

DIVERSIFICATION OF MARGINAL COFFEE FARMS IN VERACRUZ, MEXICO:  
AN ANALYSIS OF SOCIO-ECONOMIC CHARACTERISTICS OF SMALL-SCALE  
FARMS IN ZOZOCOLCO

by

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(Under the Direction of Jack Houston)

ABSTRACT

The purpose of this research is to analyze and evaluate the potential for agricultural diversification of marginal, small scale coffee farms to support family incomes in Veracruz, Mexico. The municipality of Zozocolco is selected as the focus of the University of Veracruz efforts to help local farmers to diversify their farming systems out of low quality coffee and into other, more profitable enterprises. This research focuses on an analysis of household characteristics, government programs, migration, and alternative enterprises in the marginal coffee growing regions, such as vanilla and black pepper. Factors that would provide incentives to coffee farmers to diversify are evaluated. In Zozocolco, the land available for agricultural diversification depends mainly on two variables: coffee price and number of coffee plants. This work contributes to the understanding of the coffee grower's characteristics and their incentives to diversify into other crops.

INDEX WORDS: Coffee, Mexico, coffee growers, marginal coffee farms, rural diversification fair trade.

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México, 2003

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial  
Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

ATHENS, GEORGIA

2007

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## DEDICATION

*A Dios*

A mis padres dedico todo el sacrificio y las horas de trabajo, por su incondicional amor y constante apoyo que hacen cada logro posible.

A mis hermanos Daniel y Gisela por todos sus consejos y aliento.

A mi sobrino con todo mi cariño.

A la memoria de quienes me brindaron su amor y hoy se encuentran en un mejor lugar.

## ACKNOWLEDGEMENTS

I would like to thank Dr. Jack E. Houston, my major professor and Dr. Glenn Ames, director of the TIES program and member of my committee, for all their advice, support and patience, even in the most difficult moments. Without their help, this work would not have been possible. Also, I would like to express my appreciation to Dr. Lewell F. Gunter, a committee member, for all his suggestions and Dr. James Epperson whose guidance helped me to publish my first paper.

I would also like to thank all the people from the University of Veracruz, who worked so hard to make the TIES program a success. I begin my recognition with Dr. Raul Arias Lovillo, Rector of the University of Veracruz, for affording me the opportunity to represent the University of Veracruz. I would like to express my appreciation to Dr. Ricardo Corzo Ramírez, Academic Provost, for his significant support to the TIES student exchange program and my studies. I would also like to thank Dr. Ernesto Rodríguez Luna, Dean of the Biological and Agricultural College, for his interest in my research and his support in securing all the data necessary for this research. I would like to thank CITRO and DIPROCAFE for all their assistance in the accomplishment of this work, especially to Dr. Mario Fernández Sánchez, Director of the Project for Coffee Diversification, and Dr. Ana Aguilar designer of the survey used in this research; special thanks to Dr. Bertha Murrieta, Director of the School for Foreign Students, for supporting me and my exchange program, also to Leticia Rendón for all her assistance. In addition, I

would like to thank the Academic Research Body “*Economía Sectorial y Desarrollo Sustentable*” especially to Dr. Gustavo Guerra for all his support.

I want to express my sincere appreciation to everyone at UGA, especially Jackie Roberts in the Office of International Public Service and Outreach, who worked very hard to make my stay easier in Athens, GA.

To all my family and friends back in Mexico for always being supportive and cheering me on. I would like to thank all my friends in Conner Hall, especially, my officemates in 309, Tania, Fariz, Ozgur, Carrie, Joe, and Julia, who made the stressful times easier and fun. Thanks to all my Latino friends, including Virginia, Maria Ruth, Ricardo, Saul and many others. Finally a special thanks to my friend Dennis for being there for me.

The Training, Internships, Exchanges and Scholarships (TIES) program supported my studies through a grant awarded to the University of Georgia in partnership with the University of Veracruz. This study of agricultural diversification in Veracruz, Mexico in partial fulfillment of the requirements for the Master of Science degree in Agricultural and Applied Economics at the University of Georgia is made possible by the generous support of the American people through the United States Agency for International Development (USAID) and the Higher Education Development (HED) office. The contents are the responsibility of Katia Romero León and do not necessarily reflect the views of HED, USAID or the United States Government.

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## **CHAPTER 1**

### **INTRODUCTION**

#### **Mexican Coffee Production**

Many developing countries find themselves dependent on a particular product or commodity, especially those with low economic growth rates. They are significantly dependent on those commodities that are being traded on the domestic and international market as their primary source of income and employment. A large number of countries fall into this category, many with coffee as their main source of export earnings. This heavy dependence on a few commodities has in general had an adverse economic impact, on growth and the reduction of poverty, during periods of low commodity prices. Coffee provides a particularly important share of the export earnings of developing countries and the large numbers of growers who depend on coffee for most of their income suffer from falling prices.

The international market demands high quality coffee today. The discriminating consumer demands high quality coffee. This is why, in Mexico, there is a need for a program to be implement which eliminates coffee growing areas located less than 600 meters above the sea level. Specifically in Veracruz, coffee produced at low elevations is generally low in quality with a low rate of return and not wanted in the international market.

### **Coffee Market Situation**

In Mexico the role of a particular product, the country's exports is a factor responsible for creating rigidity in production and is determined by economic, social and political factors. In the coffee exporting countries, the concentration of export index is very high in relation to coffee. Coffee accounts for more than half of the export earnings of certain producing countries. Moreover, to the extent that coffee is a source of income for coffee farmers lacking other resources, it is an engine of social and economic development. As such, it plays an important role and can help to alleviate poverty.

Coffee was introduced into Mexico during the nineteenth century. Mexican coffee is mainly the Arabica type. Mexico is the third largest coffee producer in Latin America. During the 1980s, coffee became Mexico's most valuable export crop. In 1985 coffee growers produced 4.9 million sixty-kilogram bags, and coffee exports earned \$882 million at the unusually high world price of US \$0.90 per kilogram (COVECA 2002). Thereafter output fluctuated between 5.6 and 4.4 million bags.

As international coffee prices rose further, the government in 1988 encouraged coffee growers, to increase output and expand the area under cultivation. It tried to increase production by offering easy credit to coffee growers and by converting forested land into *ejidos*<sup>1</sup> for cultivation by poor coffee growers.

In the early 1990s, more than 2 million Mexicans grew coffee, they were barely subsisting. Seventy-five percent of Mexico's coffee growers worked plots of fewer than

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<sup>1</sup> Group of farmers with the property rights over determinate area used to cultivate crops including coffee. Until reforms in the Mexican legislation in 1992, farmers only had rights to use the land but they could not sell or use the land as collateral.

two hectares (4.94 acres). These small scale cultivators produced about 30% of the country's annual harvest; larger and more efficient farms produced the rest (SAGARPA, 2003).

International coffee prices fell 50% between 1989 and 1993. Lower prices combined with the elimination of coffee subsidies to reduce the income of coffee growers by an estimated 65%. Lower prices reduced Mexico's export income from coffee to about \$370 million by 1991. They also depressed coffee production, which fell from 5.2 million bags in 1992 to 4.1 million bags in 1993. In early 1994 the government introduced subsidies for rehabilitation, mainly to improve quality. In 1999, coffee overproduction led to the lowest prices in the decade. In 2000 coffee production hardly reached 3.8 million bags (ICO, 2003).

Coffee farms often produce more than coffee. It is common among small farms for the household to extract useful products like firewood, construction materials, fence posts, and fruits from the holding, in addition to the coffee harvested each year. The source of these items is the shade tree cover associated with many coffee farms. As peasant producers living precarious livelihoods year to year, such "non-coffee" products provide the family with items that can be used directly or traded locally for other cash or other needed products.

The increase in world supply and great competition that has grown among the most important coffee producers in the world has driven prices. Under this wild competition, Mexico is at a disadvantage because part of the coffee that gets into the market is low quality, poor productivity at the farm level, and no preference for Mexico's beans in the world market. United States is the principal coffee consumer in the

world; however all Europe has larger demand. Japan is one of the emerging markets and a great potential consumer for coffee. Coffee is a normal good so the higher income level, the higher level of consumption. The European market seems to be the next to become saturated, so in the present the coffee specialization is necessary like the organic coffee, gourmet, decaf, etc. (BANCOMEXT, 2003). However the real difference in the market is the quality.

In Mexico as in others countries coffee production is one of the most important crops that generate income. In Mexico, there are 2,826,000 producers working on 761,160 ha. At present, the coffee that is grown is either arabica or robusta; the weather and the conditions are excellent to grow quality coffee, but the low marginal benefits are less than their closest competitors. The problem also comes at the harvest time when all the cherries are mixed together, green, red and dry; this mixing process makes the Mexican coffee low grade quality. In 2004, Mexico produced 3.5% of the total world coffee production and accounted for 2% of world coffee exports. The coffee from Chiapas, Oaxaca and Veracruz are the better coffees in Mexico (USDA FAS, 2003). However Mexico's reputation is not good due to low quality in the process and the mixing with of bad quality coffee with good coffee.

### **Low-grade Coffee Situation of Veracruz**

Coffee is one of the most important crops in Veracruz. It has generated benefits to many people who are directly involved in the coffee product chain. Traditionally the coffee plantations were established in areas with an altitude of 1000 meters above sea level; although, this changed in 1970 when the Mexican government created an incentive

for expansion even in areas below the 600 meters above the sea level (COVECA, 2002). Even the coffee was not good quality, subsidies and high coffee prices allowed great benefits for the population. But after the coffee crisis in 1989, the Mexican Institute of Coffee was closed and the assistance for producers was reduced. In 1991 Veracruz government created a new agency the Coffee Council of Veracruz (COVERCAFE by its name in Spanish) as a decentralized organization to help farmers with the commercialization. The conditions of free market have revealed the importance to alternatives commodities and also to increase the quality of gourmet coffee.

Veracruz is the second most important producer of coffee in Mexico after Chiapas. In Veracruz 34% of the total land used for coffee is below 600 meters above the sea level. The 50% of the area is in regions of Misantla, Atzacan and Los Tuxtlas (COVECA, 2002). Almost 139 communities are considered extreme poor. The Mexican coffee sector is mainly comprised of small farmers (92%) with land under 5 ha. each (COVECA, 2002).

The production volume varies depending on the weather conditions. Veracruz produces about 10 to 12 coffee quintals for hectare (COVECA, 2002). This is higher than national average but less than the leading countries like Colombia or Brazil. The management of the plantations and techniques to process coffee are very heterogeneous. In some places they have the modern technology but in others they follow the traditional design of multiple crops (intercropping) with many parts of the process depending solely on hand labor. This difference characterizes Mexican coffee in the international market as a coffee without identity, which difficult to trade in the international market.



Around 58% of the producers in Veracruz trade their product as a fruit coffee berry, the 6.5% as a gold coffee; a 5.5% as a parchment and 29.7% sell any presentation of the coffee but basically the cherry. Seventy-six percent of those farmers have to use intermediaries to get in the product to market. This means that the benefits are almost zero or even less because the price is very low relative to the cost of production. The average Mexican coffee production is 1.5 ton per ha and the world average is between 2.2, and 2.5 tons per ha.

The altitude is a coffee quality determinant; it gives the body, the smell and the flavor to the bean. Coffee grown under 600 meters above the sea are low quality and generate low income in all the state. A low price and long distance from the market centers represent the high cost of marketing coffee. The market prices in 2002-2003 fluctuated between \$0.01 to \$0.12 cents per dollar per kilo, compared with the rural prices the result will be a negative utility. In most cases the crop is lost before the harvest because of the cost of harvesting and transportation. Only by applying all the technology and techniques to get better coffee, the producer will have positive utility. Coffee plantations in these zones are more a habit than a business; it's a family tradition for the farmers that is why they keep their plantations despite the high cost. About 65% of the farmers in this area intercrop crop their coffee plantations; from these 73% have crops such as corn, beans and chili; 25% fruits such as mangos, bananas, avocados and oranges (COVECA, 2002). The solution to the farmers' economic situation may be to stay in the rural activities, at least for the older generation but diversifying with other crops (horizontal diversification) that actually give them some benefits.

### **Objectives**

This study has as its main objective to analyze the present situation of the coffee producers in Veracruz, Mexico and the potential for diversification on farms at the lower elevation community of Zozocolco, Ver. The focus is to analyze the socio-economic condition of the coffee growers, the factors that will determine their willingness to diversify their coffee farm, and describe the market for those crops that could represent an opportunity for income generation for the farmers

### **Procedures**

In order to address the above issues, the methods of diversification theory will be applied on a function of the land proportion for diversification. In order to capture the conditions for the coffee producers in Zozocolco, a description of the social characteristics will be delineate in chapter four and in chapter five a linear model will be estimate to find the factors that may incentive the farmers to alternate crops. The analysis relies on concept of rural diversification theory.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **Diversification Concepts**

The concept of diversification became more important when Harry Markowitz developed the modern theory of portfolio management in 1952. He proposed that investors should focus on selecting portfolios based on their overall risk-reward characteristics instead of merely compiling portfolios from securities that have attractive risk-reward characteristics. Diversification is often explained with the centuries-old saying "don't put all your eggs in one basket." With diversification, risks are uncorrelated and it decreased the likelihood of bankruptcy. (Lyandres, 2004)

Using modern portfolio selection theory as a model, diversification strategy has been applied in the field of agricultural products in a prosperous way. Diversification has come to be regarded as a mean of reducing a country's dependence on a particular product (ICO, 2002). In the agriculture sector, diversification is considered a shift from one crop to another crop (Vyas, 1996). However, Davis and Devinney (1997) argued that there are three possible types of diversification: a shift from less profitable crops to more profitable crop within agriculture (horizontal diversification); shift from only farm to farm and non-farm activities (vertical diversification); and small use of resources in diverse activities (due to both horizontal and vertical diversification). For each, a key condition for success is that the market targeted by diversification must be a growing and dynamic (CEC, 2003).

