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Diversification in Low-Grade Coffee-Growing Areas of Veracruz, Mexico: Market Possibilities

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The economic performance and development prospects of many developing countries are largely dependent on commodity exports. The heavy dependence of such countries on a few commodities has an adverse economic impact. Coffee provides a particularly important share of the export earnings of many developing countries. The world market is largely for high-quality coffee; for this reason, a diversification program in Mexico is important to eliminate dependence on coffee with a low rate of return—in this case, coffee grown in Veracruz in areas under 600 meters (nearly 2,000 feet) above sea level. This paper evaluates the potential diversification opportunities for this region, particularly for tropical commodities such as papaya, guava, anthurium, and vanilla.

Many developing countries are heavily dependent on a limited number of commodities—in many cases, commodities with low rates of return. Many such countries are primarily dependent on coffee as the main source of export earnings. This has severe adverse economic consequences for large numbers of growers when coffee prices fall (ICO 2002). In Mexico, those areas growing low-grade coffee—coffee grown at altitudes under 600 meters—are especially vulnerable. This paper evaluates the potential for commodity diversification in the low-altitude coffee-growing areas of Veracruz, Mexico.

Diversification

Diversification is a long-established risk-management tool involving multiple enterprises which are uncorrelated by design (Lyandres 2004). Thus falling prices for one enterprise are offset by rising prices for other enterprises.

Diversification can play a role in reducing a country's dependence on a particular product or commodity (ICO 2002). In agriculture, diversification allows producers to shift among alternative crops (Vyas 1996). Davis and Devinney (1997) maintain that there are three possible types of diversification: shifting from less-profitable to more-profitable crops (horizontal diversification), shifting from farm to nonfarm activities (vertical diversification), and dividing the use of resources among diverse activities (horizontal and vertical diversification). For each, a key condition for success

is that the markets targeted through diversification must be growing and dynamic (CEC 2003).

Vertical diversification refers to moving up the value chain for traditional commodities, resulting in domestic added value. This can involve differentiation through quality or origin in addition to processing. Horizontal diversification allows movement to new commodities such as exotic or organically grown crops for export.

Diversification into nontraditional commodities has been considered an excellent strategy because it involves resources similar to those used for traditional commodities. (CEC 2003) The market for nontraditional commodities has been seen to be more dynamic than that for traditional commodities. Unfortunately, most developing countries exhibit constraints to horizontal diversification because of a lack of marketing expertise in nontraditional commodities, access to financial services, and infrastructure (ICO 2002).

Diversification can be used to minimize the risk of output prices, weather uncertainties, and the like. Agricultural diversification can be designed to aid in the alleviation of poverty and protection of the environment (Hayami and Otsuka 1994).

Coffee-Market Situation

The dominant role of a particular export commodity is a factor that creates rigidity in production which has profound economic, social, and political implications. In some countries, the export concentration index is very high in relation to coffee (ICO 2002).

During the 1980s, coffee became Mexico's most valuable export crop. In 1985, coffee growers pro-

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duced 4.9 million sixty-kg bags at an unusually high price of \$0.90 per kg. As world coffee prices rose further, the government encouraged coffee growers to expand areas under cultivation (COVECA 2002). After 1989 world coffee prices fell 50 percent. Lower prices combined with the elimination of coffee subsidies reduced coffee production, and the income of coffee growers fell approximate 65 percent. Coffee production was only 3.8 million bags in 2000, but rebounded to 4.5 in 2004 (ICO 2005).

At present, Mexico accounts for 3.5 percent of total world coffee production and exports two percent of total world exports. Mexico is the third largest coffee producer in Latin America. In the face of expanding competition, Mexico is at a disadvantage because of low quality when the world market prefers high-quality coffee. The United States is the principal coffee importer, while European demand is growing. Mexico must focus on producing for the expanding specialty coffee markets (BANCO-MEXT 2005).

In Mexico the best coffee is produced in Chiapas, Oaxaca, and Veracruz higher than 600 meters above sea level. Traditionally, coffee plantations were established at an altitude of 1,000 meters. However, this changed when the Mexican government distributed forest land to those who wanted it for cultivation with the understanding that the land could not be sold. As a result, many of the low-altitude (under 600 meters) land-grant farms were planted in coffee. Over 34 percent of the coffee farms are at low altitudes and are unable to produce quality coffee (COVECA 2002). Even though the coffee was substandard, subsidies and relatively high coffee prices provided great benefits to producers and surrounding communities. After the coffee crisis in 1989 support subsidies were eliminated, leaving producers of substandard coffee barely able to subsist. Furthermore, coffee-processing techniques are very heterogeneous, leaving Mexican coffee without a clearly identifiable distinction in the international coffee trade.

