), the tequila companies produced their own agave (Luna 1991). However, after the land redistribution, the tequila companies became dependent on *ejidatarios* (the small farmers awarded land in the land redistribution) for the supply of agave.

Today, the tequila industry is comprised of three main groups: the agave farmers, the tequila distilleries, and the bottlers and distributors. The last several generations of agave farmers cultivated the agave and then sold it to the tequila companies, often through intermediaries known as *coyotes*. The cultivation of agave is more complex than that of most crops, however, because blue agave takes six to ten years to mature after being planted, which has historically complicated supply and demand patterns. As a result, the tequila companies now increasingly rely on contract arrangements with the agave farmers to ensure their supply of agave, and some firms have started to rent the smallholders' land and grow the agave themselves. In 2005, an estimated 12,000 farmers and 11,200 agricultural day laborers (many working directly for the tequila companies) were responsible for the production of agave (CNIT 2005).

After being harvested and delivered to the tequila distilleries, the heart of the agave plant is roasted and pressed to obtain the juices, which are fermented and distilled to produce tequila. 114 firms are currently registered to produce tequila (CRT 2007). The third group of

actors, the tequila bottlers and distributors, is comprised of companies primarily in Mexico and the United States, which accounted for 74% of tequila exports in 2005 (CNIT 2005).

The GI[1] for tequila was established by the Mexican federal government in 1974. The GI stated that that in order for a product to be marketed as "tequila," it had to be made from at least that least 51% Weber blue agave[2] grown in the states of Guanajuato, Michoacán, Nayarit, Tamaulipas, and Jalisco. The federal government was responsible for delimiting the GI region. The GI region is very large, covering 180 municipalities, and includes territories without appropriate climatic or environmental conditions or a historic tradition of cultivating agave; some areas (e.g., the municipalities in the state of Tamaulipas) are widely considered to have been included for political reasons. The GI for tequila protects two basic types of tequila: tequila that is made from 100% blue agave, and tequila that is made from 51% blue agave and 49% alcohol from other sugars (generally sugar cane), known as *tequila mixto*. Tequila made from 100% blue agave, which is of higher quality and sells for a higher price, must by law be bottled within the GI region. However, *tequila mixto*, which comprises the bulk of tequila exports to the US, is often sold in bulk and bottled outside of Mexico, to save on transportation costs. The GI for tequila was largely ineffective until it was endorsed by the United States and Canada in 1994, and by the European Union in 1997, which gave it international standing, protected the tequila producers from competition from producers of imitation tequila in Spain and South Africa, among others, and shifted all of the responsibility for production of blue agave to Mexico.

The agave-tequila supply chain is managed by the Tequila Regulatory Council (CRT, according to its Spanish acronym), which was created in 1994 and is responsible for the quality control and certification of the tequila production process. The CRT is comprised of four groups of actors: agave farmers, tequila producers, tequila bottlers and distributors, and governmental representatives. The primary functions of the CRT are: to protect the GI for tequila in Mexico and internationally, to guarantee the authenticity of tequila to the consumer, to provide information to the agave-tequila supply chain, and, most importantly, to verify and certify compliance with the norm for tequila production. The official norm that governs the tequila production process is created by the federal government, in consultation with supply chain actors. In 2006, a new norm governing the production of agave and tequila was established, replacing the previous 1994 norm. The main changes associated with the new norm were that it allowed for the production of flavored tequilas and created a new category of tequila, "*extra-añejo*" (extra-aged) tequila, in addition to three existing categories: *blanco* (white), *reposado* (rested), and *añejo* (aged).

Within the supply chain, the tequila firms exert considerable control over the agave farmers when negotiating issues such as the price of agave and the norms that govern production. Moreover, the tequila market is highly concentrated, meaning that even when considering power dynamics among the tequila companies, a few key firms exercise disproportionate control. At the beginning of 2005, four firms (Cuervo, Sauza, Herradura, and Cazadores) controlled approximately 67% of the total tequila market controlled primarily by multinational spirits corporations (e.g., Fortune Brands, Brown-Forman, Diageo). This means that

[1] In Mexico, tequila is protected under a "*denominación de origen*" (denomination of origin). However, in this paper, to avoid confusion, I will use the term "geographical indications," the term employed by the WTO, to describe the protection granted to tequila and to other place-named products.

[2] The minimum proportion of agave required to produce tequila has decreased over the last fifty years. In 1949, the first official norm for tequila was established. It stated that tequila must be made with 100% Weber blue agave (Luna 2002). However, since then, during times in which the supply of agave in the GI region was insufficient to meet the demand for tequila, the tequila companies have successfully appealed to the Mexican government to change the norms regulating the production of tequila. In 1964, a new norm was established which stated that tequila had to be made out of a minimum of 70% blue agave sugars, and in 1970, the minimum proportion of agave sugars required to produce tequila was reduced to 51%.

international interests increasingly influence the politics and production norms of the tequila industry, despite its reputation as being uniquely representative of Mexican history and culture. I discuss the impact of these changes below.

