DEALING WITH RISK: SMALL-SCALE COFFEE PRODUCTION SYSTEMS IN MEXICO  

ALBA GONZÁLEZ JÁCOME

Background:

In this article, the history of coffee production in Mexico is not only a background but also a framework to understand the adjustments peasants had to make through time to deal with risk. Furthermore, some questions in the changes of different types of risks are basic for the understanding of contemporary coffee production and the impacts it has on the management of the relationship between nature, culture and socioeconomic forces. Dealing with risk is a continuous process acting in coffee production; but in the case of the small-scale cultivation it becomes basic to understand the decision making process involving land use, labor allocation, amount to harvest, time to sell, quantities to sell, other market crops options, and coffee monoculture or intermixing coffee with other plants (staples, natural vegetation, other commercial crops, and so on).

Dealing with risk is the result of a series of environmental, social, cultural and ideological adjustments peasants have to make in order to produce food, reproduce their own families and obtain monetary resources to subsidize biological, economic, social and cultural necessities. Moreover, these adjustments change through time according to changes in the environment and socioeconomic forces.

1 Alba González Jácome is responsible for the historical research on coffee, she also organized the data on different coffee cultivation areas in Mexico and she is responsible for the interpretations in this chapter. The case studies are based on current research that is being carried out by José Luis Blanco Rosas in Ocotal Chico, Veracruz and Ramón Mariaca Méndez in Santa Marta Chenalhó, who obtained the information on contemporary small-scale coffee cultivation in the highlands of Chiapas, where he has a current research project in Santa Martha Chenalhó. The Xopilapa case study was studied by Jorge Aníbal Servín Segovia for his MA Thesis on Social Anthropology at the Iberoamericana University in Mexico City. The three researches gave Alba González license to use their case study findings in this chapter.

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in nature, availability of natural resources, fluctuations in the market system, national and international economic policies, relations between rural and urban societies, demographic characteristics and the structure of local population, impacts from modernization programs, technological advances applied to local activities, and culture change.

Mexican coffee production is presently in the hands of small-scale producers. According to Martínez Morales (1998:44-45, 50) 69% of the coffee producers work plots which have less than two hectares, 2% grow coffee in less than 10-hectare parcels and, 90% of Mexican coffee producers have lands whose size is less than five hectares. This means that coffee production is mainly in the hands of peasants, many of whom are Indians. In 1990, Mexico had 357 municipalities in which coffee was cultivated and 200 of them had Indian population (IMECAFÉ, Coffee Census, 1990). The peasant agricultural production relies on unpaid family labor and also, on local collective labor-sharing ways of social organization (tequio, macoa, mano vuelta).

Some strategies developed by peasants through time are related to agricultural activity and to the management of environmental and economic risks in order to obtain subsistence and market commodities at the same time. Small-scale coffee cultivation is not an exception; but the crop itself has local, national and international characteristics and mechanisms to adjust to, which must be studied in order to understand its role in the economy and life of this. Small-scale coffee producers had been characterized of being poor, using traditional techniques, with no access to financial help from banks, with a minimum use of fertilizers and fungicides and lower coffee plant renovation (Martínez Morales, 1998:50). However, small-scale coffee production in Mexico is a much more complicated matter than its purely economic aspect in societies and it can represent local adjustments to peasant economy as a whole.

**Introducing coffee in Mexico:**

**The beginning and the first steps during the XIX century**

Coffee was consumed in New Spain as an exotic beverage at least since the end of the Colonial times. It was imported from Cuba, already ground and packed. Coffee was expensive and it was only consumed by rich people. During Viceroy Bernardo de Gálvez’ government (1785-1786) one public establishment to drink coffee and smoke cigars was founded (E.M., Vol. II, 1987:1142). A royal order from the Spanish Crown, which was signed in 1792, exempted taxes to the imports of appliances for sugar and also for manual coffee mills (Real Orden, 1792).

The introduction of commercial coffee cultivation in New Spain could be situated in the year 1795. Available data consider the rural estate (hacienda) of Guadalupe -near the city of Orizaba in Central Veracruz- was the first place in which coffee was grown. The Spaniard Juan Antonio de Gómez de Guevara seems to have been the first coffee grower in the country; he introduced coffee cultivation in Córdoba, which was an ideal place for its 24º C annual average temperature, and its altitude of 827 meters above sea level.ii (Baz y Gallo, 1874:124, 128-129). Coffee production was exported in small quantities through the Port of Veracruz in the years of 1802, 1803 and 1805 (272, 493 and 336 quintal)

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3 One quintal equals 46 kilograms or equals 100 pounds.

The Spaniard Jaime Salvet introduced coffee cultivation in his country estates of San Diego de Barreto and Nuestra Señora del Rosario de Xuchimancas in the neighboring zone of Cuernavaca, in the State of Morelos. During 1808-1809, 4,000 coffee trees were cultivated by Salvet in the State of Morelos (AGN, Industria y Comercio, ff 444-469). Jaime Salvet’s success in coffee cultivation made him write a petition to the Viceroy in order to obtain a 25-year-exemption for paying taxes and tithing to the Church. However, the 15 of July, 1809, the Church Council (Cabildo Eclesiástico) denied Salvet’s petition adducing that coffee was cultivated in Ahualulco, Oaxaca, since 1800 (EM, Vol. II, 1987:1142).

Coffee was planted at the Archdiocese of Oaxaca in 1800. Francisco Antonio Rodal was sent to verify the situation of the crops. He reported the existence of some small-scale plantations the majority of which had only 9,000 coffee trees. Eleven years later, at the beginning of Independent Mexico, Jerónimo Manchinelli introduced coffee cultivation in Chiapas during 1820, and Miguel Teviño did it in Michoacán in the year of 1860 (MNCP, 1996).

The German naturalist Alexander von Humboldt traveled in the New Spain between 1803 and 1804. In his famous book published in Paris in 1822 he wrote that coffee was rare in Mexico at that time; but he also wrote that coffee cultivation would be very successful in places like Xalapa (Veracruz) and Chilpancingo (Guerrero), (Humboldt, 1978:291).

In 1826, a half million coffee plants were cultivated in the neighboring region of Córdoba in the State of Veracruz. Between the 1820’s and the 1850’s coffee cultivation spread to the States of Veracruz, Oaxaca, Chiapas, Tabasco and Michoacán (EM, Vol. II, 1987:1142). Mocha coffee was introduced into the region of Uruapan, in the State of Michoacán, by the General José Mariano Michelena after a trip to the Middle East. The State of Colima promoted coffee cultivation in 1873, when the local Congress exempted coffee growers of paying taxes for ten years and it also accepted to pay a premium of 500 pesos to the first coffee growers able to prove a 100 quintal coffee-bean harvest (EM., Vol. II, 1987:1142).

Since the beginning coffee was planted with the idea of exportation. On the Pacific Coast it was a hope to capture the USA coffee market. The partial bankruptcy of Brazilian coffee plantations in the year of 1866 was also an important factor to increase coffee cultivation in Mexico. By 1874, Coatepec, in Central Veracruz, also started coffee cultivation. During the same year, Mexico had eight States with 148 places in which 3,125,998 coffee trees were planted. Economic policies about coffee production support its cultivation. In Central Veracruz the area for the coffee cultivation increased from Córdoba to Orizaba, Huatusco Xalapa and Coatepec. Governmental support thought tax exemption was given to coffee producers in the States of Colima, Morelos, Oaxaca, Tabasco and Veracruz (EM., Vol. II, 1987:1142).

Furthermore, historical sources show that, at least in the rural communities of Central Veracruz, coffee trees also spread from the country estates to the small-scale peasant home gardens; however, this process seems to be most important after 1910. According to travelers’ descriptions of the region, it seems to be that in the XIX Century there were at least two different ways of coffee cultivation: one way carried out through cutting the forest and growing coffee without tree shade and, the other way was through the intermixing of the coffee plant with banana, orange and mango trees. Technological advances were
absent and coffee beans were dried in terraces which were free of vegetation and also in small plains and yards, using only solar heat and wind to complete the process.

During the last years of New Spain and the beginning of the XIX Century -after the Independence of Mexico- coffee was a crop cultivated by the estate owners. During this period of coffee introduction in the country, environmental risk was the most important factor acting when the coffee cherries were in the process of being dried. At this point, there is not available data to understand the difficulties coffee introducers had to deal with the adaptation of the coffee plants to the subtropical environment in which they were cultivated. There is also no information to know something about the cultural routes through which the new beverage was introduced in the consumers’ taste.

The first steps toward the creation of a coffee market:

In 1808, the estate of Acazónica, which was located in Central Veracruz, cleared its surrounding forest to grow coffee trees (Informe, 1809). In 1810 Acazónica was a large rural estate whose owners were Francisco de Arrillaga and his partner Bazán (Scharrer, 1982:250-25). Acazónica occupied an extensive area from the cold lands near Perote to the tropical lands in La Antigua. At the end of 1829, Carl Christian Sartorius and Karl Lavater bought 4,500 hectares of the old country estate from Arrillaga; this land was located in a place called Paso de los Monos (The Passage of the Monkeys), whose name was changed to El Mirador (The Observation Balcony) (Scharrer, 1982:250-251). An old road passed from Paso del Macho (Passage of the Mule) to the Cerro de los Micos (Hill of the Monkeys) in a zigzag design, which avoided the ravines and the basin of the Atoyac river -100 meters deep- which was covered with tropical vegetation (Baz y Gallo, 1874:122-123).

From the total of El Mirador’s land only 25 hectares were cultivated with sugar-cane, coffee and pineapple. The coffee cultivation at El Mirador acquired economic importance only after 1870, when this product was directed for exportation (Scharrer, 1982:250-251, 257). In his famous book Mexico about 1850, the German Carl Christian Sartorius (1961:168) described the agriculture of the coastal regions to the altitude of 4,000 feet as having crops of cocoa, vanilla, indigo, sugar, rice, banana, tobacco and coffee. Sartorius (1961:175) wrote that coffee was at that time a new crop, its cultivation was “insignificant” and “none is exported”. However, his description of the coffee tree explains that it “thrives exceedingly well, producing a small, hard, very aromatic bean.” Sartorius’ book is a good source to understand the ways in which coffee was cultivated at that time.

Small-scale coffee cultivators in Veracruz grow a few hundred trees near their houses. Coffee plantations looked like gardens (coffee-gardens). The picking of the ripe cherries, their cleaning and the drying of coffee beans was carried out by women and children between November and March. The Indian coffee gardens around Orizaba were intermixed with orange, banana and mango trees. Coffee trees started blooming from February until April and their appearance was “magnificent”. Each coffee tree produced between pounds to a pound and a half of dry coffee whose price at the time of harvesting was six-dollars-per hundredweight. A thousand coffee trees were able to be cultivated in one acre and the small-scale planter was able to take care of 5,000 trees, with only external labor needed during the harvest time (Sartorius, 1961:175).

An important legal impulse to coffee cultivation was the expedition of Decree
number 170, signed by Governor Miguel Palacio on April 16, 1852. In this document the State of Veracruz exempted the coffee grower of paying taxes for a period of two years (IMECAFÉ, 1976).

After 1854, the estate of El Mirador started to send small quantities of coffee to its commercial agents in the Port of Veracruz. A year later Sartorius’ opinion about the Huatusco region was that coffee “is like cash” because the European market had maintained high prices for it (Sartorius, 1870:160). After 1870 El Mirador increased the area in which coffee trees were planted. The planting and harvesting of coffee needed more labor than the people used to live in a permanent way on the estate lands; the share-crop agreements (contratos de aparcería) were used to obtain the necessary labor. El Mirador also had planters, from which coffee trees were taken and given as a gift to the laborers for the planting and re-planting in their rented lands (Scharrer, 1982:257).