Vertical diversification refers to moving up the value chain of traditional products with domestic added-value in order to capture a larger share of the sales price. This does not necessarily involve processing it can also refer to differentiating a traditional product by quality, origin or production method. Horizontal diversification generally refers to the substitution of traditional crops with new non-traditional products as exotic vegetables, fruits, cut flowers, and organically grown traditional export crops.

Diversification into non-traditional commodities has been promoted for the past four decades and has been considered an excellent opportunity for income generation because production involves activities using similar resources as traditional commodities. Therefore, usually diversification does not require excessively high capital or human capacity investment. (CEC, 2003) The markets for non-traditional commodities have been more dynamic than the traditional commodity markets.

Developing countries mostly export a small range of commodities without much value added. Diversification is commonly seen as the remedy but developing and implementing a diversification strategy is complex. Most developing countries evidence a mix of constraints to horizontal diversification; lack of knowledge in manufacturing and marketing non-traditional commodities; lack of access and costs of financial services for new industries; and absence of infrastructure (ICO, 2002)

Diversification is considered as a strategy to minimize farm risk, which arises as a result of fluctuations in output prices, weather uncertainties, among others (World Bank, 1990). Agricultural diversification can be designed to both alleviate poverty and protect the environment (Hayami and Otsuka, 1994).

Rural households in many different contexts have been found to diversify their income sources, allowing them to spread risk and stabilize consumption (Valdivia et al., 1996). Using modern portfolio selection theory as a model, diversification strategy has been also applied to the field of agricultural products in a prosperous way. It is applied to agriculturally based peasant economies because of the risks such as variable soil quality, household and crop disease, price shocks, unpredictable rainfall, and other weather related events.

Cagvilia and Sills (2005) start with the definition of portfolio theory of diversification. According to their theory households trade-off the relatively high mean profitability of one activity for profits with lower mean and variance originating from a variety of activities, to reduce risk and maximize utility.

Dorsey (1999) agrees with Caviglia and Sills (2005) that even the concept of economic diversification is not entirely new, agricultural diversification has not completely developed because it is extremely complex. Agricultural diversification is a process influenced by population density, resource availability, behavioral factors and other economic opportunities. He made the distinction between “farm diversification” and “farm income diversification” which other authors do not do. For Dorsey, farm diversification refers to diversification of on-farm activities primary within the sphere of agriculture, like the introduction of a commodity such as coffee, organic vegetables or other value added products. With the concept of farm income diversification, he refers to on-farm and off-farm income-earning activities.

Chaplin (2003) thinks that diversification will not decrease dependence on agriculture; opposite to this he thinks that it can be a strategy more into agriculture. He

agrees with the idea that diversification will help to mitigate poverty, although he does not say it explicit. I think is implicit when he mentioned that low-income localities are more in need of diversification policies. He thinks that stimulating economic development in rural areas in the Central Europeans Countries (CEC) is a big challenge for government; Dorsey (1999) also thinks that diversification rather than continuous planting of fields to single or only few annual crops is a better strategy. However, Chaplin thinks that farm household's diversification is more important than crop diversification as Dorsey recommends.

Winters, Davis and Corral (2001) also think Chaplin, for them diversification is important for both on-farm and off-farm income-earning activities, they define livelihood diversification as the process by which households construct a diverse portfolio of activities and assets to survive and improve their standard of living. For Caviglia and Sills (2005) income diversification can be achieve by producing a variety of crops and/or by pursuing off-farm employment.

European Union policy has gradually embraced diversification as a vehicle for rural development, creating support programs oriented to a market agricultural policy. Dorsey (1999) argues that governmental intervention is not that necessary because small farmers diversify by growing a variety of crops in different locations at the same time. In Mexico, all the rural activities that generate income in rural areas are important evidence, for developing countries. Rural households rely on the diversification of assets and activities, in fact, 40% of rural income is generated from non agricultural activities (Winters, Davis and Corral, 2001).

Summer and Wolf (2002) define diversification as the presence of multiple enterprises with distinct marketed outputs in a single management unit. In the agriculture sector, diversification is considered a shift from one crop to another crop (Vyas, 1996). Summer and Wolf (2002) also study the vertical diversification although they called it, vertical integration.

For Caviglia and Sills (2005), the determinants and effects of diversification are not conclusively predicted by theory; diversification may have a negative effect on income distribution but also a positive impact on poverty. Crop diversification spreads the national sources of income and is seen as an important means of avoiding an over reliance on a limited number of agricultural commodities (Dorsey 1999). The general consensus is in favor of policies supporting diversification by rural households because of its potential to enhance their welfare and because it may allow more efficient use of both human and natural resources (Caviglia and Sills, 2005).

Each author tries to determine whether diversification works in each country or not and if the government intervention is necessary. For each case, all of the authors develop or applied a method that will give different. Dorsey applied a two stage least square regression analysis to determine the relation between net income, diversification, and commercial specialization. He used data from the small farm survey in Kenya for different years. He preferred to measure small farms because the average percentage of available land and under production per individual is 90% He found that these variables are positive correlated. Also he finds that large-scale agriculture specialization is not more efficient.

To measure the effectiveness of diversification in US for dairy products, Sumner and Wolf (2002) use a diversification index which equals cash farm sales-milk revenue of cash farm sales. They identify different regions on US and compare results, diversification is negative correlated to herd size which would be a similar result as Dorsey (1999) predicted that smaller farm size is better for diversification.

Chaplin (2003) defined agriculture diversification as the existence of other gainful activities by farmers outside production of food. Therefore he measured with a multinomial logit model where he included agricultural diversification depending on education, advice, governmental program.

In Mexico, Winters, Davis and Corral (2001) defined six categories of diversification crop production, livestock production, self-employment, non-agricultural wage employment, agricultural wage employment and migration. They analyzed income participation also including social and public capital; they also analyzed *ejido* population size, cooperation, semi-urban, lack of formal production system and infrastructure.

Caviglia and Sills (2005) used a maximization utility model, to analyze diversification in Brazil; they hypothesized the expected household choices of diversification and forest condition will be related. They tried to find a correlation between income diversification and land use.

Dorsey (1999) found that crop diversification is important in Kenya; smallholders attempt to reduce risk through the practice of staggered crop season. Cash crop production and rotation tend to stimulate the national economy so government promotes to incentive diversification. Evidence shows that in Kenya, diversification has been effective to increase yields, income, and to maximize opportunities for land holdings.



Sumner and Wolf (2002) found that diversification and vertical integration effectiveness depends on farm size. They leave all the diversification choice to a private decision of the farmer where government is not involved.

The results for Chaplin (2003) were similar. Diversification is good for the three countries that the analyzed education and diversification and found a positive correlation and negative correlation with unearned income so is good to diversify because decrease risk. They also agree with Dorsey and Sumner that size is negative correlated to diversification; it is for the smallholders more convenient to diversify.

The evidence provides the view that the types of social and public capital matter. Both of these variables are indicators of social capital as they measure associational activity. However, only an association with productive oriented organizations has a positive influence on livestock income. Both non-agricultural and agricultural wage income are positively related to the level of infrastructure. *Ejidors* with access to electricity, public lighting, water and paved roads, all general indicators of economic development, provide higher wage employment income than those without. They found that rural income does not depend only in agricultural production so is very important for Mexican farmers to have the ability to diversify over different activities.

For Cagvilia and Harris (2005), size is also important as a factor in diversification or not; they found that positive significant effect of cropland and cash income. They did not find that income diversification reduce forest clearing, they explained is because with diversification opens more possibilities for more intensive production on land that is already clear. So diversification does have good effect over the environment.

Dorsey (1999) recommends that governments should create incentives for diversification to avoid high dependence on coffee; it may relieve some of the pressure by reducing the degree to which farmers produce solely for subsistence although it is the farmer who knows himself the advantages of diversification.

Sumner and Wolf (2002) also recognized that it is the farmer who has the decision to diversify or not. For Chaplin, policies that increase agricultural price supports tend to decrease diversification; however, in an opposite way than the other authors recommend in these countries they suggest that policy should tend to be an incentive for non-farm diversification. For Mexico, Winters, Davis and Corral recommend that diversification policies that increase rural income should be done not only for crop diversification but also it should improve household access to both household level and general infrastructure since each of these enhances the level of income earned from non-agricultural employment. Similarly, if the government decided to commit resources to generally improving income levels, investing in household access to infrastructure is likely to have the broadest and greatest impact.

Caviglia and Sills (2005) conclude that diversification policies should be applied because they contribute to reduce poverty reduction but also it helps to the environment, stopping clear cutting forest. Socioeconomic conditions explained the way the diversification is done. In general diversification in Brazil is better for those who have more cropland than cattle, for them diversification will actually increase their income.

Diversification policies are helpful; although it will depend on the conditions for each country, the way the government should create incentives for it. Best option for low

income farmers is non farm diversification which will include not only crop diversification but also include other income generating activities.

This literature review will be used to guide the analysis of agricultural diversification prospects in the municipality of Zozocolco, Veracruz. Specifically, diversification strategies will be utilized to analyze farm survey data from this locality

Diversification opportunities will be considered for marginal coffee farmers in Veracruz. An analysis of socioeconomic conditions in marginal coffee farms in the municipality of Zozocolco will be presented in a separate chapter in this thesis, then the opportunities for diversification into vanilla and black pepper will be estimate from secondary data.

### **Alternative Crops for Coffee Growers**

The diversification in Veracruz is very promising since it has good soils and very good weather for tropic fruits and forests. There are 452 different ecosystems in the land under the 600 meters above the sea level. In these naturals systems the possible crops are rice, red cedar, baby bananas, guanabana, guava, maracuya, papaya, bambu, anthurium, black pepper and vanilla; most of these products are non traditional products. Diversification theory indicates that these crops might be the best options; however two products such as vanilla and black pepper will be analyzed to their market possibilities.

### **Vanilla**

The plant *Vanilla planifolia* is a tropical orchid which grows as a vine and needs the support of trees or poles whereupon it can reach a height of about 5 meters. The flowers have a narrow bell surrounded by thin petals which develop slowly over several

months into long narrow pods about 12-15 cm long. It grows well in altitude from the sea level up to 600 meters of altitude, vanilla requires a warm humid tropical climate with temperature ranging from 21 to 30°C, with a habitual dry summer is necessary to bring good flowering. Vanilla is adapted to a wide range of soil types rich in humus and having good drainage. The vanillas are especially liable to destructive fungus diseases. The flower does not fertilize itself so pollination by hand is necessary; Vanilla is one the most labor-intensive agricultural product in the world because it takes approximately four years from planting a cutting of the orchid vine until the plant produces orchids. This plant is native from Mexico, but now is widely cultivated throughout the tropics and in greenhouses.

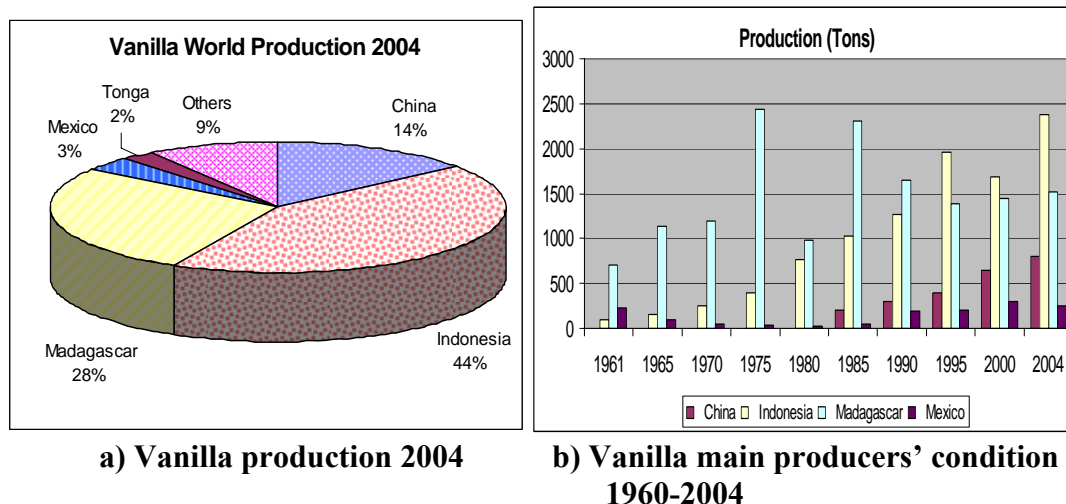
There are fifty or more kinds of vanilla plant, the best one with a fruit suitable for use in flavoring extract is *vanilla planifolia*, so called for its flat leaves. It is a native of the valley of Misantla, in Veracruz, Mexico (SAGARPA, 2001); however at present, although the wild plant is abundant in this Mexican State, the vanilla in the world, production comes almost exclusively from Indonesia. In the markets most of the varieties are known by the name of the country in which they are produced. The finest varieties are Mexican, but other varieties are the vanilla *simarona*, bourbon or Indian Ocean vanilla, Tahiti vanilla and Java vanilla (Hughes, 1926).

The Mexican vanilla, the first quality occurs in pods from 15 to 20 cm long. The color is dark brown, the pods fairly plump, the surface ridged longitudinally, when fresh somewhat viscid, but always roughish to the touch. The best quality Mexican beans are those plucked in January and February. A fruit which has not been picked early enough or has been picked too early are inferior in flavor, and has no aroma. This means that the

management means of the vanilla crop should be very meticulous to get the highest quality (SAGARPA, 2001). Vanilla needs a process of curing the pods which may be picked green then sun dried, oven heated or cured in hot water. The practice of curing the beans by placing them under blankets in the sun is still in vogue, but using a regulated artificial heat is more certain, and it is the modern method (Barragan, 2002).