Comté cheese

Cheese production has taken place in the Jura Massif region in France since the 12th century, as a means of preserving milk for consumption during the harsh winters. Groups of dairy farmers would pool their daily milk output at the local cooperative cheese dairy, or *fruitière*, in order to make huge rounds of cheese that could be kept for a long time. This method of organization is still employed in the Comté industry today. Comté is a cooked and pressed cheese made with unpasteurized milk from the Montbéliarde cow, a local breed. A key feature of Comté cheese is its aromatic diversity: more than 200 aromatic components, according to a 1993 study (CIGC, undated, as cited in Gerz and Dupont 2006). The taste, flavor, and texture of each cheese depend on four main factors: the environmental conditions in the specific location where it is produced, the season of production, the techniques and know-how of the cheese producer, and the aging process (Gerz and Dupont 2006). Today, 3,200 dairy farmers are organized into 169 *fruitières*, or cheese-producing factories. Cooperative cheese factories[3] account for 86% of Comté cheese production, while 14% of Comté cheese is produced by private firms (Colinet et al. 2006). After receiving the milk from the dairy farmers, the *fruitières* make large rounds of Comté known as *meules*, which weigh approximately 35 kilograms (77 pounds). The large number of small *fruitières* accounts for a lot of the diversity and specificity discussed above and is valued by the supply chain actors. The cheese is then aged for a minimum of four months by one of 20 *affineurs*, or cheese ripeners.

In 1958, Comté cheese was awarded GI status[4]. By law, Comté cheese cannot be produced outside of the Jura Massif region in eastern France. The GI region is comprised the entire department of Jura and parts of the departments of Doubs and Ain. In 1963, the Inter-professional Committee for Gruyère from Comté (CIGC, according to its French acronym) was formed to regulate the Comté label and to codify the rules of production. The CIGC is comprised of three "*collèges*," or groups of actors: the dairy farmers, the *fruitières* and private cheese factories, and the *affineurs*. The CIGC has several functions. Most importantly, it is responsible for the creation and ongoing modification of the "decrees" that regulate production and processing methods. The CIGC has made successive revisions (1976, 1984, 1994, 1998, 2006) to the original 1958 decree, in order to defend the traditional model of production and to better control the quality of milk and cheese (Blin David-Mougel et al. 2004). Some of the most important modifications include the 1998 requirement that milk be collected within a maximum radius of 25 kilometers of the *fruitière*, and limiting the stocking rate to 1.3 animal units[5] per hectare of grassland pasture (first established in 1998 and modified slightly in 2006). The CIGC's second major function is control of production volumes, a right granted to it by the French government. The CIGC limits the production of Comté cheese by selling "*plaques vertes*" (green casein plates that are affixed to each *meule*

[3] The cooperative cheese factories, or *fruitières*, are comprised of between five and fifty dairy producers who pool their milk together to produce cheese. Most *fruitières* have between ten and twenty members. The president of the *fruitière* is one of the farmers and is not paid for his work, except in the case of the largest *fruitières*. The cheese-maker (*fromager*) and other staff members (i.e., store clerk, *fromager's* assistant) are hired and paid by the *fruitière*. As discussed above, the *fruitières* sell the cheese (*fromage blanc*) to an *affineur*, who ages it. All profits from the sales of the *fromage blanc* are divided among the members of the cooperative on the basis of the volume of milk contributed, with premiums given according to the quality of the milk.

[4] Comté is actually protected by an "*appellation d'origine contrôlée*;" however, as stated above, to avoid confusion, I use the term "geographical indications" to refer to all place-named products.

[5] One animal unit is equivalent to 1000 pounds of live animal weight; therefore, this stocking limit is roughly equivalent to one cow per hectare of grassland pasture.

of Comté and that are legally required for the sale of Comté cheese). The *plaques vertes* are divided among all of the *fruitières* and private cheese factories, and the total number of *plaques vertes* sold is calculated to correspond to the total demand for Comté cheese (with a compulsory yearly increase). Almost all of the CIGC's income (95%) comes from the sale of the *plaques vertes*. Finally, the CIGC also funds collective advertising campaigns, both to promote the sales of Comté cheese in France and abroad (mainly in Germany, Belgium, the United States, and now Japan), and to encourage tourism in the GI region (i.e., visits to the farms, *fruitières*, and refining cellars).

