

The Potential for Small-Holder Fruit and Vegetable Production in Mexico: Barriers, Opportunities, and an Alternative Model

To be presented at the Tri-National Research Symposium: NAFTA and Agriculture: Is the Experiment Working?, November 1-2, 1996, San Antonio, Texas. Sponsored by Texas A & M University and CIESTAAM, Autonomous University of Chapingo, Mexico.

Robin R. Marsh and David Runsten*

October 1996

* The authors are agricultural economists and senior research associates with the North American Integration and Development (NAID) Center, School of Public Policy and Social Research, UCLA . Research for this paper was carried out with the financial support of the UCSD Center for U.S.-Mexican Studies' Ejido Reform Research Project, the Bank of America Foundation, the Kellogg Foundation, and the Ford Foundation. The authors would like to express their appreciation for this support.

I. INTRODUCTION

Since the announcement by the Government of Mexico (GOM) of its *Programa Nacional de Modernización del Campo, 1990-1994* in 1990, the signing of the NAFTA accord on January 1, 1994, and most recently with the launching of *Alianza para el Campo* in October 1995, its stated agricultural strategy has been to promote the diversification of agricultural production from basic grains to higher value crops and animal production, with special emphasis given to fruits and vegetables. The justification hinges on the GOM intention for inefficient grain producers, under world market prices, to become efficient through "technification" or by shifting into alternative activities that better utilize their resources. Increased U.S.-Mexican agricultural investment and trade were expected to encourage this transition.

In this paper we address the social or *ejidal* sector, and its potential for diversification into fruit and vegetable production. There are several hundred thousand ejidal producers currently growing fruits and vegetables, most of them on a small-scale, and there is potential for many of these producers to expand and diversify further given the right conditions. There is also potential for ejidal grain producers with good quality land and access to water to shift, at least partially, into fruits and vegetables. Such diversification or intensification, however, entail overcoming a difficult policy environment. We highlight the need for producer associations to form reliable partnerships with U.S. and Mexican firms to overcome the principal barriers identified.

Research for this paper was conducted using a case study methodology. Our intention has been to identify actual examples of participation by ejidal small holders in both fresh and processed fruit and vegetable production, and analyze the range of conditions that have led to their relative success or failure. Previous research relationships with U.S. and Mexican firms and producer associations as well as diversity in geographic location, crops produced and institutional arrangements (i.e. partners, financing, marketing) were considered in case study selection. Two case studies were presented recently at the conference on *Post-NAFTA Policies and Investment in Mexican Agriculture*, UCLA, September 27, 1996 (Mission Produce, Inc. & Monterey Mushrooms). Table 1 lists the eleven cases with brief information on basic characteristics.

The paper is divided into four sections. Section II presents a brief overview of U.S.- Mexican fruit and vegetable trade and investment and provides preliminary figures on *ejido* participation from the SARH/SRA/CEPAL 1990 and 1994 surveys. Section III analyzes the principal barriers and opportunities for diversification into fruits and vegetables facing *ejidatarios*, citing examples from the eleven case studies. In the last section, we present an alternative model of how to overcome these barriers as a means to increase small holder participation in fruits and vegetables.

Table 1: Summary Characteristics of Case Studies

CASES	STATE	MIGRA - TION AREA	DISTANCE TO PAVED RD (aver.)	PARTNERS		SOURCES OF FUNDING	CROPS	IRRIGATIO N
				US	Mexican			
DEL CABO COOP.	Baja California Sur	no	0.5 km	✓		U.S. partner, U.S. banks self-financing	organic basil, tomatoes (other vegs.)	“cheap drip”, pumped water
MISSION PRODUCE, INC.	Michoacán, Monterrey, Oxnard	high	on road	✓		U.S. partner, U.S. banks growers - self-financing	avocado, mango, lime	flood, sprinkler, drip
MONTEREY MUSHROOMS	Guanajuato (SMA), Watsonville	medium	on road	✓		U.S. partner, U.S. banks	mushrooms (fresh, canned)	in-door, fully controlled production
LA HUERTA	Aguascalientes Zacatecas	high	0.2 km		✓	processing plant self-financing	broccoli cauliflower	furrow pumped water
VALLE DE SANTIAGO a. fresh broccoli	Guanajuato	medium	0.5 km	✓		U.S. buyer, migration remittances, self-financing	fresh broccoli	same as above
b. frozen broccoli	Guanajuato	medium	0.5 km		✓	processing plant, migration remittance, self-financing	frozen broccoli	same as above
IRAPUATO STRAWBERRY COOP.	Guanajuato	low	1.0 km	✓		U.S. buyer self-financing	strawberries	same as above
MAYA FRUT/ JALAPENOS DEL CARIBE	Quintana Roo	no (except Cancún)	3.0 km		✓	FIRA/commercial banks fresh shipper processing plant	chiles (habaneros, jalapeños)	furrow plus drip, pumped water
YUCATAN (Akil) a. citrus	Yucatán	no	variable		✓	Gov. of Mexico Banco Int'l, BANRURAL self-financing	oranges	mostly no
b. local vegetable prod.	Yucatán	no	on the road		none	Gov. of Yucatán self-financing	tomatoes, chiles, cilantro, radishes	“cheap drip” pumped water
UNION DE CREDITO PUEBLA : peaches “Acajete”	Puebla Estado de México	low	3 km		none	unión de crédito/ BANRUR-AL, self-financing (petition in for SEDESOL \$)	peaches (traditional, improved)	no irrigation