Coffee plants needed from three to four years to start producing. During these years tobacco, corn and beans were also interplant. Supplies (ministraciones) to coffee production were also given to small-scale coffee planters. These supplies were loaned to land renters for a period of three years, after which they had to pay the debt using as a base the coffee prices of the market. Land renters also had to sell their product to the owner of the land. The drying and grinding of the coffee beans also had to be done in El Mirador; the half of the expenses needed for the harvesting and for the transportation of coffee from the plots to the yards of the estate was paid by the enterprise (Scharrer, 1982:257-258).

The American Colonel and journalist Albert S. Evans (1992:214) traveled in Mexico during 1869. In his book on the country he writes that coffee trees were cultivated from Orizaba to the Paso del Macho, in Central Veracruz. He added that the cultivation of coffee was carried out with not much care on the plants, which produced sufficient coffee to cover the internal market; but Evans added that with more favorable social conditions, the country would be capable of exporting coffee in great quantities. However, the time to the coffee “boom” in the Mexican economy was only starting; better ways of communication and the expansion of coffee cultivation were related facts in this history.

Furthermore, Cambrezy-Bernal and Lascuráin (1992: VII) considered that from 1870 to 1910 the modern rural estate in Mexico had its peak, and the plantations and ranches increased their economic importance while the rural towns decreased. It is possible to consider that modern agriculture and new commercial crops such as coffee were organized at this time. The reorganization of the Mexican economy and the economic policies tied to this production change had very important impacts on the Mexican local and regional landscapes.

The coffee cultivation from 1870 to 1910:

January first of 1873, Gilbert Haven (1992:277, 299-300) an American protestant pastor arrived in the Port of Veracruz. The same day the President of Mexico –Sebastián Lerdo de Tejada- arrived in the Port for the first inaugural trip of the Mexico City to Veracruz railroad. Haven’s book was published in New York two years later. On one of his trips -going from Fortín de las Flores to Orizaba- Haven described the vegetation along the road as teeming with big banana, coffee and mango trees; the peasant houses were hidden in this exuberant vegetation. Coffee plantations were located along the road. Coffee plants were no more than six to eight feet high and they were protected from the sun with the
shade of banana trees and different types of broad-leaf trees.

Haven (1992:300) describes the way in which coffee was drunk at that time. The beverage was very strongly prepared (extract), but it was served mixed with two thirds of hot milk. Good coffee drinkers diminished the quantity of milk to almost nothing; coffee in the houses was served using two pots, one for the milk and the other for the coffee. In his opinion the best Mexican coffee was produced in Colima, on the west coast. Its price was one-and-a-half pesos per pound and the quality of this coffee was better than of the Rio de Janeiro’s coffee, as a result of its taste and mildness. However, Haven considered that Mexican coffee was not as good as Java and Mocha coffees. Furthermore, Mexican coffee was not mixed with chicory or garbanzo, as happened in the USA where pure coffee was very expensive.

A year later (December 1873 to January 1874) the British traveler John Lewis Geiger (1992:309, 320) crossed the country from the port of Manzanillo to Veracruz. Geiger wrote a Chronicle which was published in London in 1874. He described Córdoba as a very famous place for its coffee, which according to him was as good as Colima and Mocha coffees. At that time Córdoba had numerous country estates dedicated to the cultivation of coffee, whose exportation to the USA was favored by the railroad. At that time numerous foreigners were buying properties in the region.

Governmental protectionism was applied to coffee cultivation in the States of Colima, Morelos, Tabasco, Oaxaca and Veracruz. Coffee producers from Miahuatlán, in Oaxaca, were organized in a group. The coffee from Uruapan, Soconusco and Coatepec was known as the best in the country (EM., Vol.2, 1987:1142). In October 1875, an urban railroad from Xalapa to Coatepec started being built to facilitate communication between the two cities and agricultural exportation (Baz and Gallo, 1874:278).

In 1873, a magnificent description of coffee cultivation in Orizaba was made by Baz and Gallo (1874:164 -166). Lescano, a coffee cultivator, was the main source for Baz and Gallo’s narration. Coffee, tobacco and sugar-cane were the most important agricultural commercial productions in the Orizaba region. Coffee was easy to cultivate and the price was rising and for these reasons new areas were opened for this crop at that time. Coffee was able to be cultivated in different types of soil: red and dried or black and humid, but coffee plants were best adapted to profound crumb soils which did not need irrigation.

Previously, coffee planters had to be installed and no coffee cherries which fell to the soil naturally would be used, because their quality was inadequate for transplanting. Planters were located in open areas with mediocre soil quality because a process of crumbling the soil would start before planks (canteros, tablas) could be made. Mature coffee cherries harvested directly from the coffee trees had the pulp removed, were dampened, and wrapped with ash fifteen days before the planting. Three coffee beans were planted in each hole. The planters had to be irrigated every afternoon, but flooding the soil under the planks was not adequate. After ten months, the coffee plants could be transplanted to the fields, but soils had to be humid, or had to be irrigated before that. The coffee plants had to be at least 75 centimeters high. Transplanting was carried out during the hot months of the year and also during the rainy season (Baz and Gallo, 1874:164).

There were two methods for avoiding coffee plant drying: trimming the roots or taking care that the roots were not hurt. The second method was the one recommended by Lescano. The coffee plantation zone was formed of rectangles, according to the weather and to the micro topography of the place. The dried-soil rectangles were smaller than those in humid soils. In level terrains the coffee trees were planted with more density than in hilly
terrains. In humid soils the digging of trenches was basic for controlling water excess. Coffee trees were planted in meter-deep holes which were organized in rows with a distance of one meter to one-meter-and-a-half from each other, to favor the clearing of the coffee plantation soil. Each hole had to have manure (*mantillo*), covering the coffee plant (Baz and Gallo, 1874:165).

The coffee plantation had to be free of plant remains because insects and pests used to live there. Fallen leaves had to be removed and dried or decomposed outside the plantation and only after that, this green manure could be applied to the soil. In this way dirt was an excellent green manure for the coffee plantation. The inter-planting of coffee trees with plants like the pineapple was a good way to control insects because they preferred the pineapple as a host and also because the insects died. This agricultural practice was applied by some Cuban coffee cultivators at that time. Plant lice attacked the roots of the coffee tree; it was a current problem and the way to control it was through carving the infected root to find the wound and covering it with mud (Baz and Gallo, 1874:165).

Altitude was very important to decide if the coffee trees needed shade or not. There were zones in which no shade was necessary for the coffee trees. In places in which coffee trees needed only a little shade banana trees were planted; however, banana leaves were very long and they diminished the circulation of air and light intensity, and also the soil maintained too much humidity. Lescano recommended an inter-planting of coffee plants with shade trees because air, light and humidity were basic to obtain good coffee production. A coffee plantation had a life span of 15 and 60 years, depending on the received care (Baz and Gallo, 1874:166).

This care included a harvesting in which coffee trees were softly moved when the coffee cherries were red and mature. The maturing process had to be uniform to obtain good quality coffee, because mixing green with red coffee cherries would produce the loss of the coffee aroma. Coffee beans were sun dried in special places called driers (*secadores*), but the grains were removed everyday using a rake to obtain uniformity. The peeling of the coffee cherries was done by machines (*despulpadoras*), (Baz and Gallo, 1874:166).

According to the 1907 Statistics (AGVE, Hacienda, 1908), the rural estates in the Municipality of Córdoba were concentrating their agricultural production in the cultivation of coffee. In 22 of the total of 23 officially registered estates, coffee was the main crop, and only on one of the estates was coffee combined with tobacco. The Potrero rural estate had 3,988.00 hectares planted with coffee and it was the biggest coffee producer in the Municipality. The rural estate of Monte Blanco was the second one, with 2,598.11.72 hectares dedicated to coffee cultivation. Both estates belonged to persons whose last name—Adams and Braniff—were of foreigner origin. Zopilote, belonging to José Antonio Márquez Hoyos, had the smallest surface dedicated to coffee cultivation, with 15,321.50 hectares (Statistic of 1907, AGVE, Hacienda, 1908).

The Municipality of Córdoba had a total of 17,606.85.52 (97.38%) hectares with mono coffee cultivation, 473.75.61 (2.62%) hectares inter- planted with coffee and tobacco and a total of 18,080.61.13 hectares (100%) with both types of coffee cultivation. This data shows that mono coffee cultivation in the rural estates of the Municipality increased very drastically from 1874 to 1907 (Statistic of 1907, AGVE, Hacienda, 1908).
Figure 1:
Coffee production in the rural estates of Córdoba in 1907

<table>
<thead>
<tr>
<th>Rural estate</th>
<th>Total Hectares</th>
<th>Coffee</th>
<th>Coffee/tobacco</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Potrero</td>
<td>3,988.00</td>
<td>3,988</td>
<td></td>
</tr>
<tr>
<td>Monte Blanco</td>
<td>2,598.11</td>
<td>2,598</td>
<td></td>
</tr>
<tr>
<td>San Francisco</td>
<td>1,635.43</td>
<td>1,635</td>
<td></td>
</tr>
<tr>
<td>San Francisco</td>
<td>1,369.44</td>
<td>1,369</td>
<td></td>
</tr>
<tr>
<td>Las Animas</td>
<td>1,198.28</td>
<td>1,198</td>
<td></td>
</tr>
<tr>
<td>Zapopapita</td>
<td>1,048.48</td>
<td>1,048</td>
<td></td>
</tr>
<tr>
<td>Tapia</td>
<td>648.72</td>
<td>648.72</td>
<td></td>
</tr>
<tr>
<td>San Miguelito</td>
<td>548.99</td>
<td>548.99</td>
<td></td>
</tr>
<tr>
<td>La Capilla</td>
<td>502.82</td>
<td>502.82</td>
<td></td>
</tr>
<tr>
<td>San José</td>
<td>492.00</td>
<td>492.00</td>
<td></td>
</tr>
<tr>
<td>Buena Vista</td>
<td>473.75</td>
<td>473.75</td>
<td></td>
</tr>
<tr>
<td>Presidio</td>
<td>461.05</td>
<td>461.05</td>
<td></td>
</tr>
<tr>
<td>Ocampo</td>
<td>423.97</td>
<td>423.97</td>
<td></td>
</tr>
<tr>
<td>Cacahuatal</td>
<td>385.15</td>
<td>385.15</td>
<td></td>
</tr>
<tr>
<td>Toluquilla</td>
<td>371.50</td>
<td>371.50</td>
<td></td>
</tr>
<tr>
<td>La Trinidad</td>
<td>353.06</td>
<td>353.06</td>
<td></td>
</tr>
<tr>
<td>María</td>
<td>351.75</td>
<td>351.75</td>
<td></td>
</tr>
<tr>
<td>Zacatepec</td>
<td>342.15</td>
<td>342.15</td>
<td></td>
</tr>
<tr>
<td>La Ceiba</td>
<td>224.67</td>
<td>224.67</td>
<td></td>
</tr>
<tr>
<td>Guadalupe</td>
<td>216.80</td>
<td>216.80</td>
<td></td>
</tr>
<tr>
<td>Zopilote</td>
<td>153.21</td>
<td>153.21</td>
<td></td>
</tr>
<tr>
<td>Ojo de Agua</td>
<td>110.59</td>
<td>110.59</td>
<td></td>
</tr>
<tr>
<td>Ojo de Agua</td>
<td>110.59</td>
<td>110.59</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>18,080.61</strong></td>
<td><strong>17,606.85</strong></td>
<td><strong>473.75</strong></td>
</tr>
<tr>
<td><strong>Percent</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>97.38%</strong></td>
<td><strong>2.62%</strong></td>
</tr>
</tbody>
</table>

Source: Statistic of 1907, AGVE, Hacienda, 1908.