The efforts of the CIGC have led to improvements in the quality of Comté cheese (Barjolle et al. 2000) and significant increases in total sales of Comté cheese over the last fifteen years. Between 1992 and 2005, Comté cheese production increased from 35,016 tons to 49,435 tons, which corresponds to an average increase of more than 3% per year (DRAF 2006, as cited in Colinet et al. 2006). Today, Comté cheese is the most important AOC cheese in France. However, with this growth have come important changes in the structure of the supply chain. Traditional distribution channels, such as farmer's markets and local cheese stores, have become less important, while the percentage of Comté sold in supermarkets has increased substantially, from 66% in 1990 to 85% in 1999 (CIGC 2007). Extralocal actors (retailers and some *affineurs*) are increasingly involved in the Comté supply chain; one Belgian-owned firm (Entremont) now refines 31% of Comté cheese (Author interviews, 2007). Up until now, the quality of Comté has not been negatively affected by these changes, and the CIGC has succeeded in making the decrees successively stricter, as a way of preventing concentration (at the level of the farmers and the *fruitières*) and preserving traditional methods. However, some actors worry that the CIGC will not be able to check the power of the large retailers and *affineurs* forever, and fear that this increased extralocal involvement poses a threat to the quality of the Comté cheese and the maintenance of the local population.

Socioeconomic and Ecological Effects of GI Protection

Tequila

In the Amatitán-Tequila valley, where tequila production originated, the agave-tequila industry constitutes the backbone of the local economy. The industry is seen by the local population as bringing job opportunities, value-added agriculture, and tourism to a depressed area that would have a hard time surviving without it. In Amatitán and Tequila, the two main municipalities that comprise the valley, 78% of agricultural land in the valley is planted with blue agave (SAGARPA 2005). The primary economic activities in the area are agave cultivation, work as an agricultural day laborer (on another person's or company's agave fields), and off-farm employment within the tequila industry. However, as I explain below, the long-term ecological and economic sustainability of the industry and the region are threatened by the enduring conflicts that exist between the agave farmers and the tequila companies, and by the related cycles of surplus and scarcity of agave (see also Bowen and Valenzuela 2006).

First of all, the high degree of dependency of the local population on the agave-tequila industry (and in particular, on agave cultivation) is potentially dangerous, because the incomes associated with the industry vary greatly from year to year. The tequila industry has been characterized by cycles of surplus and shortage, and corresponding fluctuations in the price of agave, throughout its history. Between 1999 and 2003, the tequila industry experienced its most devastating agave shortage to date. The blue agave population in Jalisco decreased by 50.7% between 1997 and 2000 (González 2002). The shortage was due to several factors, including fungal infestations in the mid-1990s, an early winter frost in 1997, and farmers' lack of incentive to plant agave during periods of low prices, such as occurred during in the mid-1990s, when prices were so low that some farmers chose to let

their plants rot in the fields. With the shortage, the average price of agave skyrocketed, shooting from $0.77 centavos per kilogram in 1998 to more than $14.00 pesos per kilogram in 2002 (SAGARPA 2004). Farmers with existing agave plantations "became rich overnight," but many smaller tequila companies were pushed out of business, because they could not afford to pay such high prices for the agave.

The agave shortage prompted two main changes in production relations that have had lasting effects on the local population and landscape. First, agave production expanded into new areas. In the last ten years, areas such as southern Jalisco and southern Nayarit have emerged as growing centers of agave cultivation. These areas are within the production zone defined in the GI for tequila, but do not have a historic tradition of agave cultivation. Second, at the same time, the largest tequila companies began expanding their control within the supply chain by becoming increasingly self-sufficient in their supply of agave. Instead of buying agave from independent farmers, the largest firms now obtain 90%-100% of their agave needs through their own plantations and through contract arrangements. It is increasingly difficult for independent farmers to sell their agave, especially since the agave market has again entered a state of severe surplus, and the price of agave has dropped to between $0.50 pesos and $2.50, at or below the costs of production (estimated to be $2.55 pesos per kilogram by the Tequila Regulatory Council in 2005). The bargaining power of traditional agave farmer vis-à-vis other supply chain actors, therefore, has been damaged in two ways. First, high prices prompted more farmers to start planting agave, creating more competition. Second, the increased self-sufficiency of the tequila companies means that the demand for agave produced by independent farmers is decreasing.

In conclusion, then, although the agave-tequila industry serves as a major part of the local economy in tequila's region of origin, the agave farmers are unevenly and unequally integrated into the supply chain. A study by the COECYTJAL (Consejo Estatal de Ciencia y Tecnología de Jalisco) found that of the total value-added generated by the tequila industry in 1999 ($5,756 million pesos), just 8% accrued to the agave farmers, while 63% and 29%, respectively, were associated with the production and commercialization of tequila. Furthermore, the combination of the continued cycles of surplus and shortage of agave and the changing production relations in the industry contribute to economic insecurity. The dramatic shifts in price that characterize the industry make it difficult for farmers to plan or to assure a stable income from agave cultivation. It is difficult for farmers to predict what the price of agave will be in six to ten years. Even though all agave plantations must be registered with the CRT, the CRT does not provide easily accessible information to the farmers on the annual agave inventory or predicted future prices. In addition, smallholders who decide to plant agave must have sufficient capital to be able to cover the costs of maintaining their agave plantations during the long period that it takes the agave to mature. This is particularly difficult for small and/or poor farmers given that credit can be very difficult to obtain, and extremely expensive, in Mexico. The state's lack of involvement in the agave-tequila industry and the agave farmers' lack of representation in the CRT means that instead of using state institutions and the structure of the GI for tequila to stabilize the market for agave, the most influential actors in the agave-tequila supply chain are eliminating the agave farmers from the supply chain altogether.