UNION DE CREDITO PATZCUARO: potatoes	Michoacán	high	7 km		none	UC/BANRURAL/FIRA self-financing	potatoes (traditional, improved)	no irrigation (residual humidity)
MICHOACAN: blackberries	Michoacán	high	variable	✓	✓	UC/BANRURAL/commercial banks/FIRA, SEDESOL remittances, self-financing	blackberries (<i>zarzamora</i>)	furrow and drip pumped water

Table 1 (cont).

CASES	TECHNICAL ASSISTANCE	EST. COST. OF PROD/ha. (1995)	TYPE OF ORGANIZATION	MARKETS	VALUE ADDED		
				Local/national/exports	None	Grading/packing	Processing
DEL CABO COOP.	U.S. partner, Mexican hired agronomists	N.A.	SSS (Sociedad de Solidaridad Social)	export		✓	
MISSION PRODUCE, INC.	U.S. partner (processing), Mexican agronomists (fresh)	N.A.	contract farming	national, export		✓	✓
MONTEREY MUSHROOMS	U.S. partner ("state-of-the-art" technology)	N.A.	wholly U.S. owned production farm, joint venture with cannery	national, primarily export (U.S., Japan)		✓	✓
LA HUERTA	processing plant agronomists	NM 9,000.00	none	local, national, export			✓
VALLE DE SANTIAGO	U.S. buyers	NM 13,000.00	contract farming	export		✓	
a. fresh broccoli							
b. frozen broccoli	processing plant agronomists	NM 9,000.00	contract farming	export			✓
IRAPUATO STRAWBERRY COOP.	U.S. buyers (in the past) traditional knowledge	NM 15-20,000.00	cooperative (formerly under CNPH control)	export			✓
MAYA FRUT/JALAPENOS DEL CARIBE	shipper hired agronomist/ focus on IPM	NM 5,000.00 (trad.) NM 14,000 (full technology)	Asociación en Participación	local (fresh), national (processed), export (fresh & processed)		✓	✓

YUCATAN (Akil) a. citrus	Plan Chac, Gov. of Mexico, SARH (in the past)	NM 3,000.00 (non-bearing), NM 5,000 (bearing)	Unión de Ejidos	export (frozen juice)			✓
b. local vegetable prod.	Technical University (Yucatán), State gov.	no info.	none	local (all fresh)	✓		
UNION DE CREDITO PUEBLA : peaches "Acajete"	SINAPROM, S.A. (tech. assistance agency ass. with UC Puebla)	NM 19,000 (establishment + 1 st year management)	SSS (some also members of UC Puebla)	local, national	✓		
UNION DE CREDITO PATZCUARO: potatoes	UC agronomists large potato farmer/input vender	NM 10,000 (local var.), NM 14,000 (improved var.)	failed effort to form asos. en part., some members of UC Patz.	local	✓		
MICHOACAN: blackberries	U.S. buyers/Mexican distributors nurseries in Uruapan	NM 40-70,000.00 (establishment through 1st harvest)	some members of UC Pátzcuaro	local (fresh), export (fresh & processed)		✓	✓

IIa. OVERVIEW OF U.S.-MEXICAN HORTICULTURAL TRADE AND INVESTMENT

Mexico plants around 1 million hectares to fruits and vegetables annually, or 3.5 to 4.0% of total agricultural land (Cook et al 1991, Gómez Cruz 1994). About 80% of production is sold in domestic markets, and the remaining 20% is exported (USDA/ERS 1995). Mexico has been an important supplier of U.S. fresh vegetables for many years, contributing about 10% of total supply and over 70% of total imports (USDA/NASS). U.S. fruit imports are more diversified, with Mexico contributing about 6% of total supply and 16% of imports (*ibid*). After the 1994 peso devaluation, there has been a surge in Mexican horticultural exports to the U.S.. Between 1994 and 1995, the quantity of fresh or frozen vegetables increased 30.5% from 1,393 to 1,817 thousand MT, while the value increased by 19.6%, from \$991 to \$1,186 million dollars (USDA/ERS 1996). The increases were 31.3% and 34.4%, respectively, for fresh or frozen fruits (*ibid*), and the upward trend continues in 1996. Horticultural production for export is concentrated on private farms in the irrigated agricultural districts of the Northwest, however, there are important regions of export production in Central and Southern Mexico as well, where small and medium-size growers are concentrated.