Since 1874, the coffee region in Veracruz has extended to include Coatepec. The same year, the number of coffee trees in the State of Veracruz was 1,322,806. The region Xalapa-Coatepec had a temperate climatic characteristic. With less heat and more humidity the region is located at an average of 1,400 meters above sea level. The precipitation ranged from 1,500 to 2,000 annual millimeters; although the dry periods were short and drizzle (chipi chipi) was not very long, it was sufficient to maintain humidity. Xalapa and Coatepec are situated in the abrupt slopes of the Cofre de Perote which produces an undulate topography with fertile soils very adequate for agriculture. Altitudinal changes produce immediate changes in the type of soils and vegetation (Cambrezy-Bernal and Lascurain, 1992:26-27).
The country estates in the Xalapa-Coatepec region had a Caribbean-Spanish construction style which was characterized by lush vegetation, appropriate water management, and the abundance of open yards and portals (Cambrezy-Bernal and Lascuráin, 1992). The estates cultivated not only coffee; there are data which permit us to see the strategy of inter-planting coffee with other agricultural products and with other economic activities their owners developed. This was a way to deal with economic risk and it is presently the normal strategy followed by the medium and the large-scale coffee cultivators in this region (Segrove, 2003).

### Figure 2
**Country estates producing coffee in the Xalapa-Coatepec region: 1870-1910**

<table>
<thead>
<tr>
<th>Name</th>
<th>Localization</th>
<th>Agricultural activity</th>
<th>Other economic activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lucas Martín</td>
<td>Road Banderilla to Xalapa</td>
<td>Sugar-cane, coffee, fruit, cattle</td>
<td>Textile industry since 1841. Smelter.</td>
</tr>
<tr>
<td>Las Ánimas</td>
<td>Entrance road Veracruz to Xalapa</td>
<td>Sugar-cane, coffee (since 1919)</td>
<td>Sugar-cane factory Coffee factory (since 1985)</td>
</tr>
<tr>
<td>Consolapa</td>
<td>Road Xalapa to Coatepec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>La Orduña</td>
<td>Road Xalapa to Coatepec</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monte Verde y Pasagera*</td>
<td>Cantón de Xalapa</td>
<td>Coffee, cattle</td>
<td></td>
</tr>
<tr>
<td>Pacho</td>
<td></td>
<td>Sugar-cane, fruit trees, cattle, coffee (since 1870).</td>
<td>Sugar grinding</td>
</tr>
<tr>
<td>Pacho Nuevo*</td>
<td>Cantón de Xalapa</td>
<td>Coffee</td>
<td></td>
</tr>
<tr>
<td>Quimiapan</td>
<td></td>
<td>Coffee</td>
<td></td>
</tr>
<tr>
<td>Zimpizahua</td>
<td></td>
<td>Sugar-cane, coffee, fruit, cattle</td>
<td>Coffee factory</td>
</tr>
<tr>
<td>Mahuiztlán</td>
<td></td>
<td>Sugar-cane</td>
<td>Sugar mill</td>
</tr>
<tr>
<td>Tuzamapan</td>
<td></td>
<td>Sugar-cane, coffee</td>
<td>Sugar mill, hotel, and distillery.</td>
</tr>
</tbody>
</table>

Sources: Cambrezy-Bernal and Lascuráin, 1992:27-28, 88, 94, 105, 117, 125; Estadística de 1907, GEV, Hacienda, 1908 (*).

In 1880, at the beginning of Porfiriato, the State of Veracruz was considered as the most advanced place for the cultivation of coffee in Mexico. Veracruz was providing two thirds of the total coffee production in the country. The State of Colima produced one sixth of the total and the rest of the coffee production was provided by the States of Chiapas, Guerrero, Michoacán, Morelos, Oaxaca and Tabasco. Ten years later coffee cultivation was
extended to the States of Jalisco, Tamaulipas, Durango and Mexico. The northern States of Nayarit (Tepic), Sinaloa and Coahuila were also included; however, in this last northern State coffee cultivation was abandoned very soon (López Rosado, 1968:98; d’Olwer, 1974:99).

In 1877, International coffee prices decreased as a consequence of the increase of world areas in which coffee trees were cultivated 10 years before. During 1883, Mexican coffee supplied 1.6% of the World production. In the next year, Mexican coffee supplied 4.0% of the World production. At this time the coffee from Michoacán was considered the finest in the world and Mexican coffee the mildest produced in the world. Coffee from Michoacán and Colima was sent to the national market while Córdoba, Orizaba, Coatepec and Oaxaca coffees were destined to international markets, but the major part was consumed in the USA; minor coffee quantities were sold in Spain, France and Germany, and the British market still was much reduced (d’Olwer, 1974:98).

On January 9, 1879, a group of 70 American entrepreneurs, industrialists, merchants and journalists traveled from New Orleans to the Port of Veracruz under the command of Colonel Whiting, to open commercial relations with the Mexican government directed by Porfirio Díaz (Finerty, 1992:9 -13). The Irish-American journalist from the Chicago Times, John F. Finerty, came with the group and visited the country from Veracruz to Chihuahua passing through Querétaro, Aguascalientes, Zacatecas and Durango. During his 30-day trip he sent 14 articles to the newspaper; in 1904, he put together the articles and wrote a book titled Mexican Flash Lights. A Narrative of Travel, Adventure and Observation in Mexico, Old and New (1904).

On his way to the Orizaba volcano, Finerty (1992:22-23) described the coffee region surrounding Córdoba. The writer considered coffee from this region as the best in the north of the continent. For the eyes of the journalist, the coffee plantations were attended with great care, banana and coffee trees were cultivated in intermixed rows, and banana trees gave shade to the neighboring coffee plants. The laborers (peones) were in charge of harvesting the coffee cherries. The owners of the country estates were lazy to supervise the crop and many times they rented the land to speculators. Using data from the American naturalist Frederick Ober, who also visited the zone around Orizaba, Finerty (1992:23) described the home gardens cultivated with corn, coffee, pears, sugar-cane, grapes and mango trees.

A Belgian traveler -Jules Joseph Leclercq- who was the president of the Belgium Geographical Society and a member of the Geographical Society in Paris traveled through Mexico in 1883 (Leclercq, 1992:119-156). His book was published in Paris in 1885. Leclercq came from New York to Mexico City and from there he took the train and went to the Port of Veracruz. This traveler visited Orizaba, Córdoba, Xalapa, Medellín, and Alvarado. According to Leclercq (1992:127), Córdoba had an exuberant vegetation including native and foreign species like the Chilean Araucarias, the coffee trees from Liberia (Moka tancifola iv), pepper and mango trees, Cryptomeria japonica, Carica papaya, banana trees (Musa ensete), medlar-trees, laurel-trees, azaleas, and Ortodoxia regia, among others.

Leclercq (1992:127-128) went to visit a coffee plantation which was a property of his host; it was located within walking distance from Córdoba. The coffee plantation was described as “a botanical garden” of 500 hectares, irrigated by a nearby river with several falls whose borders were abundant in tropical vegetation like giant arbores cent ferns and figs. The coffee trees were trimmed to control their height and also in order to obtain the
growth of horizontal branches which facilitated the harvest. Coffee beans were harvest from November to April and after harvesting the coffee beans were sun dried in yards. Coffee trees “liked” to be under the shade of an acacia (*Puanciana imperialis*) but in order to obtain another production, coffee growers used to plant banana trees instead.

In this region banana plantations were always coffee plantations also (Leclercq, 1992:129). Leclercq’s host was introducing a variety of coffee from Liberia whose leaves were longer than other varieties and also with flowers which had seven to nine petals instead of only five. In order to counteract the lower prices of coffee at that time, Leclercq’s host was also growing quinine trees whose price in the international market was sufficiently high to cover coffee production losses (Leclercq, 1992:129-130). The rest of the tropical vegetation in the country estate was composed of mango trees (*Mangifera indica*), coconut palms, date palms, fiber palms, *Ravenala madagascaris*, bread trees, avocado trees, milk trees (*Galactodendron utile*), banana trees, brown sapota-trees (*chicozapote*), cherimoya (*chirimoya*), guava, pomegranate, pineapple and orange trees.

According to Leclercq’s host, -a foremen by the way- after traveling all around the world, this region was the most beautiful land of all; however, the host added “it is a pity that Mexico was crowded with Mexicans”. For this man, the main problem to maintain his property was the pillage of corn during the harvest time; but the most terrible enemies for the coffee trees were the ants and the moles. A year before the man spent 15,000 francs to combat them with no good results; although Indians took in their hands the capturing of moles which they ate (Leclercq, 1992:131).

On his way to Xalapa, Leclercq (1992:137) passed through Huatusco, a place with a humid climate very favorable for coffee cultivation, which was at 1,200 meters above sea level. Xalapa was a city with a population of 10,000; the town of Coatepec was near it. A man from Switzerland named Robert was in charge of a steam plant used to classify coffee beans; the plant belonged to the Ritter House in Veracruz. According to Leclercq the steam plant was magnificent and also it was the best in Mexico.

In 1887, the Jesuit Charles Croonenberghs visited Mexico. His book on his trip was published in France in 1893. Croonenberghs (19992:166-167) went to Orizaba and Córdoba where he was invited to stay at the Las Ánimas estate, a property of a Spaniard named Ignacio Vivanco. A few hectares of the estate were dedicated to coffee cultivation, which was planted in intermixed rows with banana trees. The coffee trees required a seven-to-eight-year period for obtaining a plentiful production. Coffee trees were trimmed to maintain a height no more than 10 to 12 feet. The period of harvesting was from November to April. The drying of the coffee cherries was carried out on paved terraces under the wind and the sun. Later, the coffee beans were stored in ventilated granaries. After a while the beans were taken out of their cascarilla bark; when perfectly dried, the coffee beans were weighed and packed in sacks in order to be transported to Europe. Croonenberghs (1992:167) considered the coffee from Michoacán as the best of the country because was strong and aromatic.

A Bostonian journalist, Maturing Murray Ballou, published the book *Aztec Land* in 1890, after a pleasure trip to Mexico. Murray (1992:183-185) visited Orizaba, Córdoba and Xalapa. Murray’s descriptions of coffee production in the area tell us that a plantation was 25 to 30 acres located in the level land, the coffee trees were planted in rows mixed with banana, orange and mango trees and some other shade trees. The coffee trees were trimmed to maintain a certain height. The plantation had also quinine trees which were harvested four times a year; quinine trees were very profitable.
In 1890, the Minister of Economics in Mexico published a book written by Alfonso Luis Velasco about the geography and statistics of each one of the States in the country. Volume III was dedicated to Veracruz, which at that time was organized in 18 political regions (cantones), 197 municipalities and 1,174 congregations. The richest regions of the State of Veracruz were: Veracruz, Orizaba and Córdoba (Velasco, 1890:59). The main agricultural products were: corn (307,000,000 kg.), cotton (16,000,000 kg.), beans (11,952,000 kg.), coffee (6,700,000 kg.), tobacco (4,200,000 kg.) and dried chilies (2,760,000 kg.), (Velasco, 1890:60).

Coffee was planted in the regions of Córdoba, Orizaba, Huatusco, Coatepec, and in small quantities in the Tuxtlas (Velasco, 1890:61,127). The region of Córdoba had 15 municipalities, 83 congregations and 41,374 inhabitants, 204 of whom were foreigners (143 Spaniards, 31 Frenchmen, 15 Italians, five Germans, two Englishmen and eight Americans). In 1890, coffee was the most important agricultural product (1,700,000 kg.), followed by tobacco (1,100,000 kg.), corn (210,000 hectoliter) and rice (200,000 kilograms) (Velasco, 1890:165-168). The city of Córdoba had 5,800 inhabitants and it was built in the middle of home gardens, coffee gardens, and cocoa groves; its economy was based on the production sent to Mexico City, and exported to the United States and Europe of coffee, tobacco, rice and fruit (mango, orange, pineapple, lemon, banana, coconut and mamey) (Velasco, 1890:172).

The region of Orizaba had 53,267 inhabitants, of which 393 were foreigners (157 Spaniards, 48 Frenchmen, two Belgians, 31 Italians, one Portuguese, 31 Germans, 66 Englishmen, two Austrians, two Swiss, four Turks, 48 Americans and one Polynesian). Sugar, coffee and tobacco were the main agricultural products in the region. There were 15 estates dedicated to the cultivation of coffee (700,000 kg. annually) and tobacco (260,000 kg. annually). The city of Orizaba was surrounded by coffee plantations, home gardens, sugar-cane and tobacco fields, gardens and cocoa groves (Velasco, 1890:178, 179).