The cycles of surplus and shortage and the increased use of contract arrangements are also leading to increased environmental degradation. The contracts drawn up by the tequila companies prescribe a "technological packet" (i.e., prescribed applications of pesticides and herbicides, and prohibition of certain practices) and are resulting in a replacement of traditional agave cultivation techniques with a more mechanized, chemically-intensive system of agave cultivation (Valenzuela 2005, Bowen and Valenzuela 2006). This has resulted in increased incidences of disease and pest infestation (Ibid.). Furthermore, during periods in which the price of agave is very low, households cope by cutting back on the inputs (in particular, fertilizers) that they apply to their agave plantations, which contributes to

declining soil fertility and can lead to pest and disease infestations. In this way, the cycles of surplus and shortage and the economic and ecological problems that these cycles generate are mutually reinforcing.

Comté cheese

Compared to the tequila case, the effects of the Comté supply chain on its region of origin are significantly more positive. The industry is an important source of revenue for the Jura Massif region and allows for the maintenance of a network of small farms, cheese producers, and *affineurs*. Dairy farmers in the region consistently receive a price for their milk that is higher than the average milk price in France. For example, in 2003, the average price of milk in the Comté supply chain was 0.34 €/kg, compared to a price of 0.30 €/kg for commodity milk, a 14% premium (Dupont 2004, as cited in Gerz and Dupont 2006). Furthermore, the economic profitability of dairy farms in the Comté zone has regularly increased since 1990, and these farms are 32% more profitable than similar farms outside the GI region (Ibid.). In addition, production of Comté cheese, because it is characterized largely by small-scale farms and cheese factories, generates five times more jobs (in processing, maturing, marketing, and packing) than production of Emmental, a similar generic cheese (Ibid.). Finally, in large part due to the high number of jobs that are associated with the production of Comté cheese (5000), migration away from the countryside in the Comté region is half that of the non-GI region (Ibid.).

Like the tequila supply chain, the Comté industry has experienced problems coordinating supply and demand; however, the CIGC has been more successful in managing the supply of Comté cheese (mainly through the sale of *plaques vertes*, discussed above) and has avoided major crises such as those experienced by the agave-tequila industry. In addition, the incomes of individual actors (farmers or *affineurs*) are significantly more stable due to the pricing and payment structure established by the CIGC. A standard contract determines the price that the *affineurs* pay the *fruitières* for the unripened cheese (also known as *fromage blanc*)[6]. The price is based on a reference price (the National Weighted Average), which is calculated based on the *average final selling price of all Comté cheeses*, with an additional payment coefficient according to the quality of the *fromage blanc* (defined according to one of four categories: A, B, C, or D). The system of contracts and payments—in which the price received by any individual actor is dependent on the average price of Comté cheese over the whole supply chain— allows for a remarkably equal distribution of the profits associated with production of Comté cheese. For example, the average price of Comté increased by 5% between the period 1998-2000 and the period 2003-2005 (Colinet et al. 2006). 47% of the increase in price was distributed to the milk producers (by increasing the purchase price of the *fromage blanc*) and 53% was distributed to the affineurs (Ibid.). The equitable distribution of the added value reinforces the interests of the different actors in working together to maintain the quality and price of Comté cheese, and also contributes to relative stability in the incomes of the supply chain actors.

The environmental effects associated with the Comté industry are also significantly more positive than those associated with the tequila industry. The milk production system characteristic of the Comté industry is much less intensive than the industrial milk production model employed throughout much of France. As mentioned above, the diversity of aromatic properties and flavors in Comté cheese is highly valued by producers and consumers alike. Actors in the Comté supply chain believe that factors such as climate, altitude, and native species of grasses—which are incorporated into the pasture-based diet of the cows—influence the properties of the milk, and the taste and organoleptic properties of the cheese.

[6] Approximately one-third exchanges between the cheese producers and the affineurs are strictly carried out according to the standard CIGC contact; the remainder take the contract as a starting point (Colinet et al. 2006).

To maximize the influence that the environmental and climatic conditions of the region have on the final product, the specifications for Comté cheese prevent the introduction of outside products into the cows' diet as much as possible. The GI rules require a minimum amount of pastureland per cow, prohibit the use of silage, and limit the proportion of concentrates (soybeans, wheat, etc.) that can be fed to each cow[7]. In addition, all milk used for Comté cheese must come from the Montbéliarde breed, a local breed that has lower milk-producing capacity than breeds like the Holstein, but is better able to valorize local environmental resources[8]. The specifications not only guarantee the specificity and diversity of Comté cheese; they also undergird a production system that has positive effects for the preservation of the local landscape, as well as soil and water resources (i.e., by limiting the use of chemical fertilizers).