NAFTA was expected to spur U.S. investment in Mexican industry and agriculture, create jobs, and help to lift Mexico out of its economic stagnation. In fact, the record on direct foreign investment (DFI) in Mexico from the U.S. has been disappointing, particularly in the agricultural sector. The latest SECOFI estimates show a decline in DFI in agriculture from \$6,121 thousand dollars in 1994 to \$4,983 thousand in 1995. The share of total FDI in 1994-96 going to agriculture was under 1% (SECOFI 1996). Investment in horticulture occupied 75% of the total, mirroring the importance of this sector in Mexican exports to the U.S. A small part of that investment involves partnerships with ejidatarios, with examples provided in our case studies, however, there is enormous potential for far greater U.S. investment as barriers to the profitability of such partnerships are overcome.

IIb. EJIDO SECTOR PARTICIPATION IN FRUIT AND VEGETABLE PRODUCTION

There are about 2.6 million ejidatarios in Mexico that farm individual parcels, not including those that habitually rent their land. They farm approximately 15 million hectares of land; 11.7 million ha, or 78% , rainfed and 3.3 million ha, or 22%, irrigated (SARH 1992a). As shown in Table 2, an estimated 4.2% and 2.6% of total ejidal cultivated land was planted in fruits and vegetables in 1990, respectively. Of a total of 26,091 ejidatarios surveyed, 4,003 or 15% were producers of fruits and vegetables. Extrapolating to all ejidal producers with 10 hectares or less (a plausible cut off point for small and medium farmers), the national total comes to slightly over 320,000 producers (Table 3).

Table 2: Fruits and Vegetables in the Ejidal Sector

	Fruits			Vegetables		
	Figures on fruits	% of sector	% of irrigated sector	Figures on vegetables	% of sector	% of irrigated sector
# of DDRs	151	79.0	n.a.	162	85.0	n.a.
Production (1,000 mt)	3,600	n.a.	n.a.	2,400 ¹	n.a.	n.a.
Area (ha)	625,000	4.2	18.9 ²	384,000 ³	2.6	11.6 ²
Producers (#)	202,000	8.2	31.7 ⁴	182,000	7.0	28.5 ⁴
Average cultivated area (ha)	2.5			1.7		
Average yields	63% of national average			57% of national average		

Source: This table was created using data from the Proyecto SARH/CEPAL documents: *Clasificación y Grados de Diversificación de los Distritos de Desarrollo Rural por Cultivo*, Julio de 1992, and *Primer Informe Nacional sobre Tipología de Productores del Sector Social*, Tercera versión, Junio de 1992. Data for these documents came from the SARH/CEPAL Survey, 1990.

² According to SARH data (Gómez Cruz 1994), in 1991 total Mexican production of "hortalizas" was 8,501 thousand mt, so that, from the SARH/CEPAL survey data above, approximately 28% was produced by the ejidal sector.

² Fruits and vegetables are grown on rainfed land as well, so these figures are on the high side. If only 70% of fruits were produced on irrigated land, the figure would decrease to 13.3%; if only 80% of vegetables were produced on irrigated land, the figure would decrease to 9.3%.

³ According to SARH data (Gómez Cruz 1994), in 1991 total Mexican cropland in "hortalizas" was 550,000 ha, so that, from the SARH/CEPAL survey data above, approximately 70% is grown on ejidal land.

⁴ See note 2. If only 70% of producers of fruits and 80% of producers of vegetables had irrigated land, the figures in both cases would decrease to 22% of the irrigated sector.

Table 3: Preliminary data on fruit and vegetable producers and area by state: 1990 SARH/CEPAL *ejido* survey