The prices in 2002–2003 fluctuated between \$0.01 and \$0.12 cents per kg. In such cases the crop is abandoned because harvest costs cannot be covered. High-quality coffee at premium prices is dependent on altitude, technology, and technique.

Other crops are also grown on 64.5 percent of the coffee plantations in the lower zones. Chief among these are corn, beans, and chili peppers (COVECA

2002). Thus one a solution is to expand horizontal diversification into commodities with economic potential.

Diversification Possibilities

Diversification in Veracruz is promising because of good soils and weather. Based on climate and economic potential, four non-traditional alternative enterprises are identified for evaluation: papaya, guava, vanilla, and anthurium (COVECA 2002).

Papaya

Papaya is a highly nutritious tropical fruit with a pleasant taste. The Mexican papaya market is well-developed based on quality, fresh-market shelf-life attributes, and other uses—for instance, as a meat tenderizer and as a lightening agent for the beer industry (*NewCrop* 2005).

World papaya production has been increasing an average of four percent per year since 1994. In 2004 world production was 6.5 million metric tons. The main producer is Brazil, with 24 percent, Mexico is second, with 15 percent, followed by Nigeria and India (FAOSTAT 2004).

The average yield for the world is 17.7 tons/ha; in Mexico the average is 36.3 tons/ha. The average yield in Veracruz is 30.3 tons/ha (SIAP 2005). Only Brazil has higher productivity than Mexico (FAOSTAT 2004).

The cost per hectare for growing high-quality papaya in Veracruz is approximately \$2,988 (SAGARPA 2003). The cost in Malaysia is much higher because of the propensity for disease, while the cost in India is lower, but with lower quality (FAOSTAT 2004).

Since 1994, world exports have been increasing at a rate of 12 percent per year. At present Mexico exports only 10 percent of its production. In contrast Malaysia exports 90 percent (FAOSTAT 2004).

The main importers are the United States (43 percent), Singapore, the Netherlands, and Germany (FAOSTAT 2004). As a result, the United States will continue to be the principal target market for papaya producers.

The benefits of increased papaya demand are relatively high prices in the international market. Mexican papaya carries a premium price in the U.S. market. The main competitors for Mexico in the U.S. market are Brazil and Belize (USDA, AMS

2004). At present, papaya prices are attractive. In Veracruz the price is about \$0.60 per kg (SNIIM 2005).

Based on 2004 producer prices, average yield, and cost of production, total net income from papaya production in Veracruz is estimated at \$22.4 million. Papaya seems to have good potential as an alternative crop. Yields and disease resistance are good, while consumer demand is growing. The major difficulty is an unsatisfactory transportation infrastructure for marketing.

Vanilla

The plant *Vanilla* is a tropical orchid which grows in a warm, humid environment. It is native to the Misantla valley in Veracruz and is cultivated throughout the tropics for its flavoring extract (SAGARPA 2001).

Total world production in 2004 was 5,478 metric tons. Although world production has increased, production in Mexico has decreased. Indonesia produces 44 percent of world production, followed by Madagascar (28 percent), China (14 percent), and Mexico (3 percent) (FAOSTAT 2004).

China has the highest yield in vanilla production, 6,667 hectograms (hg)/ha. Madagascar, the second-largest producer, has an average yield of only 584 hg/ha (FAOSTAT 2004). In Veracruz the average yield is about 3,570 hg/ha (SIACON 2004).

World exports of vanilla extract have doubled since 1994. Because vanilla extract is an ingredient in many products like essences, liquors, medicines, and the like, countries that export raw vanilla also import processed vanilla extract as an ingredient in other processed products, largely cosmetics, confectionery goods, and beverages. Indonesia is the primary exporter of vanilla extract, chiefly to the United States. Papua New Guinea is the second-largest exporter because it is a major distribution center (Barragan 2002). The United States and France account for 72 percent of the total value of vanilla extract imports (FAOSTAT 2004).

Though Mexico is not a major player in the world vanilla-extract market at this time, 70 percent of Mexican production is exported, mostly in raw form, 90 percent of which goes to the United States. At the same time, Mexico imports 57 percent of its processed vanilla-extract needs from the United States (SNIIM 2005).

The recent approximate annual value of vanilla-

extract imports to the United States from Mexico was \$35.6 million, at a price of \$20 per kg for black vanilla (USDA, FAS 2002). This price was higher than the average for all U.S. vanilla-extract imports. Prices in Veracruz have been higher than overall Mexican averages (SNIIM 2005).

Pure vanilla is one of the most expensive spices on the market (Barron 1999), and producers in Mexico, especially in Veracruz, appear poised to take advantage of this lucrative market. A government program in Veracruz is facilitating the introduction of new technology to more efficiently produce vanilla extract (COVECA 2003).

Anthurium

Anthurium is an exotic plant with colorful flowers and decorative heart-shaped leaves that is used in flower arrangements. The weather, altitude, and shade trees of the coffee areas in Veracruz are beneficial to the cultivation of anthurium and other flowers (COVECA 2002).