[7] The decree drafted by the CIGC in 2006 proposes a minimum of one hectare of pastureland per 1.3 animal units and limits the proportion of concentrates in the animal feed to 30% (Author interviews, 2007).

[8] The decree actually permits the use of one of two local breeds: the Montbéliarde breed and the Simmental breed. However, the Montbéliarde breeds accounts for more than 95% of Comté milk production (Contrôle Laitier 2006).

Discussion

In the preceding section, I showed how the GI for tequila has largely failed to benefit the local population or environment in tequila's region of origin, while the GI for Comté cheese has had very positive effects on the maintenance of small farmers and cheese factories and the preservation of the local landscape environmental resources. What are the primary factors that contribute to more economically and ecologically sustainable GI systems? Here, I outline three main differences in the design of the two GIs (the way that *terroir* is valorized, the way that farmer knowledge is valorized, and the degree of cooperation and trust between actors) that help explain the variation between the two cases. These differences are related in large part to variations in the political economic contexts of the two cases, which I discuss at the end of this paper. Because my dissertation research is still in progress, this discussion is very preliminary.

Differences in the Design of the GI Protection Schemes

Valorization of terroir

In comparing the effects of GI protection for the two cases, it is important to consider the concept of *terroir*, which originated with the French "*appellation d'origine contrôlée*" system. In France, the recognition of the way in which local cultural, historical, and environmental factors contribute to the unique taste of products is not only embedded in state policy to protect GIs, but is also an important part of consumer culture (Trubek 2005, Barham 2003). *Terroir* refers to an area or piece of land whose soil and microclimate impart distinctive qualities to agricultural products (e.g., wine). Most fundamentally, the link between the GI product and its *terroir* is what opens the possibility for designing GI protection schemes that benefit the local environment and population. Bérard et al. (2005) state that *terroir* is a spatial and ecological concept that "links the actors, their histories, their social organizations, their activities, and, most importantly, their agricultural practices. The traditional knowledge and the technical practices have an influence on the biological diversity that they sustain."

Both the Mexican definition of "*denominación de origen*" (which protects tequila) and the French definition of "*appellation d'origine contrôlée*" (which protects Comté cheese) explicitly incorporate the concept of *terroir*, by protecting the geographical name of a place (country, region, or locality), *the quality and characteristics of which are due exclusively to the geographical environment, including natural and human factors*. However, while the specifications that regulate production of Comté cheese are exemplary in their valorization of the *terroir* of the region, the tequila GI is limited to just specifying the boundaries of the region in which agave and tequila must be produced, and does not recognize or protect the *terroir* of the region or its contribution to the quality of tequila. The GI for tequila as put into practice, therefore, violates the theoretical definition of "*denominación de origen*" outlined by Mexican law. The economic and ecological problems associated with the agave-tequila industry are related to the failure of the GI for tequila to value the link between the *terroir* in tequila's region of origin and its specific properties (see also Bowen and Valenzuela 2006). The success and sustainability of the Comté industry are likewise largely attributed to supply chain actors' shared valorization of *terroir*.

In the Comté supply chain, almost all of the actors interviewed named "the quality and specificity of the milk" as the most important factor contributing to the quality of Comté cheese. The 1998 rule that all milk be collected from within a radius of no more than 25 kilometers acts to preserve the link to the *terroir* of the region, and also has positive social effects for the region, by limiting the concentration of the *fruitières*. By limiting the size of the area from which each *fruitière* collects its milk, the particular climatic and environmental characteristics of each micro-region are translated into the specificity of the cheese produced

by each *fruitière*. Furthermore, because actors in the Comté supply chain believe strongly in the link between the *terroir* of the region and the final product, they are motivated to protect local environmental resources.

The majority of actors in the tequila supply chain, on the other hand, do not consider the *terroir* as having an important influence on the quality of tequila. Agave is generally sourced from across the entire GI region, with tequila firms basing their decisions about where to buy their agave on price and transportation costs, instead of according to environmental or taste characteristics. The GI region is very large and includes regions that do not have appropriate climatic or soil conditions for growing agave, which threatens the validity of the GI for tequila. Furthermore, because the GI for tequila does not outline any rules for defining the quality of agave, the quality and composition of the blue agave used in the production of tequila can vary greatly. However, supply chain actors do not see this as a significant problem, since most of the tequila producers did not see link the quality of the agave to the quality of the tequila. As one example of the laxity of the GI for tequila regarding the quality of agave, the new norm published in 2006 no longer requires that agave be fully mature before it can be used in the production of tequila. This was done despite the fact that many supply chain actors agreed that the use of mature agave was an important factor in the production of quality tequila. Agave farmers protested that this change allowed the tequila companies to use their own immature agave (since many firms had begun establishing their own plantations), instead of forcing them to buy mature agave from the independent farmers if they did not have adequate supplies of mature agave of their own.