Artificial vanillin produced by chemistry is employed plentifully, not only in substitution but also for strengthening weak pure extracts. Vanilla beans from which the vanillin has been removed by means of a solvent are also offered for sale. Coumarin and vanillin are ordinarily used together in adulterating; the mixture is then sweetened and artificially colored, with prune juice added. The fraud can be detected by the absence of flavor and odor. However this product has been used further by the large soft drinks companies like Coca-Cola because of its low-price (SAGARPA, 2002).

The total world production in 2004 was 5,478 metric tones and the largest producer is Indonesia followed by Madagascar. The production has increased 27% since 1995 to 2002. Although the world production has been increased, Mexico has decreased its production. Mexico was the first producer of vanilla and it was the solely producer until the nineteenth century; at the present Mexican vanilla shared of the market is almost nil. (Figure, 2.1)



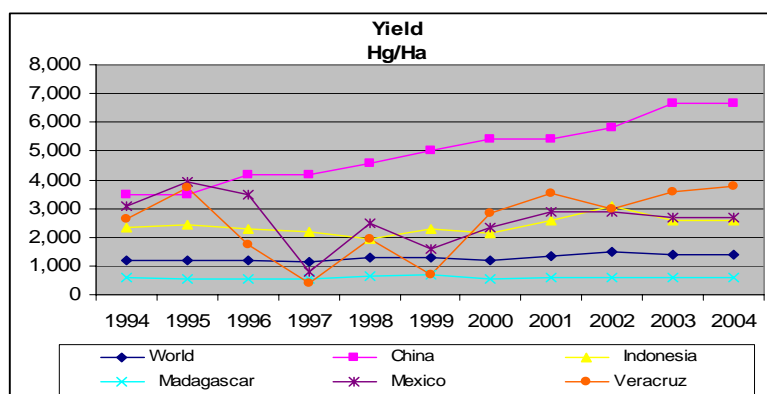
**Figure 2.1**  
**World Vanilla Production and Main Producers Participation**

(Source: FAOSTAT, 2004)

In the latest years the production has varied depending in the main producers conditions. In 2000, the world production decreased because of the meteorologist disaster that happen in Madagascar; more than 380 tons were lost and the total world production decreased (Barragan, 2002). However Mexico follows its own condition dissimilar from the rest of the world; in the late 1960's Mexico converted vanilla producing areas to coffee crops; the declining production was enormous. In 1997 there was a large decrease caused by the plague in the vanilla area in Veracruz. In 1998 the production in Veracruz had a good year losing only 1% of the crop; however with the violent storms in 1999 it lost almost all of the harvest. The volume of the Mexican production is diminutive compare to Madagascar or Indonesia (Figure 2.1).

The total area sown with vanilla in 2004 was 39,051 ha with the largest portion in Madagascar and Indonesia. The land designated to vanilla crop has increased 13% since 1994. The total land harvested was 38,000 ha and the average yield was 1,400 hectograms per hectare (hg/ha). One vanilla plant produces approximately 150 pods every harvest season; more than 1500 plants can be planted in one hectare. The most

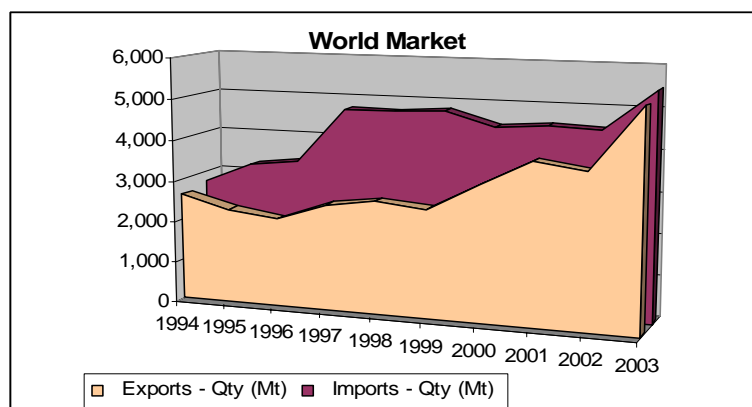
productivity country is China. It is notable that Madagascar being the second most important producer has a low productivity under the world average. Mexico does not present a constant yield however in the most recent years, yields have been increasing (SIACON, 2004). In Veracruz the yield has been increasing. (Figure 2.2)



**Figure 2.2**  
**World Main Producers' Yield of Vanilla** (Source: FAOSTAT, 2004)

Vanilla yields in Indonesia have increased ten times in the 90's and its yield is over the world average. Madagascar produces the vanilla Bourbon. This country has increased its production although its yield is low in contrast with the rest of the producers. The disadvantage that this presents is the discouragement of the farmers due to the tax increment which was 86% in 2000; the vanilla is poor quality although in the latest years it has improved its quality (Fruitrop, 2000). Also the strong climate changes and the cyclones that have regularly destroy the crops and make the vanilla expensive to grow in that country.

The world market has been growing for the last 10 years, at present the exports are twice as much as it was in 1994. Since the vanilla extract can be transform to different products like essence, liquor, medicine, etc. The re-imports is very common, this makes the import quantity more prominent than the export quantity (Figure 2.3).

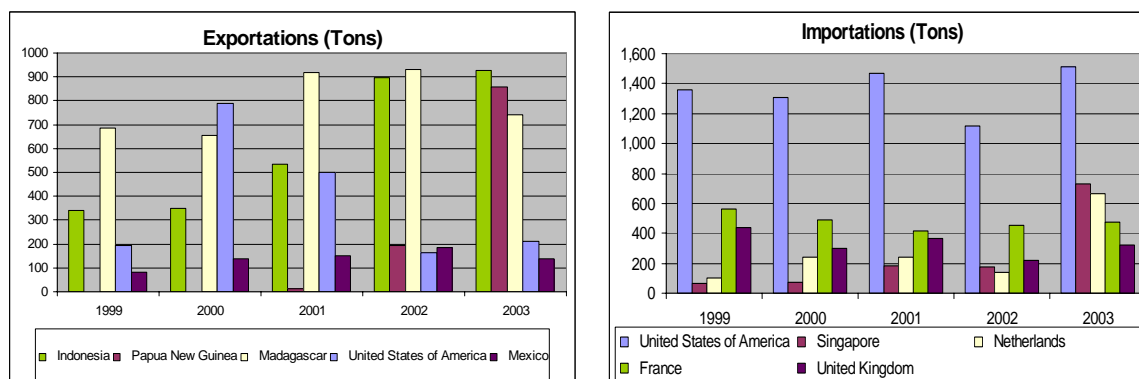


**Figure 2.3**  
**World Market Exports-Imports of Vanilla 1994-2003**

(Source: FAOSTAT, 2003)

The main exporter countries are different from those who produce the vanilla except for Indonesia that in 2003 became the primary exporter. In 2000 United States of America was the most important exporter although it does not produce vanilla, it process the vanilla selling it to other countries as a different product with more added value. In 2003, Papua New Guinea appeared as the second exporter, because it became a distribution center (Barragan, 2002). The US is clearly the most significant importer. The developed countries usually are the greatest importers because they utilized vanilla in cosmetology, confectionery and the beverage industry. France is the most constant purchaser after US between these two countries consumes the 72% of the total production. It is also notable that Netherlands has increased its consumption since 1999 to 2003 almost 300% (Figure 2.4).



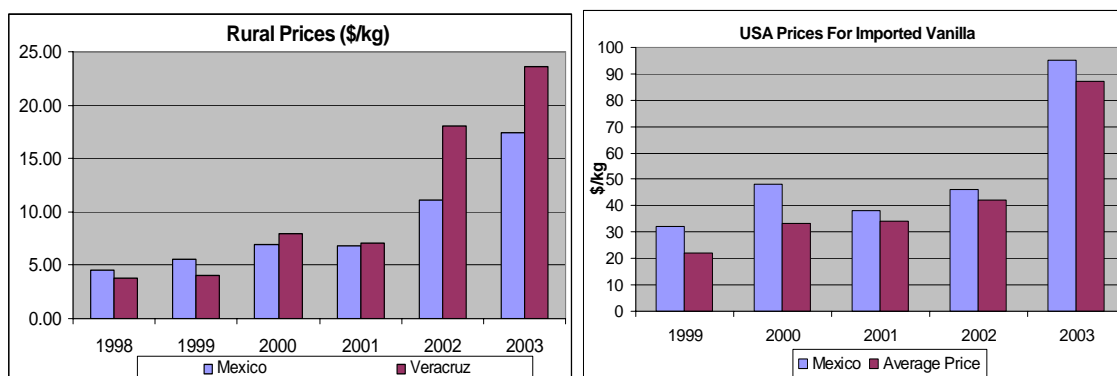


**Figure 2.4**  
**World Main Importers-Exporters of Vanilla 1999-2003** (Source: FAOSTAS, 2004)

Mexico exports the 70% of its total production however it does not figure between the main world exporters; the 90% of this exportation goes to US. Also, Mexico imports from Madagascar and USA re-exports to Mexico the 57% of the Mexican imports (SNIIM, 2005).

The vanilla prices went down in the 60's after the overproduction on that decade, since then it has been slowly recuperating, however the consumption of synthetic vanilla has stopped vanilla prices from recovering. In 2002 the increment in the price was more significant. The prices that Mexican farmers received have improved even though those would depend on the quality of the product. Vanilla produced in Veracruz has received better prices than the Mexican average; the main reason could be the government effort to increase the quality level. The international prices analysis was done from the prices that US has paid for its importations in recently years. The main vanilla exporters to US are Indonesia and Madagascar. In 2000 the approximately value of the total US imports was \$35 million dollars with an average price of \$20 per kilogram (USDAFAS, 2003). While the value of Mexican imports was \$158,210 dollars the price per kilogram for the Mexican vanilla was over the export average US paid price, the quantity is incomparable

with the imports from other countries; it is important to clarify that these prices are for the black vanilla and not further processed (Figure 2.5).



**Figure 2.5**  
**Rural and Market Prices of Vanilla 1998-2003**

(Source: Estimated USDA ERS, 2004 data)

Consumer preference in the US has caused a shift away from synthetic products toward more natural products (USDAFAS, 2002) and so in the rest of the world. Pure Vanilla is one of the most expensive spices in the market (Barron, 1999) and the conditions for Mexico, especially for Veracruz are very promising: the climate and the soil are appropriate to produce pure vanilla. In addition, the commitments by the government of Veracruz are facilitating the introduction of new technology to produce the vanilla extract. The proximity to USA and the reputation that Mexican vanilla has are two important advantages that the producers should take advantage of. The opportunity for Veracruz is in the quality of the product.

### **Black Pepper**

Black Pepper - (*Piper Nigrum Linn*) is a vine perennial plant producing berry-like and aromatic pungent fruits. It is locally known as "pimienta" which belongs to family *Piperaceae*. Leaves are thick, green with ovate shape. Flowers are white and minute

which produce fruits borne on short, hanging spikes 4 to 12 cm. long. Berry-like fruits are green when unripe and become red at maturity. Dried ripe berries become black and wrinkled constituting black pepper. Black pepper yields both black and white pepper. Black pepper is made by drying ripe or unripe fruits under the sun; white pepper by soaking, treating and removing outer skin of berry before drying (Morales, 2007).

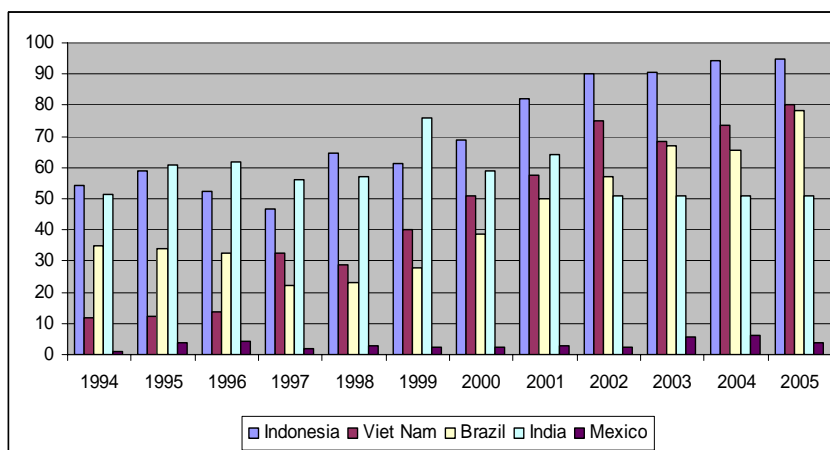
Peppercorn is marketed whole or ground. Black pepper is used as a seasoning in food preparation to enhance food acceptability. Essential oils extracted from black pepper are used in the preparation of elixir, and drugs formulation for intestinal diseases.

Varieties of black pepper are classified according to their respective source of origin, most common are Batangas, Laguna, Quezon, Davao, Zamboanga or Basilan black pepper.

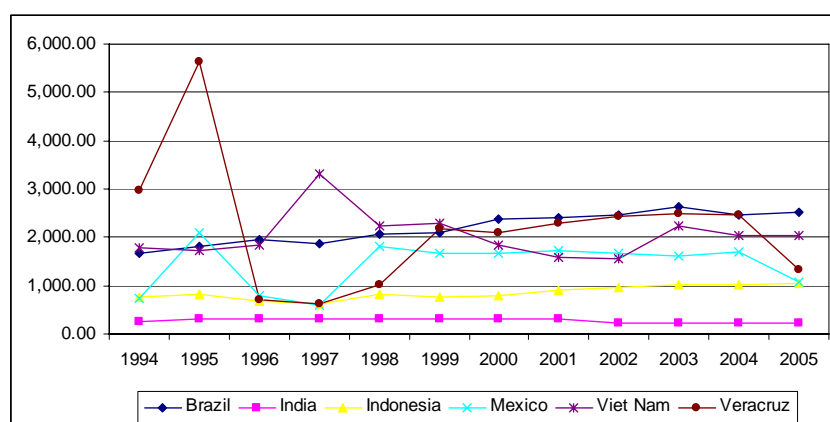
Black pepper grows in almost all types of soil. However, it thrives well in loose, well-drained soil. It is best suited under humid climate with rainfall of 100 to 250 cm and in an elevation of 350 meters above sea level. Pepper plants are climbers which grow to a height or length of 10 m or more. When its main stem is established, it grows lots of side shoots to create a bushy column.