In 1890, the Municipality of Coatepec had 34,484 inhabitants, 20 of them were foreigners (12 Spaniards, one Frenchmen, one Belgians, one Englishman, one Swiss, one Russian, two Americans and one Guatemalan). Coffee was the main agricultural product (2,300,000 kg.) followed by sugar-cane (800,000 kg.), tobacco, corn, black beans, rice, chili, yucca, peanut, root of Xalapa, castor-oil plant (Ricinus communis) and fruit (orange, lime, avocado, banana, pear, apple, and sour cherry). The city of Coatepec had 5,400 inhabitants. Exportation of coffee, tobacco and sugar were of most importance for the economy of the city (Velasco, 1890:157-159).

A few years later, in 1907, the Italian Adolfo Dollero (1992, Vol. VIII: 206-207) traveled in Veracruz. He described Coatepec as a town surrounded by large coffee and orange plantations, which was located at 1,252 meters above sea level, and had a population of 7,600 people. Coffee, tropical fruit, sugar-cane and cattle were Coatepec’s main products. The natural forest included liquidambar (Liquidambar styraciflua orientalis), and many foraging and medicinal plants. Coatepec had several installations dedicated to coffee industrial processes (beneficios). Near Coatepec was Teocelo, a small town with 3,300 inhabitants, in which coffee was the most important economic resource. In Teocelo, coffee was grown without the shade of the trees, and this was an unusual situation in this part of Veracruz.
The Tehuantepec Isthmus and the coffee corridor between Veracruz and Chiapas

The agronomist Karl Kaerger published a book in 1901 about the German investment possibilities in Hispanic America. The section dedicated to Mexico describes the agricultural products which at that time were exported and also the economic activities directed toward the internal market. Coffee was included as well as sugar-cane, cereals, Agaves, cotton, henequen, cacao, rubber, vanilla production and northern cattle rising. According to Kaerger (1986:77-78), in 1897, the Municipality of Minatitlán was included as a coffee producer in the State of Veracruz. The entrance of the railroad to the Tehuantepec Isthmus and the construction of the ports of Coatzacoalcos on the Gulf coast and Salina Cruz on the Pacific coast by the Englishman Pearson opened up this region to coffee cultivation.

Americans arrived in Minatitlán starting the coffee cultivation on the lower slopes of the mountains near the Isthmus. These coffee plantations were extended into eastern Chiapas and Tabasco. Even if the main Chiapas and Oaxaca coffee regions were located on the Pacific coast. Soconusco was the most important coffee region in Chiapas, while Pochutla was the most important coffee region in Oaxaca at that time. In the State of Oaxaca small-scale Indian land owners were cultivating coffee in the communities of Villa Alta, Choapan, Tuxtepec and Teotitlan. A big international coffee factory was installed in Oaxaca and the cultivation of coffee was extended to Cuicatlán (Kaerger, 1986:78).

Kaerger traveled from Oaxaca to Guatemala crossing through Chiapas in order to investigate some of the environmental conditions in the coffee cultivation regions. He made

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**Figure 3**

Coffee production in Mexico: 1897

<table>
<thead>
<tr>
<th>State</th>
<th>Tons</th>
<th>% of the total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veracruz</td>
<td>14,303</td>
<td>65.63%</td>
</tr>
<tr>
<td>Oaxaca</td>
<td>2,770</td>
<td>12.71%</td>
</tr>
<tr>
<td>Chiapas</td>
<td>2,465</td>
<td>11.31%</td>
</tr>
<tr>
<td>Puebla</td>
<td>704</td>
<td>3.23%</td>
</tr>
<tr>
<td>San Luis Potosí</td>
<td>404</td>
<td>1.85%</td>
</tr>
<tr>
<td>Michoacán</td>
<td>363</td>
<td>1.67%</td>
</tr>
<tr>
<td>Tepic</td>
<td>264</td>
<td>1.21%</td>
</tr>
<tr>
<td>Jalisco</td>
<td>166</td>
<td>0.76%</td>
</tr>
<tr>
<td>Hidalgo</td>
<td>156</td>
<td>0.72%</td>
</tr>
<tr>
<td>Tabasco</td>
<td>70</td>
<td>0.32%</td>
</tr>
<tr>
<td>México</td>
<td>60</td>
<td>0.27%</td>
</tr>
<tr>
<td>Colima</td>
<td>58</td>
<td>0.26%</td>
</tr>
<tr>
<td>Guerrero</td>
<td>12</td>
<td>0.06%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>21,795</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: K. Kaerger, 1986 (original 1901):77
soil analyses in order to see the possibilities for the application of chemical fertilizers on a coffee plantation which belonged to a German entrepreneur. The soil analyses were done in the Albert Company in Germany, and the result was a lack of equilibrium in the soil nutrients. According to Kaerger (1986:80-81), the coffee which was planted in zones with shade and a constant humidity produced soils with better chemical conditions than the coffee planted in zones where the coffee plants were exposed to the sun during the mornings.

A pamphlet called Cultivo y Beneficio del Café, written by the agronomist Gabriel Gómez, was published and distributed by the Mexican Government to teach people in this region how to cultivate coffee. However, this pamphlet did not take into account the sun and shade impact on coffee cultivation. Kaerger (1986:81) assured that German coffee cultivators agreed with him in this matter. Furthermore, Kaerger (1986:82) also added that humidity was the cause of nitrogen richness in the soils when shade was associated in the coffee cultivation zones. The geological origin of the soil and the degree of slope inclination in each zone were also related to the life span of the coffee trees.

According to Kaerger (1986:82), the final result of all these environmental conditions in the cultivation of coffee in the Isthmus region was the short or the long life of the plants. The inadequate conditions permitted only a life span for the coffee plant of seven years, of which only three of four were productive. Moreover, one coffee tree was able to produce only one pound of coffee but the coffee producers were happy when that was only half a pound. A common harvesting practice among the coffee producers in Oaxaca was harvesting the cherries when they had a light red color, because they thought that the deep red color in the coffee cherries was caused by too much sap losses.

Kaerger’s idea -also supported by Hilario Cuevas (1895), a coffee producer who was the owner of a rural estate in Cuicatlan- was that the lack of humidity and a resulting dryness of the soil due to insulation and the lack of shade trees in places like Juquila and Pochutla were the cause. He also found a lack of labor in the region which was associated with the problem. Moreover, some foreigners coffee producers started planting banana and rubber trees (Castilla elastica) as shade for the coffee plant. Introduction of irrigation was not a common practice in the region and only the Indian Rubber Company at La Esmeralda rural estate was applying irrigation to the crops (Kaerger, 1986:84-85).

Irrigation of the coffee trees was carried out using the topography of the terrain to catch rain water in holes (cajetes) which were open near the coffee plant. Slope inclination permitted the capture of water in the holes; but, some terraces had to be constructed in places with severe inclination. Terraces were easily constructed using edges made with earth and weeded vegetation during the clearing time on the coffee plantation. The gradual accumulation of soil and weeds produced the necessary terraces with not much human and monetary investment. According to Kaerger (1986:86-87) if the holes were covered with weeds and a superior layer of lime and soil, their water retention capacity would continue but the increase of nutritive soil substances would be better used by the coffee trees due to the bacteriological and chemical processes.

Kaerger (1986:86-87) also recommended the use of animal manure instead of chemical fertilizers. As in Juquila, no intensive cattle production was available; the German agronomist recommended the use of mules and other beasts of burden to obtain the necessary manure for the coffee trees. The development of lateral branches in the coffee trees was due to the depth of the coffee plant roots because they had to grow deeply in order to obtain the necessary humidity; dry soils would produce high coffee trees, deep
roots and no lateral branches. Trimming the coffee trees would permit the development of lateral branches and less height and length in them; it also would permit better sap circulation in the plant.

The German agronomist found a very close relationship between humus quantity and soil humidity in the coffee plantations with productivity. Five German plantations in Pochutla with a total of 400,000 coffee trees were able to produce 30,000 quintals of coffee; the average was of three quarters of a quintal of dry coffee beans per tree. The coffee trees in the Pochutla region had a life span of 12 to 15 years. The plantations lacked irrigation but annual average rainfall was higher in Pochutla than in Juquila (Kaerger, 1986:88-89).

Some descriptions about human labor in the State of Oaxaca coffee plantations were written by Kaerger (1986:88). The plantations were not able to have permanent workers living on their terrains although they were offering plots for the cultivation of corn and beans. Nevertheless the labor during harvesting times was normally enough to cover the seasonal activities. The daily salary for the seasonal labor was of three reales (37 and a half cents) with no food included. This salary was paid for several tasks:

The opening of 40 to 50 holes according to the soil hardness; each hole was an square of .42 meters (media vara) per side, with .63 meters deep (three quarters of a vara). The clearing of a square terrain surface of 21.84 meters per side (26 varas), which was called tarea. The tarea was done with the help of a grub hoe or by a coa (stick with a hardened end). The clearing of a square terrain with 32.76 meters per side (one and a half tarea), with no cutting of the weeds very close to the soil surface and using the machete. The clearing of a terrain with 100 coffee trees using a grub hoe or a coa. The clearing of a terrain with 150 coffee trees using a machete (Kaerger, 1986:88).

The harvesting of coffee cherries was paid with a price of .05 cents per 8 kg. (Almud), but the number of kilograms per each almud varies from one plantation to another. The coffee cherries must be mature but a process of bean selection was done and no red beans were harvested. Coffee plantation machinery was good but not as good as that which was used in the major coffee regions of the country. According to Kaerger (1986:88) labor salary conditions were better in Oaxaca than in the rest of the coffee production regions of the country due to the small size of the coffee production areas and the lack of demand of their related jobs.

The southern regions and the coffee cultivation

In 1892, the Southern Railroad Line was inaugurated, promoting coffee cultivation in Chiapas. Large scale coffee cultivation was carried out in at least two ways: plantations (fincas rústicas) mainly located on the Mexican border with Guatemala, where coffee monoculture was an established system, and country estates in which coffee was mixed with other commercial crops. The large-scale coffee monoculture plantations cleared the soil of subtropical vegetation leaving the coffee crops lacking of shade trees; fertilizers and manure were not applied, the hardened soils were not removed, and the crops lacked irrigation. Estate owners sold the coffee production to national and international markets (d’Olwer, 1974:101).

In 1908, when the railroad from Soconusco (Chiapas) to Coatzacoalcos (Gulf coast) was inaugurated, there were 66 plantations dedicated to coffee cultivation in southern
Chiapas (Renard, 2002:15). These country coffee estates belonged to foreigners; their long extension permitted leaving extensive areas without cultivation, pasture zones and land for the corn cultivation destined to fulfill the permanent workers’ subsistence. The railroad permitted the exportation of coffee to San Francisco, New Orleans and New York in the USA and to Hamburg, Bremen and Rotterdam in Europe, through the Guatemalan Pacific ports of Ocós and San José and the Mexican port of Madero.

The coffee peak in the international market is also related to the Brazilian coffee crisis of 1886. Some local situations occurred in southern Mexico like the growth of regional cities as happened in Tapachula, due to the arrival of merchants. The expansion of coffee cultivation in the Mame area at Highland Chiapas occurred after 1910 (Renard, 2002:15-16). Furthermore, in 1911, the coffee from the Soconusco provided to the State of Chiapas economy with more than half of its budget. Palenque, Chilón, Tonalá, Tuxtla, Pichucalco, Simojovel, Chiapa, Mariscal, Mezcalapa, Las Casas and La Libertad were also growing coffee through country estates (fincas rústicas). Coffee entrepreneurs were the most prosperous economic group in Chiapas at that time (Grollová, 2002:195).