<i>State</i>	<i>all producers < ejido survey</i>	<i>all ejido survey</i>	<i>c/b</i>	<i>c/b in descending</i>	<i>c/b x a</i>	<i>irrigated ha</i>	<i>rainfed, ha</i>	
Aguascalientes	12,905	129	33	0.26	B.C. Sur	3,301	45	0
Baja California	6,899	96	29	0.30	Colima	2,084	75	0
B.C. Sur	1,749	116	70	0.60	Yucatan	1,055	114	2
Campeche	19,370	613	104	0.17	Quintana Roo	3,286	88	67
Chihuahua	55,654	1,220	117	0.10	Baja California	5,337	72	74
Coahuila	42,477	410	19	0.05	Nayarit	1,968	20	3
Colima	7,394	160	78	0.49	Aguascalientes	3,605	115	19
Durango	55,889	712	40	0.06	Veracruz	3,140	54	9
Guanajuato	79,044	519	42	0.08	San Luis Potosi	6,397	28	17
Guerrero	130,521	1,370	236	0.17	Tabasco	22,484	106	189
Hidalgo	117,407	1,086	58	0.05	Michoacan	6,270	78	12
Jalisco	86,844	1,033	69	0.07	Puebla	5,801	60	35
Est. de Mexico	194,397	2,011	143	0.07	Morelos	13,823	110	59
Michoacan	120,621	1,670	330	0.20	Guerrero	23,835	324	115
Morelos	29,599	133	24	0.18	Campeche	5,341	14	14
Nayarit	42,987	527	157	0.30	Oaxaca	12,806	83	132
Nuevo Leon	27,353	367	37	0.10	Sonora	2,758	28	18
Oaxaca	285,047	3,230	444	0.14	Zacatecas	39,183	370	283
Puebla	143,650	1,416	257	0.18	Nuevo Leon	26,072	239	186
Queretaro	30,553	593	55	0.09	Chihuahua	2,834	57	18
Quintana Roo	23,313	549	187	0.34	Queretero	7,941	75	144
San Luis Potosi	105,871	1,332	296	0.22	Guanajuato	23,527	284	121
Sinaloa	79,959	769	51	0.07	C. Lagunera	5,303	45	29
Sonora	18,376	577	65	0.11	Est. de Mexico	2,070	119	7
Tabasco	38,602	505	100	0.20	Tamaulipas	7,644	31	136
Tamaulipas	37,880	751	53	0.07	Jalisco	2,673	64	5
Tlaxcala	34,640	445	24	0.05	Sinaloa	1,868	13	13
Veracruz	195,073	1,899	462	0.24	Durango	47,459	229	409
Yucatan	49,350	781	319	0.41	Tlaxcala	20,157	300	179
Zacatecas	70,545	772	82	0.11	Hidalgo	7,493	79	15
C. Lagunera	38,363	300	22	0.07	Coahuila	2,813	21	3
TOTAL	2,182,332	26,091	4,003	0.15		320,330	3340	2313
				max: .60			0.59	0.41

Table 3 presents the ejido survey data by state. The proportion of fruit and vegetable producers varies from a high of 60% in Baja California Sur to a low of 5% in Coahuila, Tlaxcala and Hidalgo. The five states with the largest number of ejidal fruit and vegetable producers are: Veracruz, Oaxaca, Puebla, Michoacán and San Luis Potosí. Nearly 60% of their land in fruits and vegetables is irrigated; 40% is rainfed (mainly orchards and farms located in the humid tropics).

Using the Gómez Cruz estimate of a total of 550,000 hectares planted in vegetables¹ in 1991, it is evident that ejido participation is very high, about 70%. However, in terms of volume of production, the share is much lower. Taking the SARH figure of 8,501 thousand metric tons of vegetables produced in 1991, the contribution by the ejidal sector was only 28% in that year (2,400 thousand mt.). This is confirmed by the yield data presented in Table 2, showing that ejido average yields were just 63% and 57% of national average yields for fruits and vegetables, respectively. The reasons for this disparity are explored throughout this paper.

III. BARRIERS AND OPPORTUNITIES FOR SMALL PRODUCER PARTICIPATION IN DIVERSIFICATION

Information gathered from the eleven case studies listed in Table 1 was analyzed to identify the leading barriers and opportunities for small-holder participation in fruits and vegetables, grouped under the following themes: marketing, undercapitalization, technology and extension, transaction costs, labor migration and costs, and cultural factors.

Marketing

Many of the problems that small producers face in a transition to fruit and vegetable production lie in the marketing system. Ejidatarios repeatedly demonstrate that they can learn to produce such crops, but can they sell them at a profitable price? Demand for horticultural products increases with higher incomes and health concerns, and is now temporarily depressed in Mexico and subject to saturation and declining prices in U.S. markets for the major crops. Small Mexican producers, in particular, need access to up-to-date information on off-season and niche market opportunities that compete less directly with U.S. supply, as well as “market intelligence” on domestic and regional markets. Unfortunately, efforts by the Mexican government to assist small producers have been largely confined to the sphere of production.

Lack of regulation and recourse in transactions.

There are many examples of opportunistic behavior by intermediaries in fresh fruit and vegetable

¹We have no similar data for total area and production of fruits.

marketing, and this is as true of brokers in U.S. markets as it is of Mexican intermediaries. Small producers far from markets, without a truck, are dependent on intermediaries to purchase their crop *a pie de la huerta* (at the farm gate). Oranges in Veracruz, avocados in Michoacán, carrots in the Bajío, and chilies in many regions are all examples of crops where such intermediation is dominant. Although this type of marketing can be convenient for small producers, it leaves them vulnerable to low prices and, in the case of sales "on credit," to not getting paid at all.

The lack of an effective legal system of recourse in such transactions in Mexico, such as the Uniform Business Code and the Perishable Agricultural Commodities Act in the United States, leads to mistrust and opportunistic behavior on both sides. Mexican growers at times take advances from intermediaries but spend them on unrelated goods, or take advances from one buyer and then sell to another. U.S. partners have complained about producers renegeing on supply contracts to sell to domestic buyers when Mexican demand and prices are high. If small producers are to succeed in fruits and vegetables, more formal advance and payment arrangements need to become the norm.

Lack of transport and volume.