In addition, unlike in the Comté supply chain, in which the diversity of local grass species is seen as contributing specific properties to the taste of the cheese, actors in the tequila supply chain have not considered the importance of protecting biodiversity in tequila's region of origin. Of the nine varieties of agave traditionally used in the production of tequila[9], only one (*Agave tequilana Weber*) is currently permitted by the official norms; in this way, the GI for tequila has actually contributed to a reduction of biodiversity in tequila's region of origin. Moreover, the cultivation of agave in monoculture poses a significant threat to the genetic variability of the blue agave plant and increases the region's susceptibility to a large-scale outbreak of disease or pest infestation (Valenzuela 2003, 2005).

Valorization of farmer knowledge

The knowledge of local farmers, or *savoir-faire*, and the traditional practices and techniques that have developed around a particular GI product, are intimately related to the *terroir* and the quality of that product, and are protected as such. GIs are often found in areas with particularly harsh environments; the unique biophysical and social characteristics that endow GI products with their distinctive quality attributes are often the same characteristics that make it difficult for large-scale, intensive agricultural systems to thrive in these areas (Ilbery and Kneafsey 1998, Parrott et al. 2003, Murdoch et al. 2000). GIs are developed as, over generations, producers adapt their farming and processing methods to the ecological and cultural specificities of particular places.

Both the Mexican and French legislation for GIs theoretically recognize the "human factors" that have influenced the quality and characteristics of GI products. The vast majority of the actors in the Comté supply chain see the *savoir-faire* of the dairy farmers as integral to the quality of Comté cheese. However, the traditional practices of the agave farmers are not valued by the rest of the tequila supply chain. This knowledge base is in danger of disappearing as the tequila firms increasingly obtain their agave through their own

[9] Nine varieties were listed as being used in the production of tequila at the end of the 19th century. Agave liquors, which are sold on local markets, are still made with a diverse mix of local agave varieties by small producers.

plantations and through contract arrangements that specify the practices that farmers are required to use. These differences in the importance attributed to farmer knowledge, moreover, have significant effects on the ways in which the dairy farmers and agave farmers are represented in their respective collective organizations (the CIGC and the CRT) and on the distribution of power throughout each supply chain.

In the Comté supply chain, dairy farmers stated that they do not see themselves as milk producers, but as cheese producers. Just as importantly, the other actors in the supply chain also see the dairy farmers as primarily cheese producers. This has a positive effect on the quality of the final product, since the dairy farmers are more motivated to maintain the quality of their milk, in many cases even beyond the specifications required by the GI decree. For example, the majority of farmers participated in a voluntary quality program in which farmers, along with a technician from the Syndicate for Milk Control, developed a farm-specific progress plan that would allow them to make successive improvements in milk quality. The recognition that the dairy farmers are also cheese producers also has positive implications for the relations among supply chain actors. Since quality cheese can only be achieved through the cooperative efforts of all three groups of actors (dairy farmers, cheese producers, and affineurs), all three groups play an important role in the governance of the supply chain. The three *collèges* of the CIGC are obligated to come to a unanimous agreement about any major decision, which prevents the marginalization of any one group.

In the tequila supply chain, on the other hand, agave cultivation practices are increasingly dictated by the tequila companies. Traditional agave farmers are forced to imitate the methods required by the tequila companies, and in many cases are pushed out of the supply chain altogether. Because supply chain actors do not attribute any of the specificity of tequila to the traditional agave cultivation practices (for example, intercropping agave with corn or beans, manual pruning of the agave to prevent pest infestation), they are largely unconcerned by shift in control from the local smallholders to the tequila companies. The tequila firms' primary concern is to guarantee a more stable supply of agave, not to guarantee the authenticity of the agave production process or the quality of the agave.

The tequila production norms and the structure of the CRT also reflect the exclusion of the agave farmers' practices from supply chain actors' conceptions of the quality and specificity of tequila. The agave producers are officially represented in the governance structure of the CRT; however, the tequila producers and bottlers and importers have significantly more influence. The norms for the production of tequila consistently favor the tequila companies and distributors. The most obvious contradiction is the production of tequila *mixto*, made from 51% blue agave and 49% generic sugars. Furthermore, there are virtually no specifications related to the agave production process included in the official norm. The agave-tequila industry and the norms that govern production are evolving in a direction that does not value the contributions of the agave farmer or the raw material (agave) to the quality of tequila.

Cooperation and trust among actors

Finally, a third factor that helps to explain the difference in the effects of the two cases is the amount of trust between supply chain actors and the degree to which they have been able to cooperate in the construction and implementation of the GI. Authors such as Torre (2006) and Barjolle and Chappuis (2000) have highlighted the importance of trust to the success of GIs. Torre states that relations of trust generally existed before the setting of formal rules related to the management of the GI, and furthermore, play an important role in situations where relations are not specified (i.e., in the absence of contracts). Because GIs are defined and regulated *collectively* by a group of supply chain actors, it is important that those actors be able to work together effectively to uphold the quality and reputation of the GI product.