In the Soconusco, the Central American Railroad Line (1908) facilitated the transportation of coffee production from Puerto Mexico (Coatzacoalcos) on the Gulf coast to Hamburg and Bremen, and from Salina Cruz on the Pacific Coast to the East coast of the United States (Walter, 2002:27). The shortening of the period of transportation of the coffee beans from the Chiapanecan plantations to Europe -which originally was nearly four months-, was the trigger for the increase of coffee cultivation in this region. In 1900, the Soconusco had 26 coffee plantations which increased to 94 in 1927 (Waibl, 1936).

***The last days of the Porfiriato:***

At the beginning of the XX Century, the coffee production in Mexico had some characteristics: (1) very limited zones were producing the best coffee in the country (Xalapa, Coatepec, Uruapan, Miahuatlán, Soconusco, Tuxtla, Mezcalapa, and the Valley of Tulijá), (2) the cultivation of coffee was very much in a stage of experimentation, (3) the coffee prices were capricious, (4) the coffee for international markets had problems with its presentation, (5) the economic policies for coffee cultivation differed from one State to another, (6) the zones producing coffee all around the country suffered from a lack of labor, but after a time some activities such as the harvesting of coffee cherries were done by women and children (d’Olwer, 1974:99-101).

The coffee cultivation in Mexico between 1880 to 1910 was carried out at least in three different ways: (1) large-scale coffee plantations (monoculture), (2) diversification of crops in country estates whose commercial production included coffee and many other agricultural products such as oranges and bananas (Xalapa and Coatepec) or sugar-cane, tobacco and quinine (Córdoba and Orizaba) and, (3) small-scale coffee cultivation in home gardens which could be tied to the estates through land renting, labor arrangements such as share-cropping, and the control of the market by hoarders. Moreover, the coffee regions of Veracruz, Tehuantepec Isthmus and southern Chiapas were developed. These regions were related to the international coffee markets through the ports on the Atlantic and the Pacific coasts and with the support of the railroads.
The expansion of the coffee region in Veracruz

The consolidation of the coffee region in the Gulf coast can be understood through travelers’ descriptions of the region. In January 1909, the French climatologist Vitold de Szyszlo (1992:169-193), arrived in the Port of Veracruz from Havana. The French traveler stayed in Mexico for a year, visiting Veracruz, Puebla, Oaxaca, Chiapas, Guerrero and Baja California. In 1913, his book was published in France and two chapters were dedicated to the careful economic descriptions of the Port of Veracruz, Xalapa, Coatepec, Xico, Teocelo and Perote.

Szyszlo (1992:188) wrote that agricultural productions in the State of Veracruz had a value of 120,000,000 francs from which 35,000,000 francs (29.2%) corresponded to coffee production. Coffee was followed in importance by sugar-cane (25%), corn (16.6%), tropical woods (12.5%), tobacco (10.8%), vanilla (8.3%) and beans (4.2%). This information shows the importance that coffee cultivation acquired for the State of Veracruz just before the Mexican Revolution. It also permitted the understanding of the huge economic importance that commercial agriculture exportation had acquired in the country, which at that time had two Atlantic ports from where coffee exports were sent: Veracruz and Coatzacoalcos.

Vitold de Szyszlo (1992:188-189) described the risks that agriculture had to deal with at that time. These were: climatic conditions; lower prices; speculation and political insecurity. In the area surrounding the city of Xalapa the popular disturbances usually caused the real owners of the estates the loss of the harvests. But, at the same time, climatic conditions, soil conditions and humidity explained why the Xalapa region was very good for coffee cultivation and no irrigation had to be applied to the crops. It is also possible to distinguish the existence of at least three coffee cultivation systems at that time.

(1) Large-scale monoculture agro-ecosystems. The properties in the Xalapa and Coatepec region with an average surface of 400 hectares -and more- were cleared. The process of clearing started by using axes for the cutting of higher trees; the lower vegetation was also cleared by using machetes, and after that, fire was used to destroy the weeds from the lower vegetation stratum (slash and burn). A cleared terrain had a market price four to five times higher than that which was not. The wood obtained from clearing was sold, giving an additional economic benefit to the company. Afterward the terrains were ready to be cultivated with some commercial crop (Vitold de Szyszlo, 1992:188-189).

(2) Large-scale intermixed agro-ecosystems. The biggest coffee plantations in Coatepec mixed coffee plant with tree crops which protected them from the sun; these crops were banana and orange trees. Orange cultivation was a good business because an eight-meter-high orange tree was able to produce 2,000 oranges which were harvested from the beginning of September (Vitold de Szyszlo, 1992:192-193). The substitution of natural shade trees by commercial crops gave shade to coffee trees and money to the coffee producer; however, the cultivation of only commercial crops doubled the economic risk to producers, leaving them in the hands of market price fluctuations.
During the Porfiriato, diversification of crops -including coffee cultivation- was also a common practice in several country estates in Veracruz. The fluctuation of the coffee prices in the international market was an important economic risk to deal with; however at least one of the other agricultural products of the country estates was able to succeed in the market. Some commercial products such as sugar-cane, tobacco and quinine were highly priced in the national and international markets.

Furthermore, as the estate owners controlled the coffee production obtained from the neighboring communities and also from the peasants living on their estate lands, they were able to fix prices at the small-scale level. Some pests attacked the coffee plants such as ants and moles; pest control was expensive but it also was not successful. Political instability in the Coatepec region during the beginning of the XX Century was another factor of risk the estate owners and the peasants had to deal with. In 1920, some army movements occurred in the region of Xico, Teocelo and Coatepec where revolutionary factions were operating (Blázquez, 1992:73).

(3) Small-scale agro-ecosystems were organized by peasantry through home gardens, intermixing coffee plants with staples (corn), fruit trees and broad-leaf trees. At that time, for peasants’ coffee was a secondary crop, which produced additional monetary sources for their families. Peasants sold the coffee production to the neighboring country estates. Some parts of the process were also controlled by the estate owners such as the coffee plant they were giving to the peasants and the drying of the coffee cherries in their own estate yards and terraces. Labor for planting and harvesting coffee in the communities was non-paid because peasant families were in charge of them. Ants and moles were controlled by peasants through non-costly traditional hand methods. Technological advances applied to the drying of the coffee beans, packing and transporting were in the hands of the estate owners.

Before the Mexican Revolution (1910-1921), coffee production for exportation to the international markets was increasing; but at the same time, the international market was centralized in the USA. World War I, from 1914 to 1918, was another important factor to explain the reduction of the European coffee market and the expansion of the American one. The Mexican internal coffee market also diminished from 1.5 kilograms per person per year before 1920, to 0.4 kilograms per person per year during the 1920’s (EM, Vol. 2, 1987:1142).

**Coffee cultivation after the Mexican Revolution**

The Mexican Revolution between 1910 and the 1920’s had a very strong impact on the land tenure of the country. In 1916, the first Agrarian Law was declared and the owners of the rural estates had to return part of their lands to the communities which had been the original owners. However, the communities needed to prove their legal property rights on the claimed land (Carranza, 1916). After 1920, the country estate (haciendas) land had to be divided among other solicitors, and the estate owners who were affected at that time only retained the buildings and some part of the land. The agricultural landscape significantly changed in Central Mexico where communal land (ejido) was granted to
The Mexican agrarian land grant revolt was done in stages through the communal property (ejido). From the 1930’s to the 1970’s many peasant communities throughout the country received communal parcels. Land for granting was taken from the rural estates; but it was not at the same time all over Mexico. In Central Veracruz the grant process occurred since 1916; however in the south of the State the grant process occurred later. In northern Chiapas, the first Agrarian grant occurred in 1934 and as a consequence the coffee plantation owners decreased their investments (Pérez Castro, 1989:80; Walter, 2002:28).
Many authors agree with the idea that the Mexican Revolution caused the rise and the expansion of small-scale coffee cultivation in the country (Martínez, 1998; Moguel and Toledo, 1999). Furthermore, another idea emerged from this one, that coffee cultivation was “taken by the Indian peasantry” although coffee was not a native Mexican plant. It becomes very difficult to discuss the types of coffee agro-ecosystems, their ecological, social and cultural characteristics in all the country, mainly because there are 357 municipalities and 4,326 communities which at least in 1990 (IMECAFÉ, Coffee Census, 1990) were coffee cultivators.

**Figure 5**

**Coffee production: volume and value: 1921-1950**

(Thousand tons and thousand pesos)

<table>
<thead>
<tr>
<th>Period</th>
<th>Production (thousand tons)</th>
<th>Value (thousand pesos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1921-25</td>
<td>200</td>
<td>100,338</td>
</tr>
<tr>
<td>1926-30</td>
<td>2567</td>
<td>92,671</td>
</tr>
<tr>
<td>1931-35</td>
<td>241</td>
<td>147,643</td>
</tr>
<tr>
<td>1936-40</td>
<td>287</td>
<td>173,297</td>
</tr>
<tr>
<td>1941-45</td>
<td>271</td>
<td>104,674</td>
</tr>
<tr>
<td>1946-50</td>
<td>290</td>
<td>150,217</td>
</tr>
</tbody>
</table>

Source: Juan Gómez Cobo, DGEA, 1961.

The rise and expansion of small-scale coffee cultivation

In 1990, 276,655 persons were coffee cultivators in Mexico. The coffee cultivated surface was of 573,000 hectares and the production was of 1,395,804 quintal (SARH, 1990). The Coffee Census of 1992 established that the main coffee regions of the country were: (1) Gulf coast, (2) Pacific Ocean, (3) Center, and North of Chiapas, and (4) Soconusco in southern Chiapas. These coffee regions are distributed in 12 States of the country and they comprise 398 municipalities and 282,000 coffee producers. The Gulf coast included the regions with major coffee production in the States of Hidalgo, Puebla, Veracruz and Oaxaca. The Pacific Ocean coast included the States of Nayarit, Jalisco and Colima. The Northern and Center of Chiapas comprises the border area between the States of Oaxaca, Veracruz and Tabasco (Teapa and Tacotalco). The Soconusco region is in the Mexican southern border with Guatemala (Martínez Morales, 1996:37-40).

The coffee production in Mexico occupies only 0.39% of the total surface of the country and only the 3.2% of the agricultural cultivated land. The States of Chiapas, Veracruz and Oaxaca are the only ones in which coffee is cultivated in more than the 10% of their agricultural land (Martínez Morales, 1999:39). The present coffee production regions in Mexico have been characterized as follows: (1) low development degree, (2) low public inversion during the last 20 years, (3) paying the lowest salaries in the country, (4) very low wealth indexes, (5) bad communication and ways of transportation for the coffee production, (6) coffee production regions are also Indian populated regions, and (7) technological coffee production culture has been deeply influenced by these Indian cultures.
in managements like: trimming, replanting the rootstalk (recepá), the type of shade, the number of coffee trees by hectare, and pest and illness control (Martínez Morales, 1996: 38-39; Moguel and Toledo, 1998:4-6,12).

Coffee production in Mexico is very important for the national economy. The amount of exportation varies between 300 and 400 million dollars yearly. International coffee price fluctuation varies yearly according to world coffee production volume, specific market necessities, and international agreements. Some programs to develop coffee production and coffee quality have been implemented in Mexico. These programs explain -at least partially- the inner fluctuation in the coffee production volumes after the 1970’s to date. What happens in the local economy of different coffee regions in Mexico is still a question of research.

Case studies:

Case studies are a good way for the understanding of ecological, economical, social and cultural local processes which are related to small-scale coffee production. The abrupt regions of Soteapan in southern Veracruz, Xopilapa in central Veracruz and Santa Martha Chenalhó in Highland Chiapas will be examples of how small-scale coffee production is presently carried out by peasants and how they are dealing with ecological and economic risks. The three cases are based on current research and they show that many of the contemporary agricultural practices applied to coffee cultivation are not traditional, because they were developed and spread by federal institutions in the XX Century. Some of these agricultural practices are tied to the modernization programs of the post-revolutionary Mexican governments.