At present, Holland is the world's main producer and trade mediator of cut flowers, with 68 percent of the world market, followed by Colombia with 16 percent. In Holland the yield is 36 tons/ha (Flower Council of Holland 2004). In Mexico the yield for anthurium is about 10 tons/ha (SIACON 2004).

The United States is the second leading importer of anthurium. Mexico is the third-largest exporter to the United States, accounting for four percent (USDA - ERS 2004). The advantages for Mexico are transportation cost and preferential tariffs under NAFTA.

Anthurium is one of the most-demanded cut flowers (just behind roses and orchids) because of its color and longevity (FCH 2004). The trend reflects an increasing demand for better-quality cut flowers (USDA - ERS 2004).

Since cut flowers are an esthetic commodity, the market is subject principally to preferences. Consumers are always seeking more-exciting varieties. Anthurium, an exotic flower, is well-positioned for this market. However, changing preferences can make the demand for certain flowers change quite dramatically as consumers follow new styles in flower arrangements (Halloran 2000). Thus the anthurium market can be risky.

Veracruz is ideally suited for commercial floriculture given its diversity of climates. However, improved technology must be adopted to increase

yields, a must in order to compete with established leaders.

Guava

Guava originated in Mexico and Central America. It is a very adaptable crop which blooms throughout the year even in mild-winter areas (*NewCrop* 2005).

Until 1996, guava had limited importance to the Mexican economy, representing only 2.8 percent of the total value of fruit production. Since 2000, guava has gained importance as a fresh and processed fruit. The primary producers are Brazil (also one of the top exporters in the world), Pakistan, Egypt, Mexico, the United States, Malaysia, and Peru. Guava yields have been higher in Brazil and the United States than in Mexico. However, since 1996 yields have improved in Mexico through the application of advanced technology (ASERCA 2000).

In recent years the world demand for guava has increased substantially for fresh consumption and as an ingredient in beverages, yogurts, jams, baby food, and processed ethnic foods. Fresh consumption has increased noticeably in the EU, especially in Germany, France, and England. Exports to the

United States were prohibited in 1989 because of sanitary regulations but shipments resumed in 1998. Most guava production in Mexico (80 percent) goes for domestic consumption, of which about five percent is used for traditional handmade candies. Approximately 20 percent goes to the export market for uses described above (ASERCA 2000).

Though Mexico faces intense competition in the world market for guava, domestic consumption has continued to rise in recent years. Thus it would seem that the opportunities for producers in Veracruz lie in the domestic market. Prices for good-quality guava have continued to rise in recent years (SNIIM 2005).

Comparison of Alternative Enterprises

Table 1 shows net income and components by commodity for the State of Veracruz in 2004. Papaya has by far the highest net income of the alternative enterprises due to level of production. Anthurium is second, primarily because of favorable prices. Third is vanilla, followed by guava.

Table 2 shows the mean, standard deviation, and coefficient of variation of rural average annual prices in Veracruz from 1995 to 2004 by commodity

Table 1. Cost and Revenue by Alternative Enterprise, Veracruz, 2004.

Product	Cost per ton (\$)	Rural price per ton (\$)	Production (tons)	Total cost (\$1000)	Total revenue (\$1000)	Net income (\$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

Source: SIAP and Floricultores de Veracruz S.A. de C.V.

Table 2. Price-Risk Measures by Alternative Enterprise, 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

(prices for anthurium are limited to 1999 to 2004). The coefficient of variation in table 2 is a measure of relative risk in terms of producer prices. With this measure, vanilla is by far the most risky enterprise, largely because of wide variations in quality. Anthurium is the least risky, followed by guava and papaya.

Conclusions

It is important to note that rural diversification is a much more encompassing process than simply finding alternative enterprises for producers. The process also involves establishing new marketing and processing activities that affect the overall rural economy.

For crop diversification in Veracruz, papaya shows real promise, with good revenue potential and relatively low price risk. In addition, the required technology is in place and the papaya market shows upward potential. Vanilla also shows promise, with high income potential due to increasing consumer demand. However, price risk is a tempering factor. Relatively large price variation can be overcome in this case with greater emphasis on quality control. In terms of price and price risk, anthurium appears to exhibit excellent potential. However, caution is in order in that stylish cut flowers are subject to demand-preference changes as styles change. The implication is to consider further cut-flower diversification. The potential for guava appears limited to the domestic market until yields improve sufficiently to be competitive in the world market.

The main reasons for diversification are to increase producer income and stimulate rural development. The evaluation of commodities in this paper represents the beginning of an ongoing process to identify dynamic commodities for economic enterprise in the low-altitude coffee-growing areas of the state of Veracruz, Mexico.

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