The actors in the Comté supply chain, although acknowledging competing interests, felt unified in their commitment to common goals, including the expansion of sales, maintenance of product quality, and preservation of artisanal methods. This shared philosophy helps them better respond to crises and gives supply chain actors a sense of optimism about the future. In the tequila supply chain, on the other hand, there is a fundamental divide between the agave farmers and the tequila distilleries. The two groups do not share a common vision, and evidence of true cooperation is rare. This is likely to have negative effects on the evolution of the industry, since it prevents the agave farmers and the tequila companies from working together to solve their most pressing problem: the severe cycles of surplus and shortage of agave. As both supply chains face increasing pressure from extralocal actors and respond to problems that are outside their control (e.g., negotiations over GIs in the WTO, reform of the Common Agricultural Policy in Europe), the degree of cohesion among actors may prove to be the key to longevity and success.

In the Comté supply chain, the shared vision among supply chain actors is related to their belief that they are all dependent on each other for the maintenance of the quality of Comté cheese and the defense of the traditional structure of the supply chain. The system of contracts set up by the CIGC to regulate transactions between the *fruitières* and the *affineurs* is also key to maintaining cooperation among supply chain actors, by guaranteeing an equitable distribution of profits. Actors are more willing to work together to find new markets for Comté cheese or improve its quality because they trust that they will receive a fair share of the value associated with these positive evolutions.

The Comté supply chain has enjoyed a high level of cohesion and stability throughout its recent history; at the same time, the entry of multinational firms Entremont and Lactalis into the Comté supply chain poses a potential threat to the future organization of the supply chain. So far, Entremont and Lactalis have respected the production norms for Comté cheese and have not exerted major pressure on the CIGC to loosen production constraints. However, interview participants worried that these firms were not as committed to maintaining the quality and authenticity of Comté cheese or to preserving the "rural network" of small farms and *fruitières* as were traditional supply chain actors. In addition, Entremont, by buying milk directly from the dairy farmers and producing and refining its own cheese in a vertically integrated structure, has already begun to influence the structure of the industry. In a context in which small *fruitière*s are facing organizational and economic difficulties, vertical integration of cheese production and refining is likely to increase. Interview participants worried that it would be increasingly difficult to maintain the positive relations, high level of organization of the CIGC, and relative stability of the supply chain in light of these new evolutions.

In the agave-tequila supply chain, relations between the agave farmers and the distilleries have been uneasy throughout the history of the industry and seem to be further deteriorating. The agave farmers do not trust the tequila companies or the government to help them maintain their livelihoods from the sale of agave or to guarantee the quality of tequila. The fact that the tequila companies are effectively cutting the agave farmers out of the supply chain adds to the hostility among the farmers, and this sentiment is compounded by the surplus of agave and the fact that many agave farmers are finding it impossible to sell their agave. The agave farmers also tend to see the government as favoring the interests of the tequila companies. The tequila companies have sufficient influence that they are able to mobilize government resources when the tequila industry is threatened by market forces; however, the agave farmers do not exercise these same privileges[10]. Furthermore, the

[10] For example, in 2001, because of the scarcity of agave and the high price at which it was being sold, the Mexican government began providing the tequila companies with a subsidy of $3.00 pesos per kilogram, which rose to $9.00 pesos per kilogram in 2002 (Luna, 2002). However, the agave

highly uneven distribution of profit in the tequila supply chain contributes to the lack of cooperation among actors. Because the agave farmers know that they will not benefit from any positive developments in the tequila supply chain, they are less motivated to work with other supply chain actors to develop a shared vision or to tackle common problems. Instead of trying to negotiate with the tequila companies or lobby the government, agave farmers are increasingly turning to more drastic solutions, such as forcing the tequila companies to buy agave from independent farmers by blocking the entries to tequila factories or preventing the factories from operating. History has shown the agave farmers that confrontation is their only means of improving their position vis-à-vis the tequila companies.

Differences in the Political-Economic Contexts

GI arrangements are theorized as localizing production within the context of globalization and preserving local cultures, environments, and farmer knowledge. However, my comparison of two cases (Mexican tequila and French Comté cheese) demonstrates the varied effects that GI protection schemes can have for local regions. I have identified three differences in the design of the two protection schemes and the way in which the collective organization has been set up. These factors help to explain the variation between the two cases. To summarize, Comté farmers, cheese producers, and *affineurs* share a collective vision oriented around the preservation of the quality of Comté cheese and the artisanal structure of the supply chain. In the tequila case, on the other hand, quality is more of a political tool that is employed by supply chain actors in their struggle for power and profit vis-à-vis other actors. For example, continual reductions over the lasts fifty years of the minimum proportion of agave required to produce tequila (originally 100%, currently 51%) exemplify the way in which supply chain actors (mainly the tequila distilleries, who are the most powerful) according to their needs.