Most small producers lack trucks of sufficient size to transport products to wholesale markets, and they lack the volume individually to justify purchasing such a truck. This single fact gives rise to the controlling position of market intermediaries. The profitability of such intermediation varies greatly, as the intermediary faces perishability and market price risks. Nevertheless, our studies of price differentials indicate that "truck farming," where producers are able individually or through their organizations to deliver their produce directly to wholesale markets on a regular basis, holds the most immediate promise for raising producer incomes. Prices are generally two to three times higher if producers can truck their produce directly.

Different qualities for different markets require grading and packing.

Typically, small producers mix together produce of different size, maturity, and quality because of small volumes. The convention is to pay the price for the worst produce in the bunch. As a result, ejidatarios do not receive the total revenue their produce warrants, and intermediaries capture this revenue through their own grading and selection efforts. Simple packing houses can add value to produce with minimal investment.

Lack of information about market supply, opportunities and prices.

Probably the greatest problem for ejidal fruit and vegetable production is the lack of information about market opportunities. Since these producers have no experience with how markets really function, they do not understand the premiums paid for quality differentiation and attractive presentation. Mexican

produce markets are in the midst of an enormous transformation, as increasing amounts of produce are sold directly to supermarkets, and with increasing post-NAFTA competition from U.S. and Chilean imports, especially as the Mexican economy recovers. Small producers will have difficulty participating in this evolving system unless they have access to adequate market intelligence, and unless they organize to sell through marketing cooperatives to appropriate distributor partners.

Small producers need to organize to reduce market risk.

There are scale advantages in fresh fruit and vegetable production, as larger producers or *producer associations* can often negotiate better prices and be in the market more days of the year, thereby reducing their vulnerability to price fluctuations. They also have established contacts with wholesalers in Mexico's largest markets, or with export handlers, while small producers working alone have difficulty breaking into these markets.

Undercapitalization

Most *ejidatarios* and *minifundistas* are badly undercapitalized, as are most small businesses everywhere in the world. This undercapitalization presents a major barrier for transition from basic grains to higher value crops. For instance, in mid-1995 maize cost NM\$2,500 or less per hectare, while broccoli cost NM\$9,000, potatoes NM\$14,000, strawberries NM\$30,000 and the estimated cost of establishing a blackberry orchard was NM\$40,000 to 70,000 per hectare. The costs for *ejidatarios* may be less because of reliance on family labor, less intensive planting and lower use of inputs than recommended, but often with negative yield and quality outcomes. To shift from maize to more intensive crops therefore requires a major leap in financing.

Limited credit availability.

As a result of the higher costs involved in growing fruits and vegetables, access to credit is often essential. Yet, in Mexico today with the bank liquidity crisis and tightened regulations, sources of credit for agriculture generally are extremely limited. BANRURAL, once an important lender to *ejidatarios*, now requires collateral equal to 1.5 to 2 times the value of the loan and does not accept *ejidal* houses or land certificates, putting these producers at a distinct disadvantage. Commercial interest rates have come down in 1996 (between 35% and 45% nominal, 8% and 18% real, Sept. 1996), but are still too high for agricultural operations with relatively small profit margins. However, opportunities exist with the agricultural development fiduciary, FIRA. Through its guarantee program, FEGA, FIRA will pay up to 80% of the value of the required guarantee at a minimal cost to eligible low-income producers. FIRA also discounts interest rates to CETES (treasury) levels (31%, Sept. 1996).

Other sources of funding are becoming more prevalent.

As a result of limited credit availability and high interest rates, in the 1990s small farmers have been relying increasingly on other sources of financing for both traditional and alternative higher-value crops. Such sources include government no-interest loans and investments through *Solidaridad*; PROCAMPO payments; advances made by buyers to cover a portion of production costs (market-linked credit); advances made by processors and other types of contractors; informal lending at very high rates of interest; and, perhaps most importantly, self-financing through retained earnings, migration remittances and family money. Among our eleven case studies, seven are examples of production fully or partially financed by advances from the contracting firm both for fresh produce and processing.

Strawberries in Irapuato are typically self-financed, as are the water and labor costs of the Del Cabo vegetable growers in Baja California Sur. Savings from remittances along with retained earnings from avocado and peach operations have financed new blackberry plantings in Michoacán. Such cases of self-financed transition to higher value crops are common throughout Mexico, and represent an alternative to indebtedness and associated risks. There is a danger, however, that reliance on self-financing will maintain the producer at an undercapitalized level of investment, leading to deteriorating yields and quality, and difficulties competing in the larger markets.

Technology and Extension

Ejidatarios who have traditionally produced grains and want to diversify into fruits and vegetables to obtain higher incomes, have likely had little or no experience in production of these crops, except perhaps at the *traspatio* (home garden) level. As mentioned earlier, their lack of knowledge of market conditions that should drive production decisions is even greater. Large producers hire professional experts to advise them, but small producers generally lack the funds or scale for contracting technical assistance on an individual level. Moreover, even when the producer is willing to pay for such assistance, there is a notable dearth of Mexican agronomists skilled in fruit and vegetable production. These inadequacies in R&D investment and knowledge, and understanding of dynamic market conditions, seriously hinder Mexico's ability to compete in global markets.