The plants form short roots, called adventitious roots, which connect to surrounding supports. Although black pepper is cultivated in many tropical regions, it is native to India where it still occurs wild in the mountains. The world production is illustrated in figure 2.6 where we can see main producers are India, Indonesia, Brazil and Vietnam; even though black pepper is from India since 2000 it is grow largely in Indonesia and Vietnam. Mexico is not a very important world producer, with only ten thousands metric tons.

In figure 2.7 is illustrated the yield tons per hectare for the main producers countries; it is observed that Brazil and Indonesia has the highest and constant yield trough the years, and even Indonesia is the mayor producer it is not the more efficient, and it happens the same with India. In this figure also appeared Veracruz to show how efficient is trough the years (SAGARPA, 2003).



**Figure 2.6**  
**World Black Pepper Production 1994-2005. 1000 Metric Tons**  
 (Source: FAOSTAT, 2006)

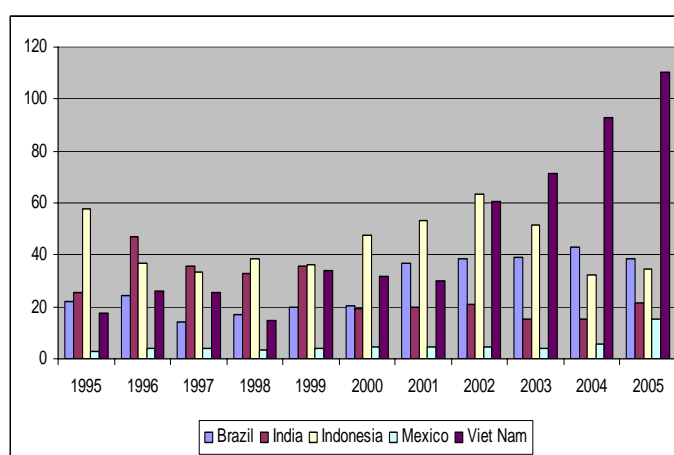


**Figure 2.7**  
**World Black Pepper Yield 1994-2005. 1000 Metric Tons per Ha.**  
 (Source: FAOSTAT, 2006, SIACON 2006)

Whole black pepper imports by the US increased by 4.84 per cent this year compared with 35,764 tons during the same period the year before. Vietnam continues to

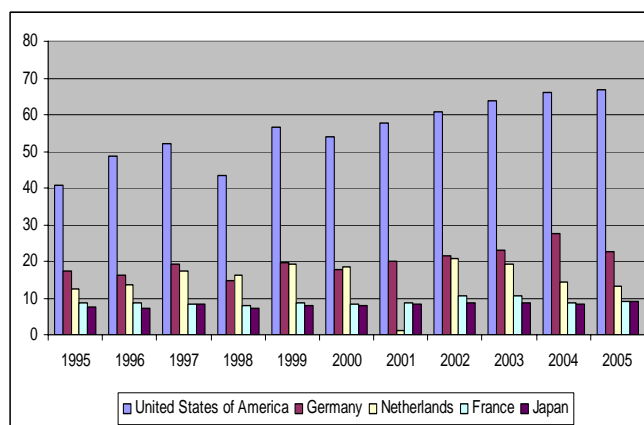
be the main supplier of whole black pepper to the US, shipping 15,108 tons, followed by Indonesia with 8,541 tons, Brazil with 8,317 tons and India with 4,395 tons. Imports of whole white pepper have also increased by 15.6 per cent (FAOSTAT, 2006).

In 2003, Vietnam shipped 359 tones and during the following three years exports from Vietnam have surpassed 1,000 tons annually. India continues to be the largest exporter of ground pepper to the US. Indian shipments of ground pepper in stood at 2,306 tons compared with 2,271 tonnes in the same period last year (Figure 2.8).



**Main Exporters Countries**

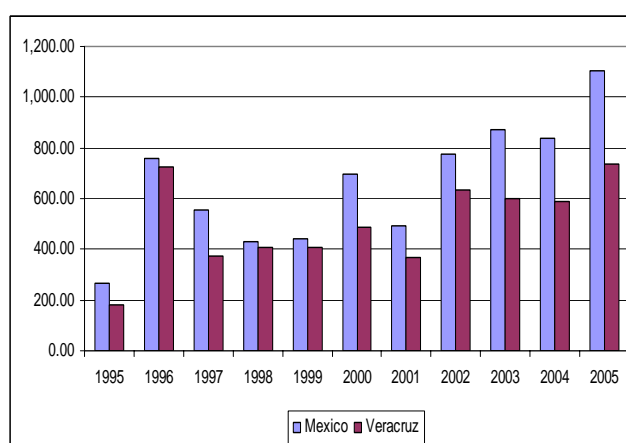
**Figure 2.8 a**  
**World Black Pepper Exports 1995-2005** (Source: FAO Statistics Division, 2006)



**Main Importers Countries**

**Figure 2.8 b**  
**World Black Pepper Imports 1995-2005** (Source: FAO Statistics Division, 2006)

As figure 2.8 illustrates US is the most important importer country, its imports has increased 3.70 per cent when compared with imports for the same period last year. Main suppliers of ground pepper to the US are India, Germany, Indonesia, Brazil and China. Vietnam exports of black pepper to world markets have shown a significant growth with the country shipping out 100,825 tons of the commodity. Black pepper prices in Mexico paid to farmers are illustrated in table 2.9, rural prices are descriptive in dollars and are per ton.



**Figure 2.9**  
**World Black Pepper Prices 1995-2005 .US Dollars.**  
 (Source: Siacon, 2006)

### Comparing Total Benefits for Some Alternative Crops in Veracruz

The table 2.1 illustrate the total benefits every, agricultural product generated in 2004 in the state of Veracruz, Mexico is illustrated in table 2.1. It is important to clarify that this is report of what happened in 2004, in order to have a simple indicator to compare the value of production in the state.

### **Coefficient of Variance for the Analyzed Commodities**

The coefficient of variance is a statistic tool that is used to measure risk in a finance portfolio. For this purpose we are going to use it as a measure of dispersion, for the rural prices this means the coefficient of variance will tell us about the changes that exist on the prices. The largest this coefficient is, the largest the changes in prices would be. In this case vanilla is the one crop with extreme changes because it can vary depending in the quality; in 2002 the price increased enormous, however vanilla is the most risky product because it also can decrease. On the other hand the black pepper seems like a very price stable crop. It is important to clarify that prices are not the only measure to calculate the risk of an enterprise, but it is a good indicator.

It is important to note, that rural diversification is a much wider process than just finding new crops to grow instead of coffee. It involves the entire rural economy and entails broadening the income sources of rural households. The process involves not only new cropping patterns, but also new marketing and agro-processing based industrial activities that affect the overall rural economy. Thus, rural income diversification encompasses both agricultural diversification and the stimulation of rural non-farm sources of income.

The vanilla seems to be the second best opportunity for Veracruz because the net incomes are very high although it is a very risky product since the prices change extremely from one year to the other. Though, it would be very important to increase its quality taking advantage of the popularity of pure vanilla. Since the world preferences are

changing to consume more natural products, Veracruzana pure vanilla can compete in the world market. It is a product that goes perfectly with other plantations as the coffee crops. Black Pepper appeared to be a good opportunity option due the stable prices and the net income which was not the highest, but the second better one, over the crops selected to compare. Veracruz does not have the technology yet to compete in the world market and the domestic market is not large. (Table 2.2)

The main reason for diversification is to increase the level of income the population in Veracruz. Since there is 70% of the population depending on rural activities it is necessary to switch to crops that give them better living standards without leaving their land. The products that have been analyzed are just an example of what Veracruz can produce, there are other opportunities, the criteria, to select new crops, should the dynamics of the product.



**Table 2.1**  
**Cost and Revenue by Alternative Crops, Veracruz, 2004.**

Product	Cost per Ton	Rural Price per Ton	Production	Total Cost	Total Revenue	Net Income
	\$	\$	Tons	\$1000	\$1000	\$1000
Papaya	171.75	259.80	254,863	43,773	66,213	22,440
Guava	2,375.00	2,700.00	23	55	62	7
Anthurium	21,218.00	86,400.00	34	721	2,937	2,216
Vanilla	20,600.00	23,572.70	180	3,708	4,243	535
Black Pepper	5065	6502.0	5047	25563.0	32,815	7,252
Source: SIAP and Floricultores de Veracruz S.A. de C.V.						

**Table 2.2**  
**Price Risk Measures by Alternative Crops, Veracruz , 1995 to 2004.**

	Mean	Standard Deviation	Coefficient of Variation
Papaya	129.18	56.39	43.66
Guava	229.80	77.86	33.88
Anthurium	114,168.00	19,297.38	16.90
Vanilla	7,363.05	7,091.69	96.31
Black Pepper	5,250	1693.497	32.32

## **CHAPTER 3**

### **FAIR TRADE THEORY, GOALS AND ORGANIZATIONS**

Less developed countries (LDCs) are characterized by their exposure to a series of vulnerabilities and constraints, such as limited human capital and productive capacity; weak institutions; geographical handicaps including poor soils, vulnerability to natural disasters, and communicable diseases; limited access to education, health, and another services; poor infrastructure; poorly diversified industries and underdeveloped markets for many goods and services; and lack of access to information and communication technologies (Stiglitz, 2005). The World Trade Organization has paid attention to this lack of resources to produce and to trade, being one of the most important policy discussions, by the international trade policy organization. The question becomes, do LDC's deserve special treatment? Apparently some consumers think they should.

While WTO is finding the best solution for all the countries, there are certain organizations that have tried to propose different market and non-market solutions. Given this trend there is growing a sentiment that exports of the developing world are under valued and that concerns about the environment and sustainable production are ignored, thus the philosophy of "Fair Trade" which support the marketing and sale at greater than free trade prices has been proposed as a selection for some commodities from LDCs (LeClair, 2003).

The Fair Trade movement can, in one sense, trace its origins back to the development of the co-operative movement in the late nineteenth century. In the form in

which Fair Trade is recognizable today, however, it began with the Mennonite Central Committee trading with poor communities in the South in the 1940s (IFAT, 2003) but only began to expand and become a “movement” in the 1960s and 1970s.

Fair Trade is a trading partnership, based on dialogue, transparency and respect, which seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalized producers and workers – especially in the South. Fair trade organizations (backed by consumers) are engaged actively in supporting producers, awareness raising and in campaigning for changes in the rules and practice of conventional international trade (FINE, 2001).

The goals of Fair Trade that flow from this definition are:

(1) To improve the livelihoods and well-being of producers by improving market access, strengthening producer organizations, paying a better price and providing continuity in the trading relationship;

(2) To promote development opportunities for disadvantaged producers, especially women and indigenous people, and to protect children from exploitation in the production process;

(3) To raise awareness among consumers of the negative effects on producers of international trade so that they exercise their purchasing power positively;

(4) To set an example of partnership in trade through dialogue, transparency and respect;

(5).To campaign for changes in the rules and practice of conventional international trade;

(6) To protect human rights by promoting social justice, sound environmental practices and economic security (Redfern and Snedker, 2002);

As is has already being mentioned, the alternative trade movement is a response to perceived inequities in the global trading system, as it has developed within the GATT/WTO framework. The alternative trade movement, as it has developed over the last 20 years, has taken two distinct forms. In the industrialized world, Fair Trade has been conducted primarily through storefront operations that offer products from the developing world at subsidized prices. In the developing world, on the other hand, Fair Trade is conducted largely by producer groups that provide a variety of services to their members, such as marketing, product development, financing, and distribution services. Although these two forms of alternative trade function in very different ways, they both rely on the goodwill of individuals in the industrialized world to purchase products at higher than free market prices. (LeClair, 2002)

The difference between the direct subsidy and the Alternative Trade Organizations (ATO) purchase depends, the responsiveness of supply to changing prices. If supply is inelastic, there is little difference between subsidies and direct payments. If it is large, which is more likely in the informal sector, then there is a significant variance (in monetary terms) between the two approaches, and cash payments are therefore superior. It is difficult to imagine the establishment of a direct subsidy program that simply paid cash grants to artisans that wanted them. Price subsidies of this form are unlikely to be efficient, and in many cases are highly inefficient. (LeClair, 2002)

### **Coffee Market Characteristics**

Since coffee is the one of the most popular fair trade product, this section is dedicated to coffee characteristics in order to get a better understanding of the role of fair trade on the coffee market. “Arabica” and “Robusta” are the two types of coffee sold on the international market. Latin America is principally a producer of arabica while Africa is principally a producer of robusta has more caffeine and a sharper taste, and sells for roughly half the price of arabica. Depending on the manner of processing, arabica is classed as “washed” or “un-washed”, the former using water to remove the pulpy fruit from the bean. Mexican coffee is washed, and is known as an “otro suave”.

Coffee is the 2nd most traded commodity in the world after oil. Since the early 1990s, the retail value of the coffee industry has more than doubled to US\$70 billion, while the export earnings of coffee producing countries has been cut in half, to only \$5.5 billion in 2004. Four countries - the USA, Germany, France, and Japan - consume over half of the world's coffee In the world, some 100 million sacks of coffee beans (of 132 lbs. or 60 kilos) are produced yearly.