Soteapan and the rise of small-scale coffee cultivation

In the region of the Tuxtla from the Lake of Catemaco to the Santa Marta mountain range -which is located in southern of the State of Veracruz-, some time around the beginning of the XX Century the Popoluca Indian group started with coffee cultivation in the home gardens of their communities and later in the hilly forested zones. During planting and harvesting times the women and men were seasonal salaried workers in the neighboring country estate of Los Andes. The American corporation owning the estate prohibited them from taking any coffee plants for themselves. Although the workers were carefully frisked, the Popolucas men stole coffee cherries by eating them and the women also hid the coffee cherries in her bodies (Blanco, 2004).

In the year of 1924 the Dane Franz Blom and the American Oliver la Farge made a trip to the Mayan areas which were part of a major research project paid by the University of Tulane. In February 1925, the travelers crossed the Sierra San Martín -in southern Veracruz- on their way to Tabasco. Nine Popoluca communities were found by them: Ocozotepec, Soteapan, Amameloya, Ocotal Grande, Ocotal Chico, Aguacate, Cuilonia, Buena Vista and Piedra Labrada. Corn was the main staple and the most important crop in the region. It was planted mixed with squash, melon, papaya, pineapple and sweet potato (Ipomoea batatas); a bush with red fruit called ajón was also planted, and it was used to season meats. These crops were located near the houses in the major surface plots. The
Popolucas obtained two crops per year. Coffee trees were planted in small-scale, intermixed with the forest. The coffee-forest production was sold in the neighboring towns (Blom and la Farge, 1992, Vol. VIII: 348, 355).

Coffee was consumed in the mornings by the Popolucas. The coffee beans were toasted in flat clay dishes (comales), ground and boiled with water and brown-sugar cakes (panela, piloncillo). This style of coffee was very light and sweet, no milk was added to it. It was considered too strong to drink at night; but another beverage called “corn coffee” (café de maíz) was prepared instead. Corn coffee was prepared with toasted and ground tortillas and boiled in the same way as coffee. A midday beverage consisted of cornstarch diluted with water (pozole) was consumed. Popoluca coffee cultivation was carried out at first in the home gardens but after—when coffee was cultivated for commercial purposes—in forests mixing the coffee trees with natural vegetation, in the hills higher than 800 meters above sea level. No fertilizers were added to soils at that time (Blanco, 2004).

During the Mexican Revolution, the revolutionary soldiers in the Tuxtlas region killed Hilario C. Salas in order to rob the coffee bean production which was sold by these soldiers to obtain money for their revolutionary purposes (Blanco, 1999:1). At that time, coffee was planted intermixed with other crops like oranges, bananas and jinicuil (Inga leptoloba). These crops, together with the natural vegetation produced the shade coffee plant needed to grow. The most common shade trees were jonote (Heliocarpus donell-smithii), yellow plum (Spondias mombin), ixpepe (Trema micranta), palo mulato (Bursera simaruba), sangregado (Croton draco), tepezuchil (Terminalia amazonia) and ocote (Liquidambar styraciflua) (García Campos et.al, 2001:115).

Both the diversified farming in the coffee-home gardens (huertos de café) and the coffee trees inter-planted among the natural vegetation (bosque de café) were the traditional agro-ecosystems for coffee cultivation in southern Veracruz. Both agro-ecosystems are still practiced today. Data from 1996 show a present surface of 2,662.5 hectares being cultivated with the coffee-forest agro-ecosystem (bosque de café). Furthermore, this surface is located in the Soteapan, Catemaco and Hueyapan de Ocampo municipalities (CVC, 1996). A recent research in the Soteapan municipality found 300 plants belonging to 72 botanic families and 155 genders which are associated with coffee cultivation just in one Popoluca community (Beaucage and López Cruz, 1999:35-39).

A current study of Ocotal Chico—one of the 10 communities forming part of the Municipality of Soteapan—about corn and coffee cultivation shows the way through which local economy had been impacted during the past century by these crops. Ocotal Chico is located on the Santa Marta Sierra slopes at 600 and 800 meters above sea level (Blanco, 2003). Before the 1970’s coffee production was the principal source of obtaining money for the Popoluca peasants. Money from coffee was used to buy soap, salt, machetes, farming implements, textiles for the women’s dresses and clothes for the men. Coffee production was sold in Soteapan to the local merchants or it was taken by beasts of burden to the Acayucan big coffee exporters. Corn was only for self-consumption, and it was complemented by vegetable and fruit from the home gardens, and the gathering and hunting from the forest, thus the population’s year-long nutritional necessities were covered (Blanco, 2004).

During the 1960’s the land Agrarian reform reorganized land tenure at Ocotal Chico. Land was sold instead of being granted by the Mexican government, and as a result some Popoluca peasants acquired land while others lost it. Forest-coffee trees were included with the land reorganization, and the new owner had to pay per each coffee tree to the first land
user. Popolucas without money were not able to pay neither for the land nor for the coffee trees. After the reorganization of land tenure the community had people with land and people with no land at all. The population at Ocotal Chico was 85 persons in 1930, but in 1960 it reached 361 persons and 748 persons in 2000 (Blanco, 2003). Furthermore, some of the peasants acquired a debt difficult for them to pay quickly, and at least two social and economical groups in the community were formed (Blanco, 2004).

In 2003, the monetary income of the peasant families at Ocotal Chico was obtained as follows: 1% from cattle raising, 2% from wood selling, 2% from salaries obtained with agricultural work, 5% from the selling of several agricultural produces (one variety of corn called chiyukmok, sugar-cane, pineapple and sweet potato), 18% from PROCAMPO governmental Program, 18% from COVERCAFÉ governmental Program, 19% from coffee productions sales, and 35% from different seasonal activities –including migration- and also from governmental educational grants given to families with children (Blanco, 2003). As a result, governmental programs give to the Popolucas more than 60% of their monetary income, and the impact on corn and coffee cultivation is very strong because many people are abandoning agricultural activity (Blanco, 2004).

At present, coffee is grown in the community coffee-home gardens and also in the nearby sub-tropical forest (coffee-forest). Coffee production in the community is considered very low with respect to the annual average of the State of Veracruz. The annual average of the Ocotal Chico coffee production is only of five quintals per hectare per year, while the annual average of the State of Veracruz is of 10 and 13 quintals per hectare (Blanco, 2003).

As a consequence of this low annual coffee production average, Ocotal Chico and also its neighboring communities dispersed on the Santa Marta Sierra region are considered as being marginal coffee producers. These communities are 56, which politically depends on seven municipalities. The Municipality of Soteapan -in which Ocotal Chico is located- includes 10 coffee producer communities and it has 2,798 hectares with coffee cultivation and 951 persons involved in coffee production with an average of three coffee producers per hectare (Blanco, 2004).

National economic developmental programs were applied in the Soteapan Municipality to help Popoluca coffee producers. The communities at Santa Marta Sierra were favored by a 1976 development program directed by IMECAFE (Mexican Coffee Institute); rural poverty and social injustice were the main objectives to solve in the region. New techniques to improve the quality of coffee trees were taught to a small group of coffee producers by PIDER (Rural Development Program) technicians. The very small initial group of coffee producers in the program slowly grew, mainly because at the beginning of the program a peasant resistance which acted against it was formed (Blanco, 2004).

In Soteapan, IMECAFE built in the 1980’s an industrial plant (Beneficio Húmedo) for coffee industrialization. Its economic goals were also the regulation of regional coffee prices, and the organization of loans and credits for the coffee producers. No interests were applied to the monetary credits that IMECAFE loaned to the coffee producers; but, credits were subject to the organization of the peasantry into units called UEPC’s (Coffee Production and Commercializing Units). These units were also used for political purposes (Blanco, 2004).

Between 1988 and 1989 the coffee productivity in the State of Veracruz decreased from 19.2 to 15.9 sacks per hectare (60 kilograms per each sack) (Martínez Morales, 1999:
In 1989, the Mexican government diminished its economic support to IMECAFÉ and the coffee producers in Soteapan were in charge of the coffee industry organization. In 1992 the Mexican Agrarian laws were reformed and the NAFTA was signed by the Mexican and American governments. Between 1991 and 1992 the coffee productivity in the State of Veracruz decreased to obtain only 10.8 sacks per hectare (Martínez Morales, 1999: figure 9). The same phenomenon occurred in all the coffee regions in Mexico, but the most dramatic data on the decrease of coffee productivity was obtained in Chiapas. See figure 6.

**Figure 6: Coffee productivity**
(60 kilograms sacks per hectare),

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chiapas</td>
<td>109.0</td>
<td>11.7</td>
<td>9.4</td>
</tr>
<tr>
<td>Veracruz</td>
<td>19.2</td>
<td>15.9</td>
<td>10.8</td>
</tr>
<tr>
<td>Oaxaca</td>
<td>7.0</td>
<td>8.3</td>
<td>5.2</td>
</tr>
<tr>
<td>Puebla</td>
<td>18.4</td>
<td>15.4</td>
<td>7.0</td>
</tr>
<tr>
<td>Guerrero</td>
<td>4.7</td>
<td>5.5</td>
<td>5.8</td>
</tr>
<tr>
<td>Hidalgo</td>
<td>5.4</td>
<td>3.2</td>
<td>3.1</td>
</tr>
<tr>
<td>San Luis Potosí</td>
<td>4.9</td>
<td>2.1</td>
<td>3.0</td>
</tr>
<tr>
<td>Nayarit</td>
<td>6.9</td>
<td>6.2</td>
<td>5.9</td>
</tr>
<tr>
<td>Jalisco</td>
<td>1.4</td>
<td>2.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Colima</td>
<td>2.8</td>
<td>3.7</td>
<td>2.3</td>
</tr>
<tr>
<td>Tabasco</td>
<td>3.2</td>
<td>5.5</td>
<td>4.3</td>
</tr>
<tr>
<td>Querétaro</td>
<td>7.6</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10.8</td>
<td>10.2</td>
<td>7.9</td>
</tr>
</tbody>
</table>

Source: Martínez Morales, 1999: Figure 9.

International coffee prices decreased at the end of the 1980’s and the beginning of the 1990’s. July 3, 1989, the International Coffee Organization stopped the control of coffee exportation quotas which before that were defined on the bases of international demand. Over production and over exportation produced coffee price decrease. NAFTA agreement among Mexico, the United States and Canada was signed in 1992, but Brazilian and Central American coffees captured the American market (Santoyo et.al., 1991). In 1993, IMECAFÉ was closed by the Mexican government and the CMC (Mexican Coffee Council) was created instead. Regional programs tied to IMECAFÉ disappeared and technical advice, financial credit also disappeared (Martínez Morales, 1999). Small-scale coffee growers in Ocotal Chico had to adjust to these changes and monetary earnings from migration appeared in the economy of several families.

**The Xopilapa case and the creation of a diverse agro-ecosystem**

A very important article written by Moguel and Toledo (1999, No11:4.12) classifies the present Mexican coffee agro-ecosystems in five types: (1) rustic coffee systems or
coffee systems in hilly areas, (2) traditional poly-cultural coffee home gardens, (3) commercial poly-cultural coffee systems, (4) shade coffee monoculture, and (5) sun coffee monoculture. This classification is based on the idea that the coffee production types one and two are traditional and the coffee production types three to five are modern. Moreover, types one and two are practiced by Indian coffee producers while types three to five are not necessarily in the hands of Indian producers. Shade and sun, biological diversity, chemical fertilizers and production are also related to this classification.

The first type (rustic coffee systems) corresponds to the old coffee-forest type in which coffee trees are intermixed with natural vegetation (bosque de café). Moguel and Toledo (1999:6) consider that this system is characterized by the following elements. A minimum impact on the forest occurs due to the way through which only the lower vegetation strata near to the soil surface (Soto Bosque) is removed to plant the coffee trees. No agro chemicals are applied but productivity is very low. Moguel and Toledo (1999:6) also adduce that this is a way of coffee cultivation in Mexico practiced in very few and isolate Indian communities.

In 2000, a study was done of Xopilapa, a peasant community in Central Veracruz which is located at 400 meters above sea level, in the basin of a ravine -through which the river of Los Pescados runs on its way to the Gulf coast. The community was chosen because it is located in an “isolated” place and because ravines had been considered difficult places for people to live. Moreover, agriculture in Xochilapa rests on self-consumption; that includes a combination between basic and commercial products. The main commercial agricultural products are coffee, mango, banana, tamarind and lime. Coffee and mango are planted intermixed in the nearby sub-tropical forest (Servín, 2000:60-64).