The government has cut back agricultural research and is out of extension.

INIFAP continues to carry out agricultural research but with severely reduced budgets and personnel. There is still a bias in Mexican agricultural research toward basic grains, and neglect of public research in horticulture. Many successful fruit and vegetable operations in Mexico, both large and small, rely on transferred technology from the U.S., both through joint ventures and returning migrant farmers. Among our eleven cases, six rely at least partially on technology transferred by U.S. partners.

Extension services have essentially been privatized through the establishment of technical

assistance agencies, or *despachos*, throughout the country, run primarily by agronomists formerly employed by the government. These *despachos* have been least successful in the center and south of Mexico where farmers are poorer, less organized, and not accustomed to pay for technical assistance.

Appropriate technology for small producers in transition.

For ejidatarios to be competitive they may need to play to their strengths in labor intensive activities. Where family labor is available for fruit and vegetable cultivation, and its opportunity cost is below the going rural wage, such producers can enjoy a significant cost advantage over large producers. In addition, contractors have found that the quality of family labor may be superior to hired labor for certain tasks, such as the monitoring of water needs and pest populations, and specialized harvesting operations. Ideally, small farmers need the opportunity to combine their own knowledge base of local crop conditions with appropriate innovations to produce high quality produce. Furthermore, the over 300,000 fruit and vegetable growing ejidatarios in Mexico cover a wide range of microclimates and soil types, opening up a wide range of opportunities for specialty crop production.

The success of the Del Cabo cooperative of small-scale producers of organic vegetables and herbs for export, in cooperation with organic farmers from California, or groups of small coffee growers producing organic coffee, or avocado, lime and mango production in Michoacán for export through Mission Produce, suggest important niche markets exist that can be accessed through an appropriate technological and marketing strategy. However, this type of strategy requires "strategic alliances" with partners able to impart this knowledge on a consistent basis.

Transaction Costs

A significant barrier to participation by small producers in fruit and vegetable production are the transaction costs incurred in dealing with them by other actors in the system. U.S. firms claim that "doing business" in Mexico involves higher transaction costs generally due to inefficiencies in infrastructure, communications, input supply, etc., which are magnified when working in more isolated areas or with large numbers of small and medium producers. Such costs need to be measured and accounted for in profitability calculations. In some cases, firms (or NGOs, foundations) will absorb these higher costs for a few years, expecting a pay-off in the longer-term.

Loans to small producers cost more.

For a bank to make many small loans, it must be able to charge higher rates of interest to cover higher per unit handling costs. The failure to do this in Mexico led to the near bankruptcy of BANRURAL and the great reduction in formal credit available to ejidatarios today. The cost of credit to small borrowers

in informal markets is usually orders of magnitude higher. As the phrase goes, "*No hay crédito más caro que crédito que no hay.*"²

Contracting with small producers costs more.

In our research we spoke with vegetable processors in the Bajío who were reluctant to contract with small-scale ejidatarios because of the transaction costs. One processor who had decided to no longer work with small producers offered the following list of costs: more technical assistance needed, and no phones, requiring more trips to their fields; need to loan or rent specialized machinery such as rototillers or high-pressure sprayers; must advance them more inputs, tying up capital; monitoring for pesticide violations more important; smaller trucks coming to the plant requires more time to weigh and unload; and more producers under contract mean higher accounting and administrative costs. Nevertheless, among our case studies a number of firms have been able to reduce transaction costs through working with organized producers, and to account for such costs in the prices they pay producers. La Huerta in Aguascalientes expanded its contracting with ejidatarios because large growers in that region were less willing to grow broccoli or cauliflower on a reliable basis. Also, the ejidatarios proved themselves to be good producers, having higher yields, perhaps 20 percent higher, than the firm's own ranches. The firm organized a cost-effective system of delivering technical assistance involving weekly visits by the firm's agronomist. Other firms have devised different types of contracts that attempt to recover some of the transaction costs associated with working with large numbers of ejidatarios.

Labor Migration and Costs

The ability of the family farm to compete by accepting lower-than-market prices for its labor and assets is well known. Lower labor costs in farming and processing continues to be a prime incentive for U.S. firms to seek joint ventures or wholly owned operations in Mexico. However, ejidal households have complex insertions into the labor market and often wear several hats that constrain their ability to operate as full-time farmers.

Migration may be a primary labor constraint.

Ejidos in many parts of Mexico are heavily impacted by migration to other parts of the country or to the United States. There is a well-known tendency for young men to migrate, thus removing the most productive laborers from the village. Therefore, the notion that ejidos have surplus labor available for more labor-intensive crops is often unfounded. It is not unusual that outside labor must be hired to carry out ejidal

² No credit is more expensive than no credit at all.

production and the cost of this labor may actually be higher than the cost on nearby large commercial farms. On the positive side, migration often provides remittances that can be invested in the operating costs of fruit and vegetable production or in purchasing a truck, tractor or additional land.