Brazil is the major producer – with the distinction of suffering highly variable weather and frequent frosts and drought. Colombia, Indonesia, Vietnam and Mexico follow. Consumption of coffee is also quite inelastic to price change – though it does vary according to changing cultural patterns. If the United States was the principal buyer of coffee on the world market (45% in 1965), it is now down to 25%; Europe is up to 40%; and Japan is at 7% and increasing its consumption per capita. These qualities made coffee

a relatively easy market to regulate during the years of the International Coffee Organization. But the secular increase in world production led to a collapse of the price when that lid was removed. And the already-mentioned climatic variables of the few, largest producers have created a volatile market indeed in recent years. .

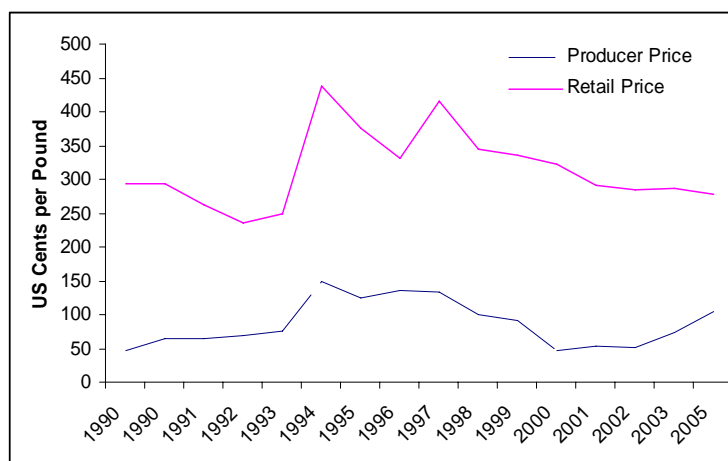
International coffee prices fell 50% between 1989 and 1993. Lower prices combined with the elimination of coffee subsidies to reduce the income of coffee growers by an estimated 65%. Lower prices reduced Mexico's export income from coffee to about \$370 million by 1991. They also depressed coffee production, which fell from 5.2 million bags in 1992 to 4.1 million bags in 1993. In early 1994 the government introduced subsidies for rehabilitation, mainly to improve quality. In 2000 coffee production hardly reached the 3.8 million bags (ICO, 2003).

In Mexico coffee production is found in 12 of the 32 states of Mexico, five of which are major coffee producers: Chiapas, Oaxaca, Veracruz, Puebla, and Guerrero. In general geographic-environmental terms, we can speak of two mega-regions: (a) the Pacific Slope (including all of Chiapas), which is responsible for 75% of the production and (b) the Gulf of Mexico slope for 25% (Lewis, 2005).

The coffee crisis was precipitated by a simple imbalance in supply and demand. Although demand has increased over time at a rate of about 1.5% per year, production has increased about 3.6% per year. In 1989, the International Coffee Agreement was dissolved, which had kept prices high and somewhat stable. In 1993, the Association of Coffee Producing Countries (ACPC) was formed to act as OPEC does for oil, and prices surged for a few years. However, few member countries other than Brazil and Colombia held to an agreement to reduce production by 20%, and countries that previously had not

been significant on world markets, like Vietnam, greatly increased production. In 2001, prices dipped below 50 cents/lb as Brazil, the number 1 coffee producer, also abandoned the agreement and began selling its coffee reserves. Currently, coffee marketing is monitored by the International Coffee Organization (ICO). Markets are located in the USA (New York), Germany (Bremen/Hamburg), and France (Le Havre/Marseilles).

Wholesale and retail price is good, but the margin between producers and retailers prices has increased from \$1.50 to \$2.00 per pound in the 1980s to \$2.00 to \$3.50 more recently. Figure 3.1 illustrates the difference between the producer price and the international market retail price, this would be usually higher than the producer price due to transactions cost. It is observed that in 1994 and 1997 prices reach a peak, after that they suffer a dramatic falling; as we have already mentioned since 1998 the prices have not been able to recover.



**Figure 3.1**  
**World Coffee Prices 1989-2004**  
 (Source: ICO, 2006)

### **Fair Trade Coffee**

Fair Trade is an alternative approach to conventional trade that aims to improve the livelihoods and well-being of small producers by improving their market access, strengthening their organizations, paying them a fair price, and providing continuity in trading relationships. Fair trade coffee is purchased directly from cooperatives of small farmers that are guaranteed a minimum contract price. Coffee is the most popular fair trade product accounting for 35% of all fair trade products (Transfair, 2006)

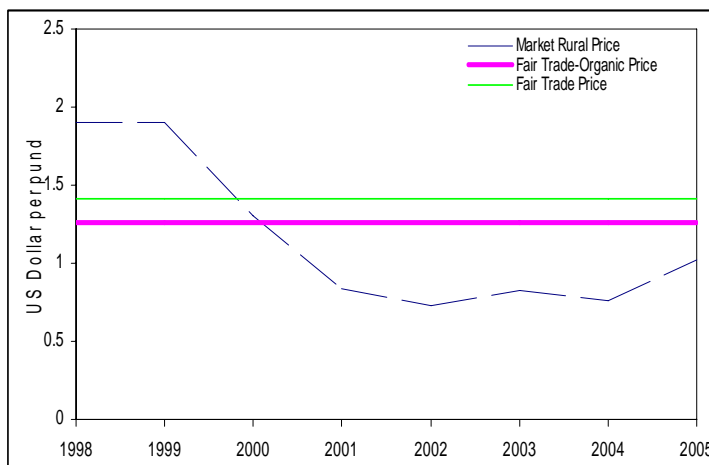
Nowadays fair trade coffee is sold in about 20 countries and has a market share of about 2.5% to 3% in the Netherlands, Denmark, and Switzerland. For most other countries, the fair trade market share is less than 2% (ITC, 1999). More than 24 producer countries currently have fair trade certified producers. These approximately 600,000 producers have the capacity to produce more than 100,000 metric tons. They are led by (in volume order) Mexico, Peru, Colombia, Nicaragua, and Guatemala (Lewis, 2005).

In the North American markets, fair trade has positioned itself as part of the specialty trade and has not met heavy consumer resistance in this high-end channel. In the four years since the official introduction of Transfair certification in North America, it has generated dramatic growth. The United States posted imports of approximately 4,600 metric tons of green coffee in 2002, an increase of 45% over 2001 when increases were closer to 50% more than the previous year. The vast majority of this, about 83%, was also certified organic and only very modest quantities were certified as shade grown. It appears that consumers are willing to pay only for fair trade and not organic.



The three most cited sources of resistance to the adoption of fair trade into the mainstream channels are a) its requirement to make prefinancing available to growers if necessary; b) that the benefits to producers are not clear; and c) what is considered a high price in relation to the current market. The first is partly an issue of mechanics as many large buyers do not deal directly with producers and would have to authorize and track deposits along their supply chains.

In practice, this is often a moot point since many producers do not request such financing. Some buyers have an issue with the FLO floor price claiming that this price is oriented toward income support without being necessarily reflected in corresponding high quality. They also argue that it is artificially set and not reflective of market realities, and it will not be sustainable in the long run because it could easily send signals to produce more when the market is oversupplied. The other side of the argument holds that the minimum fair trade price is only a just compensation and that the market does not fairly value the costs and risks of production. When the world price is above the minimum, the fair trade premium is only US\$0.05 more per pound (and, therefore, not onerous). It is expected that producers will respond with competitive quality, and buyers, who have more to choose from, will eschew poor quality. Currently, the minimum floor price is \$1.45, while in 1997 it was \$1.26, an increase of 15% in nine years (Figure 3.2).



**Figure 3.2**  
**Fair Trade and FT-Organic Premium Prices vs. Market Price in Mexico 1998-2005** (Source: International Coffee Organizations; Comercio Justo México)

### Fair Trade Coffee in Mexico

Mexico is the world leader in Fair Trade green coffee exports and dual certified organic and Fair Trade coffee exports (Raynolds 2002). Mexico has 38 certified cooperatives and Mexico is an ideal place to evaluate the extent to which the organic and Fair Trade markets are succeeding in reclaiming some of the externalized value of peasant coffee production. Mexico is the world's second largest producer of certified organic coffee after Peru with 13% of the total volume supplied on international markets in 2004 (International Coffee Organization 2003).

Fair trade requires relatively high levels of social organization. Most grow the highland arabica coffee that is highly valued on both the organic and FT markets. Mexico thus offers an excellent opportunity to assess the ways these niche markets operate in practice and their effectiveness in adding value to peasant production.

In 2000, nearly 79,000 coffee hectares in Mexico were either managed organically or were in transition (Gómez and Gómez 2002). The numbers have grown

considerably since then to over one tenth of Mexico's coffee producers and nearly one fifth of its land in coffee. According to a recent survey, 132,965 hectares are now certified organic or in transition to certified status, involving 49,687 producers (Gómez and Gómez 2002). Such rapid growth is indicative of better organization between the farmers.

Under conditions of low market prices, the Fair Trade Model, with its guaranteed prices, suggests all producers could be solvent. This way, conventional producers who can gain access to the FT market and the organic market, see dramatic improvements, recovering their transition costs promptly. Gaining access to the FT market is most important, as even conventional FT production is viable at premium prices. If a cooperative is able to market its full volume as Fair Trade, conventional production is profitable and producers may have few monetary incentives to convert to organic production since organic certification itself does not ensure the complete return of investment in less than five years so this condition the entry to a peasant producer who can not wait for that long.

Participation in Fair Trade networks substantially reduces the barriers posed by the transitional phase for those producers interested in undertaking productive innovation towards certified organic coffee. The Fair Trade premium on its own notably remunerates both conventional and organic production, while the organic premium on its own fails to remunerate the cost of organic production.

The estimation suggests that organized producers receiving conventional market prices in 2003/4 lost US \$106.00 /hectare on their coffee (Aranda, 2006) Producers who could convert to FT organic coffee, and get the FT price during the transition, would see

the higher transition price almost fully cover the cost of conversion, reducing the time to recover the initial investment to just two years, as soon as the producer would begin receiving the FT organic price. The benefit to unorganized producers is even more dramatic, as they, as it has been already mention receive significantly lower prices for their coffee from intermediary buyers. (Milford, 2004)

Fair trade represents a unique response to the perceived inequities of un-restricted free trade. Unlike other responses to the difficulties faced by developing nations in the world trading system. Fair trade is a form of philanthropy on the part of buyers, not a direct manipulation of the terms of trade. Although fair trade currently represents a minute fraction of total world trade, its importance is likely to increase as dissatisfaction with certain aspects of free trade grows. (LeClair, 2002)

For producers of commodities and handicrafts, the support of alternative trade organizations represents a means of obtaining a higher standard of living, especially in those nations where diversification of production is difficult. These increased return on traditional goods provide a disincentive for producers to diversify when possible, probably the biggest drawback to diversification and trade. Consequently, these nations may remain dependent on a very few products to secure export revenues. If, at some point in the future, consumers in the industrialized nations no longer feel inclined to pay the mark-ups inherent in fair trade pricing, artisans in the developing world may suffer a reversal in their standard of living.

Fair Trade coffee may not be an alternative for marginal coffee produces in the lower elevations of Veracruz due to the lower quality of their beans. However, fair trade

may be an alternative marketing mechanism for farmers as they diversify into other crops such as vanilla or black pepper for example.

Fair Trade is presented as an option for consumers who think that world trade is unfair for small producers, such as coffee growers. Critics, as it has been mentioned, are based on its economic model which works as a subsidy model that may not be sustainable in the long run. Also Fair Trade is presented as an opportunity for producers to access a better living standards; however, some problems that fair trade presents as Shreck (2006) suggested are the cooperative organization and the inequality that certification would bring to the community.

In Mexico Fair Trade has worked alleviating poverty for those who have access to certification. However, domestic or international consumption has stopped marginally increasing; this probably will happen in US too. This is why even fair trade has appeared as a midterm solution but it is necessary to give the opportunity to small producers in developing countries opportunities for better trade conditions.

## CHAPTER 4

### DESCRIPTION OF REGIONAL PROJECT AREA

#### **Zozocolco de Hidalgo, Veracruz**

The state of Veracruz is located on the eastern coast of Mexico facing the Gulf of Mexico (Appendix Map 1). Veracruz shares borders with the states of Tamaulipas to the north, Oaxaca and Chiapas to the south, Tabasco to the southeast, Puebla, Hidalgo, and San Luis Potosi to the west, and the Gulf of Mexico to the east.

Zozocolco de Hidalgo is an indigenous municipality in the state of Veracruz; it is located in the Totonaca region at the northern region of the state, at the latitude 20° 08' length 97° 35', the average elevation in the communities of this region is around the 280.00 meters above the sea level. The community of Zozocolco is located in the central and east part of the state over part of the mountain range *Sierra Madre Oriental*.

Due its location on the basin of the rivers Tehuantepec and Tecolutla, Zozocolco enjoys from humid and warm weather with an average temperature of 76 Fahrenheit degrees and its average annual rainfall is around 62 in. These climatology conditions are good to cultivating fruits and citrus. The characteristic foliage is constituted by shrub from the subtropical perennial and native species such as laurel, mahogany, cedar and fruit trees among many others.

Zozocolco is a small municipality with only 12,607 habitants which represents only 0.18% of the total population in the state of Veracruz the population density approximate of 119 inhabitants per square kilometer. Eighty three percent of the

population in Zozocolco is indigenous and live in the rural area (Inegi, 2006). Zozocolco has 13 main localities which are Las Barrancas, Caxuxuman, Tahuaxni Sur, Tecuanteped, Zozocolco de Hidalgo, Tlalpila, Zapotal, Acatzacatl, San José Buenos Aires, Anayal I, Anayal II, Tahuaxni Norte and Zozocolco de Guerrero. These are considered rural areas and only Zozocolco de Hidalgo is urban, economical depressed, however it is immerse into a marginal and poor situation.

### **University of Veracruz - DIPROCAFE Survey**

In the eighties the Mexican government induced rural areas in the country to grow coffee, even when the altitude was too low for high quality coffee. Zozocolco entered into this category and farmers started growing coffee extensively without paying attention to the necessary conditions to grow high quality coffee. Therefore, as it has been already mention in previous chapters, Zozocolco growers are an example of a directly affected community when the coffee crisis took place. Due to the low quality coffee that they still produce their low income does not allowed them to meet basic necessities for their families.