These differences in the design of the two GIs are related to the political-economic contexts in which the GIs are embedded. Most fundamentally, the level of state involvement in GI policy and in agricultural policy more general is very different in Mexico and France. France was the first country in the world to establish a national system for protection of GI products. The French government defined "*appellation d'origine*" in 1919, and the National Institutional for Appellations of Origin (INAO) was created in 1935. The French system is widely recognized as the strictest and most well-developed system of GI legislation in the world. Moreover, looking at the broader context, in the last 15 years, GIs have become a key part of the European Union's agricultural platform; more than 700 "protected designations of origin" (PDOs) and "protected geographical indications" (PGIs) are registered in the EU for food products, as well as more than 4,200 protected wines and spirits. In the European Union, and even more so in France, GI protection is explicitly used as a tool to promote rural development and to maintain lagging rural regions. French GI schemes must be approved both by the INAO and by the Directorate General for Agriculture of the European Union. These institutions help guarantee that GI schemes do not promote unfair competition, but also that they are designed in ways that maintain the quality of agricultural products, integrate all of the actors involved in the production of the product, and contribute to the protection of local environmental resources[11]. European agricultural policy is also key to maintaining the livelihoods of the farmers who produce GI products. French farmers continue to receive substantial agricultural subsidies, and producers in Franche-Comté stated that milk production would not be profitable, given the environmental constraints of the

producers did not receive any additional government protection during the period of surplus of agave, even though the price had fallen to below the costs of production.

[11] Even within France, the effects and structures of GI schemes vary considerably, and the Comté case is considered exemplary. However, French legislation on GIs has recently become much stricter regarding representation within the collective organizations and verification of compliance with GI standards. Furthermore, the specifications for most French GIs for food and agricultural products were modified in the 1990s to increase quality and better ensure adherence to traditional production methods.

area, without governmental support. Furthermore, milk quotas are essential to helping supply chain actors avoid major inconsistencies between supply and demand. Finally, this wider French and European culture is evoked by the Comté producers—in particular the dairy farmers—as they define their relationship to the supply chain and to the Comté GI. It is this cultural background that allows the farmers, for example, to self-identify as cheese producers instead of milk producers.

Mexican farmers do not have this culture or institutional support from which to draw. Mexico's history of recognizing GI products is shorter than France's; the GI for tequila, established in 1974, was the first in Mexico. Unlike France, Mexico does not have a specific institution dedicated to GIs; GI protection is included in the jurisdiction of the Mexican Institute of Industrial Property (IMPI), which was primarily established to protect and regulate patents and trademarks. The Mexican government has not established any objectives for GI policy (i.e., rural development, environmental protection) beyond protecting Mexican products from foreign-produced imitations. Furthermore, although the norms for the production of GI products are established by the Mexican government (in consultation with supply chain actors), there is no formal structure, like that of the French INAO, for ensuring that Mexican GIs maintain and protect product quality, producer livelihoods, and local environment. The GI for tequila has therefore been allowed to evolve in ways that undermine the quality of tequila and exclude the agave farmers. The Mexican government's failure to help regulate agave supply and minimize the cycles of surplus and shortage has also negatively affected the agave farmers. Finally, Mexico's proximity to the US, which does not recognize GIs, is very influential. Most importantly, agricultural subsidies have largely disappeared since the implementation of the NAFTA agreement in 1994, and most farmers interviewed received little or no financial assistance from the government. This has had devastating effects for rural families, given the instability in the price of agave and the difficulty of obtaining credit. In addition, Mexico's relationship with the US has a direct effect on the design of the GI itself. In 2003, the Mexican government, supported by many of the smaller tequila companies and other local interests, proposed that the norm for tequila be modified to require that all tequila be bottled in Mexico. However, in January 2006, under pressure from US bottlers and distributors and several of the large tequila companies, the US and Mexican governments signed an agreement in which Mexico dropped the proposed ban on exportation of bulk tequila.

Due to the lack of a broader GI culture, many Mexican farmers do not know what the "*denominación de origin de tequila*" is. Those that do, see it more as a way of preventing producers from other countries from producing tequila (which is also how the Mexican government sees it), than as a way of valuing the culture, history, and quality of tequila. The agave farmers, then, are unable to create an identity linking their traditions, family history, and practices to the quality of tequila. As the actors in the tequila supply chain continue to negotiate the norms for tequila and the evolving notion of quality, this lack of culture plays an important role in the shift towards a more intensive system of agave cultivation, the elimination of traditional practices, and the lack of attention to the link between the quality of the agave and the quality of tequila.

I highlight these differences to show that GI protection schemes do not exist in a vacuum; the effects of GI protection on local development are largely influenced by factors that are outside of the control of supply chain actors. Without an international system of recognition of GIs, the design and efficacy of GI protection schemes will continue to vary greatly across countries and according to different products. An internationally-recognized system is necessary in order to hold GI schemes to higher standards, instead of just assuming that protection in itself is beneficial. If GIs are to make concrete contributions to long-term environmental conservation and rural development, the specification of sustainable production practices within the legal framework of GIs is essential. This research can contribute to a more critical understanding of the ways in which GI arrangements affect rural

economies, small farmers, and the environment, and can aid in the development of policy that aims to make GI arrangements more economically equitable and ecologically sustainable.

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