Cultural Factors

There are historical and cultural factors that strongly influence both the willingness and ability of traditional maize producers to seriously undertake diversification into higher value crops. Even when the climatic and agronomic conditions are favorable for such diversification, many producers are reluctant to change their traditional practices. This is partially a function of educational levels and the historical paternalistic relationship with government and local *caciques*. Ejidatarios have not been encouraged to improve their lot through agricultural entrepreneurship, but rather to accept the benefits provided by government and to maintain the status quo. Larry Jacobs of Del Cabo says that "transforming campesinos to businessmen" is perhaps the greatest rural development need in Mexico today.

Biases can be overcome through organization.

There is a need for small fruit and vegetable producers to organize themselves to overcome the biases and limited opportunities they face as individuals. It is clear that through organization such producers can reduce their input, credit and technical assistance costs, and improve their negotiating power for obtaining better prices and payment arrangements. However, historical and cultural factors also explain a generalized reluctance in the ejidal sector to work cooperatively. The common desire to do everything independently will have to be overcome or many small producers will not survive, especially in fruit and vegetable production.

IV. AN ALTERNATIVE MODEL FOR DIVERSIFICATION OF EJIDAL AGRICULTURE.

Though it is certainly possible for individuals to diversify into fruit and vegetable production without any assistance or without being part of an organized project or group, it is likely that leaving small producers to "market forces" will tend to exclude them from sustained profitable alternatives, for many of the reasons discussed above. Therefore, it is important to identify a range of options for mobilizing resources to promote such diversification, overcoming the obstacles that currently exist.

Among these options are partnerships with larger farmers, agribusiness firms and distributors - Mexican and foreign-based - as well as associations with credit unions, economic development NGOs (e.g. FMDR), and cooperative groups of ejidatarios. These joint partnerships are needed to access markets, financing, and technology, and provide the seed money - the first push - to make the project happen. We propose a sketch of one possible model for the development of diversified ejidal fruit and vegetable production, based on experiences from our case studies:

1. **Identify sustainable opportunities.** Agribusiness projects that have good potential for development or expansion need to be identified. Such potential depends upon land, water and labor availability, the interest of producers in the project, their disposition toward organization, and, perhaps most important of all, market opportunities.

2. **Conduct a market study early on.** We have found a continuing tendency to focus on production rather than marketing. Therefore, prior to the organization and production stage, it is essential to search for profitable markets, whether local, national or international. Funding must be sought to carry out this type of demand and market intelligence.

3. **Design a marketing strategy.** If there is good market potential, the next step is to design a strategy for fully exploiting that potential. It will almost certainly include a means to increase the value of the produce through selection, grading and packing, which may well require establishing a packing house, as well as opportunities for meeting niche demand for specialty crops, producing off-season to realize higher prices, and dual product marketing (fresh/frozen).

4. **Organize the producers.** We have argued that partners dealing with small producers face high, often unanticipated, transaction costs which can discourage firms from associating with smaller producers. Moreover, small producers face major institutional barriers accessing credit, technical assistance, and market information. Organization into producer associations that reduce transaction costs while ensuring higher and more reliable volumes of production is key for overcoming these barriers. Organizations also serve to pool risks and smooth prices over time.

5. **Obtain start-up capital.** Once the marketing strategy has been designed and the producer is organized, start-up capital will be required for the intended fruit or vegetable project. We have acknowledged the scarcity and high cost of formal credit for small farm projects. Nevertheless, there are a variety of other possibilities for acquiring start-up capital, including advances by processors and buyers, capital supplied by partners, government programs (*Alianza*, FIRA), non-governmental credit sources (credit unions, FMDR, ANADEGES, other NGOs), and self-financing from remittances and retained earnings. High levels of indebtedness should be avoided because of the inherent riskiness of growing fruits and vegetables, and ejidatarios' generally limited capacity to repay.

6. **Produce with adequate technical assistance.** High quality, sustained technical assistance is crucial to the success of commercial fruit and vegetable production, especially for farmers with little experience growing these crops. It is critical that this assistance be market-driven in terms of varieties, quality standards and phyto-sanitary regulations, be delivered on the farm, and be sufficiently long-term for farmers to adequately validate and adopt the techniques.

7. Start small and plan growth. Even when a fruit and vegetable production project starts off well, there are many pitfalls that lie in the way of sustained success over time, calling for the development of a medium-term business plan. One critical aspect is planning for growth, keeping in mind the advantages of starting small, but also addressing the optimal scale requirements of packing or processing operations. It is quite common that successful small agribusinesses, involving an extended family or one or two villages, go awry when allowed to grow too fast in size and debt.