The University of Veracruz and the government of the state of Veracruz in Mexico started a project in order to help coffee farmers in this region diversify their agricultural lands. The University of Veracruz is trying to find a substitute crop to grow in this area, taking under consideration the background of the community, the climatology and soil conditions and the market situation. As a part of this project, a survey was taken in the 27 localities of Zozocolco and Atzalan. This was elaborated by members of the project, *Diprocafe*. The survey was administered to people who own a

parcel of land and had coffee as a main crop in this municipality. In this chapter the analysis and results from this survey in Zozocolco de Hidalgo are presented.

There were 226 observations in the total sample, in the Diprocafe Survey, however due to missing data this chapter would focus on seventy-six observations chose from the survey. These 76 observations are those from the farmers that have the record of their annual production of coffee and alternatives enterprises.

### **Social Characteristics**

Approximately 60% of Zozocolco's inhabitants are indigenous. Most of the small-scale coffee producers are indigenous and they speak different languages. They are direct descendants of Mexico's indigenous peoples and continue the culture, traditions and customs of their ancestors. Their ancestors' cultivated of the land with care, respect, and appreciation for *tierra madre* (Mother Earth) which still influences the indigenous people's daily work and living activities today. However, over the past century, state changes in agricultural reform and international pressures to modernize have threatened indigenous communities and their cultures.

The main demographic characteristics age of the head of the household, number of families' members, years of education, primary economic activity, weekly income from this primary farm activity, off-farm activity and weekly income, and migration status are presented in Table 4.1.

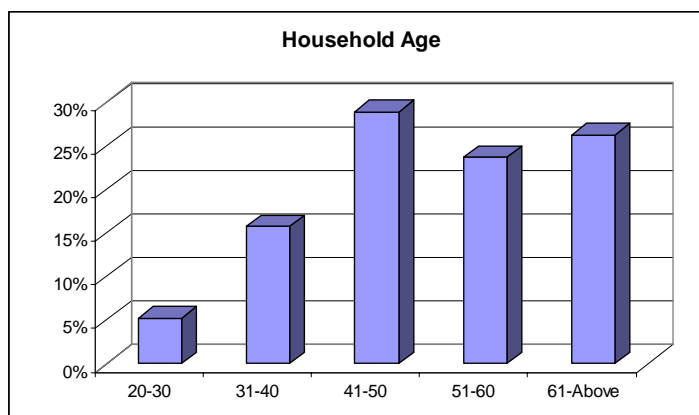


**Table 4.1**  
**Demographic Characteristics of Farm Families in Zozocolco, Veracruz, Mexico 2006**

	Mean	Minimum	Maximum
Age of Head of Households (Years)	51	24	85
Number of Families Members	5	1	12
Years of Education	5.2	0	13
	YES	NO	
Migrated in search of employment	19	53	25%
Family Member that has Migrated	29	43	41%

Source: Survey Diprocafe, 2006.

At the present time, rural areas generally have a high proportion of older persons in their total population. In Mexico, most rural communities have been experiencing a declination on their young population due to a strong migration to urban areas, in the search of a higher paid employment. The residences of Zozocolco present the same trend as in table 4.1 is illustrated. The mean of the age of the head of the household is over fifty years old. This means that the community is losing young labor hand which could be reflected in the economy of the community; as in many other places, young people have been migrating to urban areas to continue studying or working. In figure 4.1 it is showed that only 20% of the household heads are younger than forty years old. This is a very important variable because it will determine characteristics of the farmers like the migration situation, and their willingness to participate its expectation from the project. (Figure 4.1)



**Figure 4.1**  
**Percentage for Group of Age of the Head of Household in**  
**Zozocolco, 2006** (Source: Survey Diprocafe, 2006)

Even though there are more inhabitants, the family groups, on an average, are smaller; currently, families are smaller than they were fifty years ago and even ten years ago. Despite the fact that, traditionally, rural women have more children than do urban women (FAO, 1995); rural families have experienced profound changes over recent decades, modifying cultural patterns centered on large families, whose existence seemed to answer strategies of family survival in the country more than a family living conception, early marriages and strong paternal authority. In Zozocolco community the number of members in the families is lower to comparison of previous years, but still larger than the average in Mexico (INEGI, 2006). A possibly explanation is the poverty conditions that families had reduced their number of members. A way to create awareness of equal opportunities in the family should be made through the formal educational system modifying the different studies and adjusting them to a new family concept (FAO, 1995).

Education is an important variable in the development plans of any rural community. Such planning includes the interaction with other specific factors directed toward a common objective to decrease the marginalization of the rural communities and

the avoid movement of the population toward urban areas in search of better living conditions (Macedo, 2006). Educated people would have an easier understanding of these relations, the reaches and the organization of the diversification project. In Mexico basic or primary education in rural areas is reasonable covered (Macedo, 2006). The mean of the years of education that the head of the household has attended is five, in Mexico primary school is six years long, therefore 86% of the farmers have completed basic school (Table 4.2). Fifty nine percent has completed at least primary school.

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**Table 4.2**  
**Head of Household Level of Schooling in Zozocolco, 2006**

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No studies	14%
Elementary School	59%
Middle School	19%
High School	6%
Collage	3%

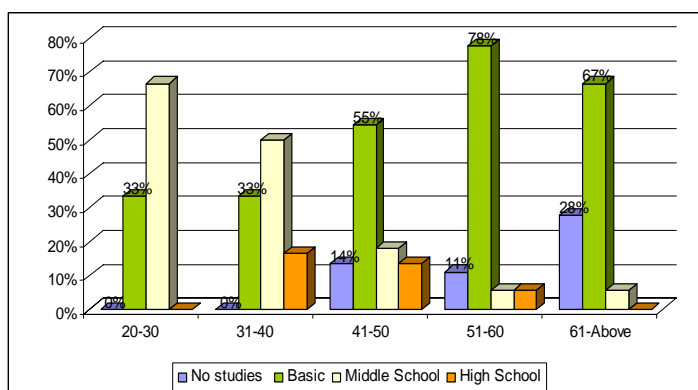
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Source: Diprocafe Survey, 2006

"The gap between urban and rural illiteracy is widening and, in several countries, rural illiteracy is two or three times higher than in urban areas. Illiteracy, means that more farmers will be unable to read the instructions on a bag of fertilizer or the warnings on a box of pesticide. Without basic education, rural people cannot increase their productivity, adopt enhanced technologies and improve their livelihoods," (Antonios 2004). In Zozocolco the survey shows that only 14% of the farmers had not school at all.

In rural Mexico, a lot of young people lack real opportunities to allow them to continue their personal development and to prepare for the workplace. The problem is linked with a significant exodus of the younger population from rural areas and the resulting decrease of school enrollment at this level. In Zozocolco, only 19% completed secondary from this percentage, all of then completed the three years of middle school. However in order to complete higher education young people will need to migrate to

urban areas. As it is expected in Zozocolco young people have a higher education level and the people that have no education at all are the older ones. From the group of people between fifty and sixty years old, 89% have at least primary education and 78% finished basic school. (Figure 4.2)



**Figure 4.2**  
**Head of Household Level of Schooling by Group of Age in**  
**Zozocolco, 2006** (Source: Survey Diprocafe, 2006)

Occupations which require low amounts of capital, either human or physical, will be associated with low earnings and therefore with higher poverty rates. Working in a rural occupation increases the probability of being poor. There has been a remarkable change in the composition of rural incomes, also for the rural poor (Lopez, 2005). The main trends are: a decline in the importance of agriculture; a substantial increase of wage income (farm and non-farm) relative to self-employment and entrepreneurial incomes; an increase in public and private transfers; and an increase in the importance of rural non-farm high return occupations as a source of income (Table 4.3)

<b>Table 4.3</b>			
<b>Daily Income from Main Farm and Non-Farm Activities</b>			
	Mean	Minimum	Maximum
Working days in a month	19	4	30
Daily Income from Primary Farm Activity	4.15	1.27	5.45
Daily Income from Primary non-Farm Activity	10.69	2.78	18.18

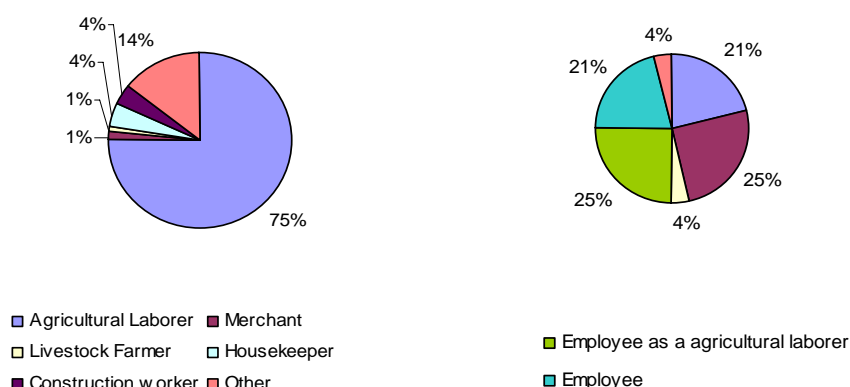
Source: Survey Diprocafe, 2006.

In Zozocolco it appears that rural activities are better paid if those are non-farm activities. It is important to mention that the farmer does not work on the same activity every day, depending on growing season and coffee prices the farmer will look for different ways to get his weekly income. The rural poor have been part of these changes, although they continue to lag behind the non-rural poor.

In Zozocolco the main activity is farming as agricultural laborer; either the farmer is the producer or an employee; those different activities that farmers have are illustrated in figure 4.4. It is observed that agricultural laborer is deeply traditional as a primary or secondary activity; then being a merchant is also one of the most important activities in the community. Four percent of the sample head of household is dedicated to housekeeping and also 4% is on the construction work. The category others, includes activities as artisans, teachers, drivers, etc. Only about 1% is dedicated to livestock farming.

## Primary Head of Household Activity

## Secondary Head of Household Activity



**Figure 4.3**  
**Head of Household Activity in Zozocolco, 2006**

(Source: Survey Diprocafe, 2006)

Even there are different activities performed in the community the weekly income is very high due the number of days of the week people work. Daily salary is about six dollars however the average number of days that farmers work is around nineteen (table 4.3). So the weekly income would depend on the activity and the number of days worked, (tables 4.4 and 4.5) agricultural activity is the lower paid of all, (and probably one of the hardest). Merchants received a better salary and other activities are the best paid. Agricultural laborers as the consequence of the coffee crisis that has affected directly these farmers are forced them to change activities to survive.

<b>Table 4.4</b>	
<b>Average Weekly Income from Main Activity (US dollars)</b>	
Agricultural Laborer	12.47
Merchant	36.36
Livestock Farmer	0
Housekeeper	9.090
Construction worker	15.98
Other	58.54

Source: Survey Diprocafe, 2006

**Table 4.5**  
**Average Weekly Income from Secondary Activity**  
 (US Dollars)

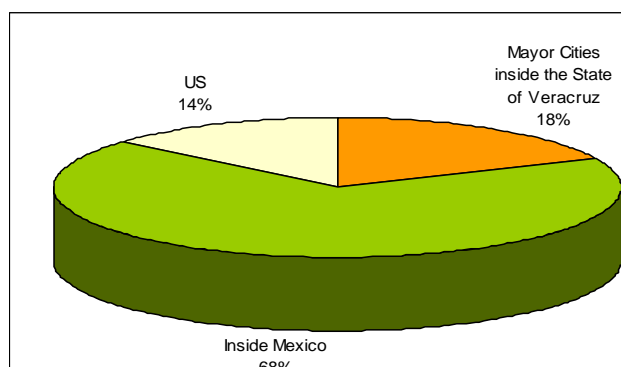
Agricultural Laborer (producer)	13.32
Merchant	19.32
Employee as a agricultural laborer	21.59
Employee	11.36
Other	7.27

Source: Survey Diprocafe, 2006

Throughout human history populations have migrated in search of better livelihoods or to escape environments which, for any number of reasons (natural disaster, a decline in game to hunt, etc.), could no longer support them. In many parts of the world, sedentary agriculture has over time exhausted the limited natural fertility of the soil, and populations have consequently needed to move to new areas (Joachim Singlemann1 2005). However, as nation-states and borders have been created, historical migration movements, especially if long-distance, have become less feasible; and as populations have increased greatly in recent decades.

In Zozocolco, Migration is the consequence of the low income in the community. The head of the household has not migrated as much as other members of the family in the search of a job, only 25% of the farmers has migrated and come back and about 40% of the family members has emigrated and has not come back. (Table 4.1) Each family who declared having a member out of Zozocolco has around 34% of their total number of members out. Regularly when people of Zozocolco migrate they look job in the surroundings of the community and mayor cities in the state of Veracruz; however, around 68% of the people who declared that has migrated went to other state and 18% even crossed the border into US. (Figure 4.4) There are rural-rural, rural-urban, urban-urban, and urban-rural (Elizaga 1965.) The main rural-urban migration most of the

farmers has migrated inside the state to the main cities; on the opposite the family members have migrated outside the state of Veracruz and even out of Mexico.



**Figure 4.4**  
**Main destinations of Emigrants from Zozocolco, 2006**  
 (Source: Survey Diprocafe, 2006)

### Farm characteristics

During the last major coffee crisis (1989-1993), many farmers abandoned their crops because coffee prices were so low that returns from coffee sales did not cover the cost of production. The land issue is extremely important to these farmers.

In Zozocolco, the average number of hectares per farmer and family is 2.29, averaging 700 kilograms of coffee per producer. The number of trees farmers in Zozocolco have plant is around 1000; however this is very low under the optima density which is about 2000 and 4000 coffee trees per hectare. Also the age of the plants is very old which means the productivity is decreasing annually.