The basin of the river is found at 400 meters above sea level. It is surrounded by a level zone (vega) in which the houses are semi dispersed. Next to the houses there are home gardens with intermixed crops such as banana, tamarind, maney, peanut, tangerine, annona, the native yellow plum (Spondias), avocado, and lime trees; there are also medicinal herbs and flowers. Nearby plots are cultivated with corn, beans, squash, and pipián squash. The sub-tropical forest is located in the southern slopes of the Ttaltecotino ravine -in the Cotlamanis and also in the Mata coyote hills. In the northern slopes there are two ravines -Mayatla and Ixcatitila- with the slopes covered with sub-tropical vegetation (in the place named Hill of The Walls, at 450 and 600 meters above sea level). The river waters and a lagoon are permanent fishing sources for the people in the community (Servín, 2000: 64, 98).

Coffee and mango are cultivated through an agro-ecosystem locally named banquetera. The banqueteras are places in the slopes in which geological conditions of the volcanic hills are acting together with the water that runs and the soil erosion to form natural terraces. The human action is being directed for controlling the soil erosion through the reinforcement of the borders of these natural terraces, putting stones around their borders and planting coffee and mango trees in the levels. Natural vegetation easily grows and after a few years the banqueteras are intermixed in the sub-tropical forest. From a distance, the landscape of banqueteras looks like a patchwork with several green tones in it.

The sub-tropical micro environment is managed through the terrace agro-ecosystem -locally developed- which is the result of a very sophisticated local knowledge of the environment and also on its related diversity and conservation. It becomes evident that this
is not a rustic coffee system in a hilly zone. Furthermore, the economy of the community has to be understood as an all, and this includes the use and the management of all micro environments in the ravine: river, level basin river, slopes of the hills and the sub-tropical forest. The use of resources is also locally controlled through ideological elements and a system of local laws about when, how and the amount of hunting taken from the forest and fishing in the river, which were accepted by the community members (González-Jácome, 2004).

Data from Servín’s (2000) research in Xopilapa show that coffee and mango productions are the most important monetary sources for the families. Both crops are obtained in the banqueteras and they make up 92.9% of the annual monetary earnings for the community members, while the agricultural products in the home gardens are only 7.1% of the total earnings. However, home garden production and river fish are the most important sources for the family food all year long. Coffee and mango prices are fluctuating all year, and every year, and earnings too; but the economic risk is counteracted by annual food stability.

Moguel and Toledo’s (1999:6) model of the “rustic coffee system”, and its description and characteristics had to be reconsidered. More case studies had to be done of this coffee-forest agro-ecosystem, in different coffee-forest zones in Mexico. However, for these studies it would be important to take into account not only the biological diversity but also the cultural diversity. The understanding of coffee production systems in Mexico is still mainly focused on economic or ecologic aspects, but social and cultural aspects are in a weak situation.
The Chenalhó case and the coffee cultivation with mono shade

Coffee cultivation in Chiapas was controlled by the rural estates until the agrarian land grants started in 1939. Agrarian grants affected coffee plantation land but not the coffee factories (beneficios) and the new small-scale coffee cultivators depended on them for industrializing and selling the coffee. Old rural estate owners changed their activity from planting coffee to controlling its production. Middle size coffee plantations (fincas) were not affected by the agrarian grants because they had less than 300 hectares of land under their control. In 1942, during the Second World War, 66 coffee plantations belonging to German citizens passed under control of the Mexican government through the Coffee Fiduciary. The German employees were substituted by Mexicans. At the end of the war the coffee plantations were returned to their German owners but many of the plantations were bankrupt (Renard, 2002:18-19).

IMECAFÉ was created in 1959 and this governmental institution changed the dynamics of coffee production in Chiapas starting in the 1960’s but mainly in the 1970’s. IMECAFÉ programs were dedicated to give technical support for coffee growers, to the renewing of the coffee plants, to pest and plagues control and to the elimination of middle-men. Loans and credit were given to small-scale coffee producers but they would be organized in UEPC’s (Coffee Production and Commercializing Units) as it also occurred in all the coffee regions of the country. In 1971 only 4.9% of the small-scale coffee growers in Chiapas were associated with one UEPC, but in 1981 the percentage of associates rose to 70% (Renard, 2002:20-21).

Before the 1960’s, coffee varieties planted in Chiapas were *Coffea arabica*, *C. tipica* and *C. Bourbon*; but after the 1960’s these varieties were substituted by *Caturras*. In the 1980’s the Soconusco coffee region started the modernization of coffee cultivation through importing genetic coffee materials from Guatemala and Costa Rica. Guatemalan consulters visited the coffee production units -for one or two days- to teach peasants how to obtain higher coffee productivity which was the main goal in this modernization. The results were (1) coffee planting in rows, (2) higher density of plants in the plots, (3) abandonment of the use of level altitudinal curves for coffee planting, (4) introduction of new coffee varieties with less height, faster time for the beginning of production and higher coffee productivity, (5) abandonment and destruction of traditional shade for coffee trees, (6) higher quantities of chemical fertilizers for coffee plants, (7) the use of herbicides, (8) faster renovation of coffee plants, (9) larger amounts of cheap human labor (Renard, 2002:21).

The introduction of these practices was directed toward the obtaining of higher quantities of coffee production. Quality of coffee was put aside in this goal because the American coffee market, at which Mexican coffee production was directed, had less exigencies than the European coffee market. The International Coffee Organization had quotas based on quantity but not on the high quality of coffee production; as a matter of fact coffee beans were mixed to obtain a homogeneous medium quality coffee. This practice of mixing coffee beans was as old as IMECAFÉ and covers the period from the 1960’ to the 1980’s. In 1989, with the disappearance of the International Coffee Organization’ annual quotas, the coffee market was glutted and coffee prices decreased from 110 and 120 centavos per pound to 55 centavos per pound (Renard, 2002:22).

At the beginning of the 1990’s, a severe impact occurred in the economy of the small-scale coffee producers. In 1993 IMECAFÉ disappeared and governmental economic help to them also disappeared. From a total of 60 Mexican coffee exporters in Chiapas
before 1989 none of them survived after 1993. Instead several international coffee enterprises appeared in the Mexican coffee regions and with them the creation of a network of merchants and middle-men that again are controlling the local coffee production. Luttman’s California Coffee Industry, Neumann Gruppe, Volkart (ERB), AMSA, Atlantic Coffee, and Nestle, among others, are controlling coffee exportation at present. The Nestle Corporation in connection with the Mexican Commerce Ministry is importing low quality coffees from South America and Vietnam to produce soluble-coffee, and decreasing national coffee prices (Renard, 2002:23; Balente, 2003:21).

The small-scale coffee production in the Highlands Chiapas started in the 1960’s as a result of sugar-cane cultivation abandonment. Coffee introduction in the Highlands was done by peasants who seasonally worked during harvesting times on the Soconusco coffee plantations. There are six political municipalities forming part of Highland Chiapas: Larraínzar, Chenalhó, Oxchuc, San Juan Cancuc, Huixtán, and San Cristóbal Las Casas, where there are 4,000 small-scale coffee cultivation units. These units are involved in 100 organizations and six of them have storage place for coffee production, but only three are organic coffee producers (Balente, 2003:18-19).

The small-scale coffee production in Highland Chiapas is presently in the hands of the Indian peasantry. Montane deciduous forest is the natural vegetation in this region; it is constituted of pines, oaks (Quercus Skinnerii, Q. acatenangensis, Q. candicans, Q. oocarpa, Q. corrugata), and sweet gum (Liquidambar). From 1,300 to 2,300 meters above sea level, the highlands habitat is cloud-bathed, wet and cool, with an annual precipitation around 2,000 millimeters and there are no frosts. In the northern slopes between 1,000 and 2000 meters above sea level the precipitation has an annual average of 1,200 and 2,000 millimeters, there is little cloudiness, and frequent frosts; the vegetation is exposed to strong north winds. Pine forest is widespread occupying shallower soils than oaks; some pines (Pinus ayacahuite and P. strobus) are restricted to humid zones with an annual average precipitation higher than 1,200 millimeters (Wagner, 1971:238-239).

Indian communities are dispersed in the abrupt topography of the zone, with slopes from 10% and 45% of inclination. There are ravines and intermountain plains through which rainfall water is drained (Mera, 1984). More than half of the agricultural surface in the highlands is dedicated to corn, beans, chili and squash cultivation through the slash and burn system. These are self-consumption crops and they are supplemented with vegetables and fruits from home gardens to conform the daily diet for the Tzotzil communities (Pérez-Grovas, 1988:7).

The economic risk caused by market fluctuations in the demand and prices for commercial crops has been managed by the Tzotzil through the diversification of agricultural products in their plots. Native and foreign origin fruit are planted, such as Hass avocado (Persea Americana), guanabana (Annona muricata), litchi (Litchi chinensis), mandarine (Citrus reticulata), lime (Citrus latifolia), and banana (Musa spp.). Tree species are also planted because their price as wood is an important source for the family economy. These trees include red cedar (Cedrella odorata), spring (Tabebuia donell-smithii), caoba (Swietenia spp.) and pink cedar (Acrocarpus fraxinifolius) (Balente, 2003).

Santa Marta Chenalhó is a Tzotzil community which it is located in a ravine that is six kilometers long and which descends from 2,000 and 850 meters above sea level. The rivers San Pedro and Cotzilnam run in the middle of the ravine. The zone has a surface of 4,171 hectares. Volcanic and sedimentary rocks form the level of the ravine. The annual average temperature is 20º C in the high zone of the ravine and 22ºC in the lower zone; the
winter and lower average temperature is 9°C in the highest part of the ravine and 12°C in the lower; the summer temperature average is of 24°C and 27°C respectively. The climate changes gradually from temperate and sub-humid to warm and sub-humid (Cw2, C (A) w2, A(C) w2 and Aw2) (INEGI, 1984, 1989, 1997). People in the community classify weather as cold and hot; 1,500 meters above sea level being the limit between the two local classifications.

Pine and oak forest as well as liquidamber forest were the original vegetation of the region. At the present time, small patches of natural vegetation are located in the upper parts of the ravine. There is a mist forest of 2,000 hectares and a river-gallery forest which surrounds the San Pedro River and has about 15 meters on each side. Coffee-forest covers the rest of the ravine since 1975, when coffee cultivation was introduced. The area has been highly perturbed by centuries of agricultural activities which had been based on slash and burn to clear the soils for sugar-cane monoculture cultivation.

The polyculture of corn, beans, squash, chili and broad bean, is complemented with other edible and medicinal plants. There are at least three beans species and two squash species planted in the family plots. Slash and burn is used to clearing the land before cultivation. The families can have one or two annual crops: one during spring and the other during winter, or they can only have the spring crop. Family necessities and availability of labor are the factors involved in that production decision. The agricultural products obtained in these parcels are directed toward self consumption. Home gardens products are also used for self consumption.

Pérez-Grovas’ (1998:9) research in Highland Chiapas assures than at least two thirds of the lands in this region are dedicated to self consumption agricultural activities. He also added that the introduction of herbicides by the peasants is changing the polyculture corn cultivation into corn monoculture and bean monoculture. According to Pérez-Grovas (1998:10-11), home gardens in the region include the cultivation of fruit trees (banana, orange, lemon, tangerine, lime, annona and sapota-trees), edible, medicinal, ornamental and ritual herbs and a small group of domestic fauna (fowl, pigs, horses and maybe one cow).