One of the largest problems in Mexico is the size of the farms as table 4.6 shows, the average of the farm is about 1.16 hectare this mean that the productivity is very low. Around 80% of the land is communal and *ejidal* land. The remaining 20% is privately owned. Much of the land held by small-holders is insufficient to work and cultivate for



personal consumption. A reduction in the size of inherited plots of land due to generations of division and distribution has made living solely off the land impossible. Some of the leading factors in increased emigration to Mexico's already over-saturated cities. This reduction in agricultural land use is significant because of its impact on smallscale producer communities who have traditionally relied on farming for their well-being, such as Zozocolco where the main crop is coffee and the average annual revenue that the farmer gets is an average of \$1500 pesos per year.

There are some authors that refers to small farms as one important issue for productivity, to fairly evaluate the relative productivity of small and large farms, we must discard "yield" as our measurement tool. Yield means the production per unit area of a single crop, like "metric tons of corn per hectare." One can often obtain the highest yield of a single crop by planting it alone on a field in a monoculture. But while a monoculture may allow for a high yield of one crop, it produces nothing else of use to the farmer. Large farmers tend to plant monocultures because they are the simplest to manage with heavy machinery. Small farmers on the other hand are much more likely to plant crop mixtures intercropping, where the empty niche space that would otherwise produce weeds instead is occupied by other crops in Zozocolco other crops are citrus, corn, pepper, tomatoes. They also tend to combine or rotate crops and livestock, with manure serving to replenish soil fertility. Even though in Zozocolco farmers grow different crops such as corn this is just for self consumption.

**Table 4.6**  
**Land Devoted to Coffee Production in Zozocolco, Veracruz, 2006**

	Mean	Minimum	Maximum
Reported Farm Size (Ha)	1.16	0.24	3.53
Measured Farm Size (Ha)	2.29	0.24	6
Area devoted to coffee production	1.13	0.25	5
Coffee Land for Diversification	1.016	0.03	2
Rented Land (Ha)	1.3	0	4
Number of Plants per Hectare	1107	20	2500
Age of Coffee plants (years)	18	2	60
Volume of Coffee production (kilos)	719	3	6000
Estimated Coffee Revenue per year in pesos	1572	6.56	13,122

Source: Survey Diprocafe, 2006

### Government Programs

The governmental programs that Zozocolco received are merely intent to poverty alleviation and not necessary to increase income from farm activities. *Oportunidades*, *Liconsa*, *Procampo*, *Alianza Contigo* are the main government programs in the community.

*Oportunidades* is the federal program for poverty alleviation including health, nutrition and education as the main objectives to improve in rural communities. But government programs require the existence of a health center and a school as a condition of operation; thus some communities might be excluded. During the last decade, policies have been focused towards poverty in rural areas, where extreme poverty is found, it has not eradicated the problem (table 4.8).

The demand for health services has increased, thanks to programs such as *Oportunidades*, but the supply has not been keeping up. Regarding education, the programs implemented by the government have been rather successful in increasing enrolment rates, especially in primary education and reducing failing. But, the quality of education service has not increased at the same pace as the coverage. Moreover social programs have not been able to reach many of the small isolated communities, as a result of the high costs involved and the lack of infrastructure.

Another government program is a nutrition program named LICONSA which means “*Leche Industrializada Conasupo*” this program used to be only for milk distribution, nowadays it enhanced with iron and zinc, and it also includes the *Tortilla* program.

Economic growth and expansion of employment opportunities in the formal sector to ensure that families who see their welfare rise as a result of some of these actions do come out of the programs, avoiding poverty traps, and once out do not fall back into poverty would be the way to alleviate poverty; that is why such projects as the diversification project is needed it.

The farming support program is called *Alianza Contigo*, within some subprograms are ferti-irrigation, mechanization, rural equipment, pasture improvement, and "kilo for kilo". The ferti-irrigation program aims to increase productivity in irrigated areas by providing financial support for the installation of joint irrigation and fertilization systems. The mechanization program supports purchases of tractors and tractor parts. The rural equipment program assists farmers to purchase low cost equipment and technical assistance, while the pasture improvement programs help producers improve the quality

of their pasture through improved seeds and infrastructure investments. The "kilo for kilo" program provides farmers with one kilo of certified seeds for the price of normal seeds.

The distribution of the federal *Alianza Contigo* resources across geographic regions is fairly similar, with the exception of the Center region which received almost one third of all federal resources. The low participation level for *ejidatarios* could reflect the fact that they have insufficient resources to participate, lack interest in the program, or are simply not aware of the program. The participation of *ejidatarios* in ALIANZA in Zozocolco is very low (Table 4.5). Thus government programs may not reach the rural poor nor lead to poverty alleviation as they were intended. This is not necessarily a criticism but an acknowledgement of limited coverage in many areas such as rural Veracruz. This may explain why more localized projects such as the agricultural diversification of marginal coffee producing areas in Veracruz become so important. These areas need specialized technical assistance and community organizations to reach the small-scale marginal coffee farmers in Zozocolco.

**Table 4.7**  
**Participation in government programs in Zozocolco, Veracruz, 2006**

	<b>Number of Participants</b>	<b>Average Payments received per program</b>		
Oportunidades	37	\$ 243.5		
Liconsa	27			
Alianza Contigo	1	\$ 48.5		
Other	4			
	Mean	Minimum		Maximum
Government Payments for all Programs (pesos per year) n=31	\$ 218.4	120		220.0

Source: Survey Diprocafe, 2006

### Vanilla and Black Pepper in Zozocolco

After the coffee crisis some farmers looked for an immediately solution to their low coffee income. From those farmers, forty nine declared that in 2006, they were growing black pepper and fifteen were growing vanilla.

The volume in kilos of black pepper that farmers cultivate average 248kg and getting a revenue of \$2438 pesos (\$225 US dollars) this is a higher revenue that the average received for coffee. It is important to observe that the minimum production in some cases is zero because they have not had the first harvest yet. (Table 4.8)

Only few farmers declared to have vanilla even they recognize the high price of the vanilla vines. It is also expensive to growing it and in many cases is the vanilla is stole from the farm. For those who are already taking the risk of the vanilla plantations, the average produced mean was only 4.14 kilos and the revenue were \$233 pesos (\$5.2 US dollar) which give us the idea of the high price they are getting \$58 pesos (\$5.6 US dollars) and that agrees with the analysis from previous chapter. (Table 4.8)

**Table 4.8**  
**Black Pepper and Vanilla in Zozocolco, Veracruz, 2006**

	Mean	Minimum	Maximum
Number of Black Pepper Trees (n=49)	26	3	200
Black Pepper Produce (Kg)	248	0	1500
Black Pepper Revenue in pesos	2438	25	11,000
Number of Vanilla Vines (n=15)	211	2	1200
Volume of Vanilla Beans Produced (Kg)	4.14	0	15
Vanilla Revenue in Pesos	233	60	500

## **CHAPTER 5**

### **AN EVALUATION OF FACTORS ASSOCIATED WITH AGRICULTURAL DIVERSIFICATION IN ZOZOCOLCO DE HIDALGO, VERACRUZ**

The main purpose of this research is to analyze socioeconomic conditions in marginal coffee farms in the municipality of Zozocolco and to estimate the influence of factors associated with producers' willingness to diversify their farming operations. The focus of this chapter will be to analyze factors associated with the proportion of land that the farmer would be willing to diversify. Using the Ordinary Least Square method (OLS) method, it will be determined what factors will influence or provide incentives to the farmer to participate in agricultural diversification project

#### **Data**

In 2006 the University of Veracruz surveyed a group of coffee farmers in the community of Zozocolco de Hidalgo in north central Veracruz State. Originally 226 observations were in the survey; however, after removing incomplete observations, the sample farms utilized in this research accounted for 62 observations for this research. The main criterion used to select this sub sample was based on those farmers who declared an exact amount of coffee production in kilos. They reported, in general, more accurate and detailed information on their production and farm and non-farm processes. The survey was made in two stages, but in the same year, so the data are considered cross sectional.

Following the model that Chaplin (2003) proposed for rural diversification, this model includes some social characteristics and some farm characteristics as Dorsey

(1999) suggested. As was mentioned in the previous chapter, the hypothesis is that certain socio-economic characteristics will be associated with farmers' willingness to diversify his or her coffee farm; factors associated with the willingness to diversify from coffee plants, and coffee prices reported in the region. Other factors include the amount of government payments, weekly income, and the farmer's age. The variables that are considered for this estimation are shown and described in Table 5.1.

### Model

The proposed linear model from the variables described in the previous section thus:

#### Linear

$$Inlwdiver = \beta_0 + \beta_1 Agecoff + \beta_2 Ncfplant + \beta_3 Cpricek + \beta_4 Gobprgpay + \beta_5 Fage + \beta_6 Ystudi + \beta_7 Wincmact \quad (5.1)$$

In the model, the dependant variable, *Inlwdiver*, is the proportion of land available for diversification; this variable is calculated by subtracting the ratio of the land devoted to coffee over farm size from 1 for each farmer observed. Therefore, it means is a percentage ranging between 0 and 1, given by,

$$Inlwdiverbv = 1 - \frac{hagrowncoffee}{(Fsize + Rland)} \quad (5.2)$$

**Table 5.1**  
**Variables Associated with Coffee Farm Diversification**

Variable Name	Units	Description	Expected sign
<i>Dependent Variable</i>			
Inlwdiver <sup>a</sup>		1 minus the ratio of coffee area to farm size	
<i>Farm Characteristics</i>			
Fsize	Ha	Actual farm size	
Hagrowncoffee	Ha	Hectares devoted to coffee	
Rland	Ha	Number of hectares rented	
Agecoff	Years	Coffee plant age	+
Ncfplant	Number	Number of coffee plants per hectare	+
Cpricek	Pesos <sup>b</sup>	Coffee price per kilo	-
<i>Social Characteristics</i>			
Gobprgpay	Pesos <sup>b</sup>	Payments from Government Programs	-
Fage	Years	Farmer's Age	-
Ystudi	Years	Education, years	+
Wincmact	Pesos <sup>b</sup>	Weekly Income from main activity	-

<sup>a</sup> Inlwdiver is equal to minus the rate of area planted of coffee divided by farm size which includes owned and rented land.

<sup>b</sup> Rate 11 pesos per US dollar

The independent variables include *agecoff*, which is the age of the coffee plants in each farm. The importance of this variable, as has been mentioned in previous chapters, is as a proxy for the productivity; older plants are less productive. In this case, it is expected to be a significant variable, since less productive coffee trees would be an incentive for the farmer to change to a new crop and diversify his farm. Therefore, the sign of the estimated coefficient is expected to be positive. The second variable chosen is *nfcplant* which is the number of coffee plants; its estimated sign is expected to be



positive; that is less plants in the holding would defer possible diversification *ceteris paribus*.

*Cpricek* refers to the price of coffee and it was estimated from the revenue obtained from coffee production divided by the total quantity of coffee produced, the variable is expected to be significant and have an inverse relationship to the dependent variable *Inlwdiver*.

*Gobprgpay* denotes all the government transfers to the farmers; it is important to recall that all government programs operating in Zozocolco are mainly social and not associated directly with farming. Its sign is thus expected to be negative. *Fage* is the farmer age which is expected to have a negative relationship to diversification. Older farmers are less likely to take risks, that diversification represents. The education that the household head has received (*Ystudi*) is predicted to have a positive effect over *Inlwdiver*. The more educated is the farmer, the more interested he would be in farming alternative crops. The weekly income generated from farm and non-farm activities (*Wincmact*) is anticipated to be negative; a farmer with a high income would be less likely to diversify due to the perception of hazard that the change represents.

### **Estimated Results**

Descriptive statistics on the dependent and independent variables are presented in table 5.2. Two subsets of observations were also created because there appeared to be excessive variability in the percentage of land available; As it is shown in table 5.2 the mean and the standard deviation for dependent variable (*Inlwdiver*) are 0.3409 and 0.28733, respectively. It can be seen that *Inlwdiver* presented a long amount of

variability, which suggests different conditions and incentives for the farmers to incentive. From the full set of the observations two subsets of the proportion of land available for diversification were obtained by separating those observations that were equal or smaller than the mean ( $Inlwdiver \leq 0.3409$ ), from those that were greater ( $Inlwdiver \geq 0.3409$ ), this means that in group one we have those farmers with smaller proportion of land available for diversification and in group two we have those with the larger proportions. First group has 29 observation and the second 33 observations. The descriptive statistics for each of the variables used in the complete set of observations are displayed in table 5.2.

As can observe, the variability among the observations is high in many cases, specifically in the variation for the coffee price. Therefore it is important to consider that in the last two years that the coffee price has been increasing, and the government of the state of Veracruz calculated the market price of cherry coffee around \$5.00 pesos per kilo (\$0.45 US dollars per kilo) in 2006, but it is observed that the intermediaries paid less than half of the market price, around \$2.50 per kilo or \$0.18 US dollars per kilo (Morales 2007). The variable *cpricek* varies from 1 to 31 pesos (\$0.09 to \$2.70 US dollar); the mode is \$2.00 and the median is \$6.00 pesos, which is close to the government estimate.

**Table 5.2**  
**Descriptive Statistics of Factors Associated with the Percentage of Land**  
**Available for Diversification in Zozocolco, 2006**

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Ncfplant	62	20.00	2804	1162	603
Inlwdiver	62	0.002	0.97	0.3409	0.287
Agecoff	62	2.00	60.00	18.88	10.81
Gobprgpay	62	0.00	7200.00	967.25	1596.13
Fage	62	24.00	85.00	52.17	13.626
Ystudi	62	0.00	13.00	4.87	3.650
Wincmact	62	40.00	1600.00	310.96	303.48
Cpricek	62	1.00	31.00	6.2 <sup>a</sup>	6.323

<sup>a</sup> The exchange rate is 11 Pesos per US dollar

For the classical linear regression, the dependant variable should be normally distributed; this holds “a priori” because the estimation of the calculated variable was using normal distribution. Besides normality another important assumption is that the variances of the disturbances or error terms are constant (homocedastic). If homocedasticity is rejected, the ordinary least square estimators of the model’s parameters will not be efficient. White’s test was used to check whether this assumption holds, and as a complement, the residuals were plotted. The W chi-square value was smaller than the chi-square critical value at the one and five percent levels (29.10). This means we fail to reject the null hypothesis that the variances of the error terms are constant; that is, the variation is homocedastic. Therefore, the method of ordinary least squares (OLS) was used to run the model, and is expected to give the best estimators, (BLUE). This holds even for the subset models with fewer observations.

The OLS estimates for the linear model for *Inlwdiver* for each of the variables selected in model (5.1) are presented in table 5.3. Due the large difference between the farms reported availability of land for diversification, the complete set of observations has been divided into two subsets and the estimated values are presented in tables 5.4 and 5.4b.

The constant term, or intercept, is weakly significant therefore the variables that are included in the model explain most of the variation of the dependent variable. The variables *Agecoff*, *Fage* and *Ystudi* are not significant, but their sign agree with the theory for the inclusion of all three variables. However, they do not have the impact on the model that was anticipated. The variables *gobprpay* and *wincmact* are weakly significant; still, they are important variables in explaining the farmer's land allocation in the model. For *gobprpay* the negative sign is as predicted; when the farmer receives more transfers from the government, there is a tendency that they will not diversify. Since these programs are for poverty alleviation, if by diversifying the farmer increases his income he will receive less payment from the government, and the farmer will prefer to keep receiving government help than make the change. Thus, this indicator points the opposite way, noted that, as it has been said the programs are not for farming develop. The sign for the weekly income for main activity (*wincmact*) is positive meaning that with lower income the farmer will be more interested in diversifying.

*Ncfplant* is a significant explanatory variable in the model and it has the expected positive sign. This means that the farmer with a greater number of coffee plants is more likely to diversify, due to the intensive farming that they practice. Coffee price (*cpricek*) has the expected sign and it is also significant, which means that, in general, when the

price goes down they will be more willing to diversify. This concurs with the theory. Although the magnitude of the parameter estimate (0.01278) is not very large; it helps explain the behavioral model. When the farmer's income depends mainly on coffee, as the price goes down, the farmer will willing to change from the coffee crop to another option that will give him the necessary income to survive.

The R-square for this model is 0.3209 meaning that portion of *Inlwdiver* variation is explained by all the variables was only 32%. However since the data is cross-sectional it was expected to have a low R-squared value.

**Table 5.3**  
**Parameter Estimates for the Complete Sample n=62 Survey Diprocafe, 2006**

Variable	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	0.27598	0.18046	1.53	0.1320
Agecoff	-0.00078732	0.00317	-0.25	0.8047
Ncfplant	0.00014002	0.00006291	2.23	0.0302
Cpricek	-0.01278	0.00547	-2.34	0.0232
Gobprgpay	-0.00004185	0.00002220	-1.88	0.0648
Fage	-0.00092704	0.00310	-0.30	0.7660
Ystudi	0.00564	0.01134	0.50	0.6209
Wincmact	0.00018720	0.00012115	1.55	0.1282

The sensitivity to change of the land available for diversification to coffee price per kilo was calculated for the model with the complete set of 62 observations. The elasticity is -2.85 which agree completely with the model; this means that for every 1% of decrease in coffee prices, land available for diversification will increase 2.8%.

Tables 5.4 and 5.5 show the two subsets results. It can be observed that the parameters estimates differ considerably and some appear to be less significant. The subset within 33 observations (table 5.4), which represents those farms with a lesser proportion of land available for diversification, (i.e. a greater proportion currently in

coffee), demonstrated an increased constant term compared with the full sample. Also the *t* values for *ncfplant* and *fage*, showed significant and expected signs, but the estimated parameters are quite small. In contrast *cpricek* and *wincmact* are not significant and neither is *agecoff* for this sample subset. *Ystudi* and *gobprgpay* remained weak important.

Table 5.5 illustrates the estimated parameters for the subset with 29 observations those farms with a greater proportion of land available immediately to diversify. In this table it can be observed, the only significant indicator is *agecoff*. This means that, for those with greater portion of land for diversification, age of the coffee plant is very important due to lower expected productivity of older plants. Although the rest of the variables keep their expected sign, none of them is significant. The R-squares for both the subsets are 0.4219 and 0.3490 respectively.

**Table 5.4**  
**Parameter Estimates for the Subset with less than 0.34**  
**Portion of Land Available for Diversification n=33 in Zozocolco, 2006**

Variable	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	0.20299	0.05110	3.97	0.0005
Agecoff	0.00026669	0.00101	0.26	0.7934
Ncfplant	0.00008863	0.00002876	3.08	0.0050
Cpricek	-0.00004383	0.00155	-0.03	0.9776
Gobprgpay	-0.00001105	0.00000660	-1.68	0.1063
Fage	-0.00223	0.00083290	-2.67	0.0130
Ystudi	-0.00370	0.00369	-1.00	0.3263
Wincmact	-0.00002687	0.00003817	-0.70	0.4880

**Table 5.5**  
**Parameter Estimates for the Subset Greater than 0.34**  
**Portion of Land Available for Diversification n=29 in Zozocolco, 2006**

Variable	Parameter Estimate	Standard Error	t Value	Pr >  t
Intercept	0.47519	0.24315	1.95	0.0641
agecoff	0.01141	0.00520	2.20	0.0394
ncfplant	-0.00001327	0.00007338	-0.18	0.8582
Cpricek	-0.01094	0.01115	-0.98	0.3378
gobprgpay	-0.00003544	0.00004780	-0.74	0.4667
fage	-0.00031826	0.00398	-0.08	0.9370
ystudi	0.01299	0.01274	1.02	0.3193
wincmact	-0.00004225	0.00013459	-0.31	0.7567

In order to get a better understanding of the determinants of land available for diversification; the model above has been re-estimated with the same explanatory variables, but using a different specification for the dependent variable. Instead of using the ratio of hectares devoted to coffee over farm size reported it was used farm size measured for operative land calculating of the dependent variable. This specification was expected to have similar results. While the signs were the same for both models, payments from governmental programs (*gobprpay*) appears to be the most important explanatory variable for this model. *Ncfplant*, the number of coffee plants, and *cpricek*, coffee prices, remain important but not significant at a 0.05 significance level. Both, however, demonstrated the expected signs showed the same positive and negative signs respectively (Table 5.6). The R-squared for this model is 29.64.

**Table 5.6**  
**Parameter Estimates for Portion of Land Available to diversification**  
**Using Farm Size Measure, Diprocafe Survey, 2006**

<b>Variable</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>t Value</b>	<b>Pr &gt;  t </b>
Intercept	0.48425	0.19030	2.54	0.0138
agecoff	0.00379	0.00334	1.14	0.2611
ncfplant	0.00010191	0.00006635	1.54	0.1304
Cpricek	-0.00844	0.00577	-1.46	0.1490
gobprgpay	-0.00007413	0.00002342	-3.17	0.0025
fage	-0.00051135	0.00327	-0.16	0.8763
ystudi	0.00369	0.01196	0.31	0.7589
wincmact	-0.00002296	0.00012776	-0.18	0.8581

In general, coffee prices appeared as one of the most important variables that explain how land available for diversification will increase. The lower, the price is, the more is the willingness to diversify. This agrees with the described economic situation of the coffee growers in previous chapters. In the next chapter, the summary, implications, and conclusions, and conclusions will link these results to the description of the farming situation presented in the previous chapter



## **CHAPTER 6**

### **SUMMARY, CONCLUSIONS AND IMPLICATIONS**

#### **Summary**

In the early 1980's, coffee production became one of the main economic activities in Mexican rural areas. Due to government support, coffee was grown extensively, even in areas below the recommended 600 meters above sea level, where the geographical and climatic conditions were not optimal. The Mexican government encouraged coffee growers, to increase output and expand the area under cultivation by giving credits and other facilities. Although the coffee was not good quality, subsidies and high coffee prices contributed economic benefits for the producers, and associated processors and distributors. This distortion made coffee a preferred crop for poor farmers, ensuring a stable income, by these means. However, in the 1990's world overproduction relative to world demand, resulting in prices falling by 50% or more. Prices were lower than the costs of production, affecting the income of millions of coffee growers.

This coffee crisis affected most families in coffee-growing regions around the world, and they could no longer afford the basic living supplies. By this time, Mexican governmental programs were over and the coffee producers, who had planted coffee as their only cash product, were exposed to the fluctuating market prices by themselves, causing a severe impact on their living standards.

At present, the world market demands high quality coffee; so coffee produced under optimal conditions now receives price premiums. Mexico is at a disadvantage,

because, part of the coffee that gets into the market is low quality, there is poor productivity at the farm level, and there is no preference for Mexico's beans in the world market. This is the case for the coffee produced in Zozocolco de Hidalgo, Veracruz, which is produced under the recommended 600 meters above the sea level. Due to low quality coffee; Farmers there receive low prices, affecting their incomes. Zozocolco is an example of community directly affected when the coffee crisis took place. Because of the low quality coffee, their low income does not allow them to meet basic necessities for their families. Government programs that are in the community are not farming programs anymore. At the present time they are mainly poverty alleviation programs.

Due to the coffee crisis, the International Coffee Organization has suggested diversification to other crops as an alternative solution to coffee growers' low income situation. The University of Veracruz, followed this advice and is developing a coffee diversification project in Zozocolco de Hidalgo, where they conducted a survey of 226 farmers.

The research objective was to analyze the socio-economic condition of the coffee growers and the factors that will determine their willingness to diversify their coffee farm into other crops.

By analyzing the survey that Diprocafe conducted, we have established the primary socio-economic characteristics of this community, achieving a better understanding of the coffee growers' living conditions and their willingness to diversify their coffee farms into other crops. However, due to missing data, this study uses only 76 observations from the farm survey that have a record of their annual production and of

coffee and alternatives enterprises. While this sub-sample is smaller than the total 226 observations, it provides the most complete set of data for analysis.

### **Conclusions**

Zozocolco is an indigenous community where the main activity is coffee farming; as in many rural areas, a high proportion of the population is older people. In this community, at least 59% of the farmers have completed primary school. This suggests that farmers would have a better comprehension of the diversification project. In Zozocolco, families have reduced family size to approximately five members, perhaps due to the low income. Non-farm activities are better paying (\$60 per week), than farm activities (\$24 per week), therefore, farmers do not work on the same activity every day.

In Zozocolco, productivity of the farms is very low. The average number of hectares per family is within 1.16 ha. Coffee production averages 700 kilograms per producer. Also yield is decreasing annually because the age of the plants is very old. Around 80% of the land is communal and *ejidal* land. Much of the land held by smallholders is insufficient to work and cultivate for personal consumption. The annual revenue from coffee production that the farmer receives is an average of \$150 per year which hardly covers his production costs.

The land available for agricultural diversification depends mainly on two variables: coffee price which has an estimate negative sign that means that the percentage of land that the farmer will be willing to diversify will increase as the price of coffee declines. This is a strong result, statistically and theoretically, that one of the incentives for alternate crops is the fluctuations of coffee prices. The second variable is the number

of coffee plants which has a positive sign. Farmers with higher numbers of coffee trees on their farm, will be more willing, *ceteris paribus*, to diversify. This means that a farmer who is producing coffee intensively and not getting the revenue expected for it will want to look for alternative crops and continuing to work his land intensively.

After dividing the observations into two subsets the coffee price variations decrease in explanatory importance. The number of coffee plants per hectare remained a significant variable and was greater in magnitude. On the other hand, the farmers' age was a more explanatory variable for the subset with the lesser percentage of land available for diversification. Since it has a negative sign, it means that the older the farmer is, the more he is reluctant he is to changes and to diversify away from coffee. On the contrary, for the subset with the higher percentage of land available for diversification, age of the coffee plant was a better explanatory variable. When a plant is older it is less productive; therefore, it is an incentive to diversification. While previous studies have indicated that higher education is generally an important variable to increase diversification, into other crops, in this research however, education was not significant in any of the models. It is important to recall that Zozocolco is an indigenous community where young people have migrated in their search for education and jobs; therefore the education of the older people that is in the community is not significant.

### **Implications**

The coffee crisis has had a great impact over coffee growers in Zozocolco. Economic well-being of the farm families is the most affected also. Migration appeared as a consequence of the low income in the community, and although the head of the

household has not migrated much, other members of the family have migrated in the search of a job. Eighteen percent of the population that migrated out of the area has crossed the border into the US.

Diversification appears as an option for the farmers in Zozocolco and all those rural areas where the coffee is low quality, since they would not reach the premium prices necessary to get higher revenues. While diversification is possible from an agronomic point of view, it is important to analyze what enterprises will contribute to the farm income. As a first, but reserved, suggestion, vanilla and black pepper are mentioned as possible alternatives. However, the lack of first-hand data with the appropriate information of costs and returns did not allow this research to make any strong recommendation for the community.

This work contributes to the understanding of the coffee grower's characteristics and their incentives to diversify into other crops. Further studies should continue analyzing coffee farmer's opportunities, as well as the other activities that can improve coffee farmers' incomes. Shortcomings of this research, due to the lack of data, were the possibility of analyzing other important factors that will determine diversification such as their relationship to market conditions, location and transport, and commercial production. Also it would have been interesting to analyze the alternatives crops that the farmers' are already growing and compare their coffee income with these other crops. If data would have been available, a benefit cost evaluation would have been interesting in order to be able to make some stronger recommendations.

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## APPENDIX

**Map 4.1**  
**State of Veracruz, Mexico**



**Map 4.2**  
**Community of Zozocolco, Veracruz**