The introduction of coffee cultivation in Highland Chiapas is related to these home gardens. Peasants who worked seasonally in the Soconusco plantations took some coffee plants with them and planted them in their home gardens. At the beginning they only used coffee for self consumption, as a dinner beverage. Home gardens used to have several useful tree species as coffee shade. The IMECAFÉ policies to expand coffee production in Chiapas and the monetary earnings from coffee sales were the main incentives for the conversion of coffee from subsistence to a commercial crop. Between 1970 and 1989 IMECAFÉ favored the coffee cultivation only associated with *Chalun (Inga sp.*) as a tree shade (Pérez-Grovas, 1998:11-12; Zúñiga, 1998).

The case of Santa Marta Chenalhó, a Tzotzil community in Highland Chiapas, is important to understand local differences with the regional model. Chenalhó was founded in the middle of the XVI Century by Dominican friars. In 1549, the disperse Tzotzil population in the region was concentrated by the friars in one town named by them as Xolotepec –a Nahuatl name- with a local name of Chu’pic –a Tzotzil name. Santa Marta was chosen by the friars as the patron saint of the community. During Colonial times Xolotepec changed its name to Jolotepec and later to Yolotepec (Calnek, 1990:105-133; Casanova, 1998; Zúñiga, 1998).
Finally, at the end of the XIX Century, the old name of Yolotepec disappeared and the community was known for its patron saint: Santa Marta. In the 1950’s the community of Santa Marta was politically dependent on the Municipal Agency of Chenalhó, and with this fact the name was completed to Santa Marta Chenalhó. More than 50 years after the Mexican Revolution, the peasants of Santa Marta received their land grants. In 1973 and 1975 they were granted with communal lands which were called Manuel Utrilla (Calnek, 1990:105-133; Casanova, 1998; Zúñiga, 1998).

Between 1910 and the 1960’s, the Santa Marta Tzotzil Indians were cultivating red sugar-cane to produce an alcoholic beverage called *posh*. White sugar-cane was introduced in the 1960’s. Santa Marta’s peasants started with coffee cultivation in 1975, because a group of them learned how to grow coffee on the Soconusco plantations where they were working seasonally. To date, self-consumption is based on the poly cultivation of corn intermixed with beans, in an agro-ecosystem which is locally known as *milpa*. Small sugar-cane and pasture surfaces complement the economic bases of the peasant families in Santa Marta.

Santa Marta Chenalhó has 1,068 plots for cultivation and 419 of them (39%) have coffee trees as a main crop. Before 1975 corn polyculture was located in the level areas and coffee trees were planted in the slopes, but at the present, coffee cultivation is displacing corn to the most abrupt zones of the region. In the first year the planting of coffee starts with slash and burn activities; the plot is planted with corn and banana trees. In the second year corn is intermixed with coffee and one shade tree (*Inga* sp.). Diversification of shade trees is recently starting with a program of ECOSUR (College of the South Border). Coffee trees are affected by *roya* that it is controlled by agro chemicals.

Before 2002, the cherry-coffee was sold to middle-men in San Cristóbal Las Casas, and the price paid for it to coffee producers was $9.00 pesos (.80 US cents) per kilogram. That price was higher than the one they paid in the year of 2003, when coffee price was of only $6.00 (.50 US cents) per kilo. When the coffee price is lower than $7.00 pesos ($6.00 US cents) per kilogram, the coffee producers in Santa Marta do not harvest it. Monetary earnings from coffee are used to acquire some commodities, to buy clothes, to complement daily diet with industrial food products and to pay expenses for the education of their children in the schools of San Cristóbal Las Casas.

A group of 18 coffee producers decided to convert conventional coffee cultivation into organic coffee cultivation, because the organic-coffee price is higher in the market. They organized themselves into a cooperative and they started buying coffee from other producers. In 2003, these 18 coffee cultivators obtained a total coffee production of 23,304 kilograms in 115 plots, with an average of 203 kilograms per plot and 1,295 kilograms per each coffee producer. At the present time, coffee is toasted, ground and packed by the Santa Marta cooperative members, and it is sold by them directly. In 2004, a kilogram of packed coffee had a net production cost of $22.00 pesos ($2.00 US dollars) and it has been sold in $40.00 pesos ($3.50 US dollars) per kilogram, with a net earning of $18.00 pesos ($1.50 US dollars) per kilogram. They still need to learn better commercialization ways.

Data from figure 7 shows that polyculture corn cultivation and home gardens together comprise 55.3% of the cultivated plots and 64.3% of the total surface in the community. These percentages are greater than the 40.4% of plots and 31.4% of the total surface that are dedicated to the cultivation of commercial crops. Applying slash and burn as a generalized system for agriculture and growing coffee with only one shade tree would be critical to the community and also to its biological diversity. The present land in...
“resting” (idle) time (4.3%), the decreasing of poly cultural corn cultivation and the conversion of nearby forested areas in conventional coffee cultivation plots would be critical to support agriculture and the population in the community for a long period of time.

Figure 7: Land uses in Santa Marta Chenalhó
Agro-ecosystems, 1997

<table>
<thead>
<tr>
<th>Agro ecosystems</th>
<th>Number of plots</th>
<th>% of the total of cultivated plots</th>
<th>Cultivated surface in hectares</th>
<th>% of the total surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn polyculture (milpa)</td>
<td>573</td>
<td>53.7%</td>
<td>389.68 ha</td>
<td>53.5%</td>
</tr>
<tr>
<td>Coffee forest</td>
<td>419</td>
<td>39.2</td>
<td>226.64</td>
<td>31.1</td>
</tr>
<tr>
<td>Home gardens with banana trees, vegetables and pasture zones</td>
<td>17</td>
<td>1.6</td>
<td>78.8</td>
<td>10.81</td>
</tr>
<tr>
<td>Sugar-cane monoculture</td>
<td>13</td>
<td>1.2</td>
<td>2.48</td>
<td>0.3</td>
</tr>
<tr>
<td>Non-cultivated areas **</td>
<td>46</td>
<td>4.3</td>
<td>31.05</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td>1,068</td>
<td>100 %</td>
<td>728.65</td>
<td>100 %</td>
</tr>
</tbody>
</table>

Sources: Community census done by Ramón Mariaca and his research team, 1997.
** Land in resting time.
+ The community measuring system is based on tareas. One tarea equal to 625 m2.

At the present time Santa Marta Chenalhó is organized by a traditional obligation system (sistema de cargos); however, related to this system there are three well defined religious groups: Catholics, Presbyterians and Pentecostals. The last religious group does not agree with the participation of its parishioners in the traditional obligation system. These religious groups are also tied to the political parties in the community: PRI (Institutional Revolutionary Party) and PRD (Democratic Revolution Party); furthermore, influence from the EZLN (Zapata’s Army for the National Liberation) on the daily life and economy of Santa Marta’s peasants has been very important since 1994.

There are two federal institutions in charge of helping peasants with monetary grants in order to compensate environmental and economic risks: CONCAFÉ for the coffee producers and PROCAMPO for agricultural development and climatic disasters affecting the crops. The grant amount for coffee producers depends on the size of registered land used to grow coffee. The amount of money of the grant varies from $80.00 pesos ($7.00 US
dollars) and $1,200.00 pesos ($104.00 US dollars). When Santa Marta’s peasants receive minor amounts of money they do not go to pick them up because transportation from the community to San Cristóbal Las Casas is expensive and it cost could be more than the grant amount itself.

Some final considerations:

Mexican coffee agro-ecosystems have been adjusted through time to economic and to environmental risks. In dealing with risk, coffee producers have been applying different coffee cultivation strategies and techniques, but coffee plant varieties have been more dependent on market necessities than on the environmental characteristics such as soil, water availability, topography, altitude, natural vegetation, climatic events, and type and intensity of sun and shade in a specific region. Coffee cultivation landscapes have been changing through time, as can be perceived from travelers’ descriptions and also from geographical and agronomic studies. Adaptation to micro environments was very important to understand coffee cultivation successful in the Mexican economy, and also in the daily life of coffee producers and coffee consumers.

Although this type of coffee agro-ecosystem dependence on market necessities had existed since the XIX Century, it increased after the 1960’s -partially due to the international coffee market conditions, the USA control of the international coffee market, and to the impact of the Mexican governmental policies and programs applied to the rural areas in the country. Certainly it is very important to understand the weight and impact that external coffee market pressures had been having on the Mexican coffee production. But it also is important to understand coffee cultivators’ responses to these pressures. Diversifying crops for self-consumption and also for commercial purposes had been one of the most recurrent small-scale coffee cultivators’ responses through time. Diversifying shade vegetation in coffee-forests and coffee agro-ecosystems had been another response but population increases in the peasant communities acts against this.

Mexican coffee had been basically an exportation product. International markets for Mexican coffee have been changing since the XIX Century. European countries were the main Mexican coffee consumers from 1802 to 1870; however, Porfírio Díaz’ government facilitated the entrance of the American entrepreneurs’ control for the Mexican coffee production and market, and obviously for American investment in coffee plantations and industries. Before the Mexican Revolution of 1910, coffee investments in the country were in the hands of Spaniards, Germans and Americans and also the coffee exports were directed to Atlantic Europe and to the USA. These markets have been impacting the Mexican coffee cultivation in two different directions: quality and quantity of coffee production.

During the first hundred years of coffee cultivation in Mexico, the European market for Mexican coffee was centralized in Spain, Germany, France and England. Furthermore, after 1969 other European countries Belgium, Denmark, Finland, Holland, Italy, Norway, Sweden and Switzerland were also included. However, the political and economic American dominance on the Mexican coffee market started after the Second World War and it was stronger after 1992 as a result of the NAFTA American cultural response to daily coffee consumption requires a homogeneous medium quality but also large quantities.
of coffee. At the present, 84% of the Mexican coffee exports are directed toward the American market while the rest -organic coffee- is directed to Germany and England, with the appearance of Japan as a new market for Mexican coffee.

Figure 8: International Markets for Mexican Coffee in the XX Century.
In 1959, with the creation of IMECAFÉ, the governmental programs were directed to the modernization of coffee production, but its agricultural practices increased the coffee cultivation regions and diminished the shade tree diversity. Coffee production modern programs were directed toward the coffee plant renovation, the planting of Central America coffee plant varieties -without shade or with only one tree shade- acted against biological diversity in several coffee-forest regions of Mexico. However, the control of coffee prices regulated by IMECAFÉ for 34 years counteracted the impact of the coffee market fluctuations at the local level. IMECAFÉ policies about coffee production in Mexico need to be understood in relation to national economic policies and their impacts on different coffee regions of the country.

Dealing with risk is a part of the daily life in peasant societies. Environmental, social, economic, political and ideological responses of peasantry vary from time to time, and coffee cultivation is not free of these responses. Diversification has been a generalized way to deal with risk in the coffee agro-ecosystems in different regions of Mexico. Monoculture practices in coffee cultivation -including shade trees- and hand coffee cultivation management and technology have been considered by experts as being “traditional”; however, many of them were the result of modernization programs in the coffee regions of the country during the XX Century.

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Sartorius, Carl, Mexico About 1850

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There are several names to design mutual aid social organization units which are related to unpaid labor of kin and friends to help someone with agricultural work, building houses, and economic activities.

Furthermore, some years later -between 1856 and 1857- a Mexican naturalist named José Apolinario Nieto was able to establish the first Acclimation Garden in the country in Córdoba. He also was responsible for the acclimatization of the Cinchona de los Andes (Cinchona officinalis) in the Córdoba region (Baz y Gallo, 1874:124, 128-129).

Porfiriato is the term used to name the almost 30 years of Porfirio Díaz governmental period in Mexico. This period ended in 1910 with the Mexican Revolution.

This is the classification of the travelers at that time.

In many rural communities there is a custom for harvesting the corn left at the fields after the main corn harvest was finished. This action is not considered a robbery but a social redistribution in which poor people are able to obtain corn to supplement their diets.
some grains for their own subsistence. It is difficult for a foreigner to distinguish this redistribution custom with robbery.

Moguel and Toledo’s model of *Five coffee production systems* is very well known and it was based on Nolasco’s study *Café y Sociedad en México*, published in 1985 by the Centro de Ecodesarrollo in Mexico. Alba González-Jácome appreciates the linguistic help of William Loyd Crothers in English.