CONCLUSION

We do not maintain that more intensive agriculture, such as fruit and vegetable production, is a solution for all ejidatarios. In fact, probably only about 15% of ejidatarios (\approx 320,000) have land, water and labor conditions that would permit viable operations, and many of those are probably not inclined to become competitive farmers. Furthermore, demand for many commodities is fairly well saturated in both domestic and foreign markets limiting the opportunity for profitable expansion. Nevertheless, there is a significant group of small holders in Mexico that could survive, compete and prosper through diversification if the obstacles addressed in this paper were overcome.

We believe that the social rate of return of supporting small-holder participation in commercial agriculture is high and the economic rate of return is positive in the medium to long-term. However, for small-holders to make a successful transition to more intensive, remunerative agriculture, it is crucial that the GOM recognize, as governments have recognized around the world, the need for favorable opportunities in both the private and public sectors that ease the initial higher costs and risks inherent in this transition. Facilitating a dynamic, entrepreneurial campesino sector will pay off in beneficial multiplier effects throughout rural Mexico that exceed the benefits of the neo-liberal model where fruit and vegetable production is left to large producers hiring seasonal farm workers.

REFERENCES AND SELECTED BIBLIOGRAPHY

Abler, David G. and Daniel Pick. "NAFTA, Agriculture, and the Environment in Mexico". *Amer. J. Agr. Econ.* 75 (August 1993). 794-798.

Bivings, Leigh, and David Runsten. Potential Competitiveness of the Mexican Processed Vegetable and Strawberry Industries. Report to the Ministry of Agriculture, Fisheries and Food, British Columbia, July, 1992.

Bullman, Doug. Monterey Mushroom Operating Experience in Mexico. Presented at the Conference on Post-NAFTA Policies and Investment in Mexican Agriculture, NAID Center, UCLA, Sept. 1996

Cook, Roberta L., Carlos Benito, James Matson, David Runsten, Kenneth Shwedel, and Timothy Taylor. "Implications of the North American Free Trade Agreement for the U.S. Horticultural Sector", in *American Farm Bureau Research Foundation, NAFTA: Effects on Agriculture, Volume IV*, Park Ridge, Illinois, 1991.

Cook, Roberta L. and Kenneth Shwedel. *Mexico Frees Up Investment in Agriculture*. Washington, D.C.: U S Department of Agriculture. 1992.

Coordinación General de Desarrollo Agroindustrial (CODAI). *El desarrollo agroindustrial y los sistemas alimentarios básicos: legumbres y hortalizas*. Documentos Técnicos para el Desarrollo Agroindustrial, No. 4. México, D.F. : Secretaría de Agricultura y Recursos Hidráulicos. 1982.

Dutrenit Bielous, Gabriela y Alexandre Oliveira Vera-Cruz. "Las Asociaciones en participación, camino para modernizar el campo". *Comercio Exterior*. 42:6. 1992.

Fuller, Stephen W. *The U.S.-Mexico Free Trade Agreement: Agricultural Transportation Issues*. Texas Agricultural Market Research Center Report. Department of Agricultural Economics, Texas A&M University. Research Report No. IM-7-91. 1991.

Girault, Antoine. *La organización de productores minifundistas en la producción de hortalizas en el Estado de Puebla*. CIESTAAM Reporte de Investigación No. 15. Chapingo: Universidad Autónoma Chapingo. 1993.

Gómez Cruz, Manuel Angel and Rita S. Rindermann. *México en el mercado hortícola mundial*. Algunos datos . CIESTAAM. *Comercio Exterior*. April 1994.

Gómez Cruz, Miguel Angel, Rita S. Rindermann, y Alejandro Merino Sepúlveda. *La producción de hortalizas de México y el Tratado de Libre Comercio con EUA y Canadá*. CIES TAAM Reporte de Investigación No. 6. Chapingo: Universidad Autónoma Chapingo. 1991a.

_____. *El Consumo de Hortalizas en México*. Chapingo: Universidad Autónoma Chapingo. 1991b.

Jacobs, Larry. *The Investment/Production Opportunities & Obstacles for Small Growers in Mexico*. Presented at the Conference on Post-NAFTA Policies and Investment in Mexican Agriculture, NAID Center, UCLA, Sept. 1996.

Marsh, Robin and D. Runsten, "Del Traspatio a la Exportación: El Potencial para la Producción Campesina de Frutas y Hortalizas en México." In *Nuevos Procesos Rurales en Mexico, Vol. I*, UNAM, Instituto de Investigaciones Sociales, México, D.F., México, October 1995.

Runsten, David, and Linda Wilcox. *Demand for Labor, Wages, and Productivity in Mexican Fruits and Vegetables: Preliminary Estimates and Implications for NAFTA*. Paper presented at LASA, Los Angeles, September, 1992.

SARH/Subsecretaría de Política Sectorial y Concertación (SPSC). *Proyecto de Tipología de Productores del Sector Social: Diseño Estadístico de la Encuesta*. SARH/INEGI, México D.F., 1989.

SARH/SPSC. *Primer Informe Nacional sobre Tipología de Productores del Sector Social*. Proyecto SARH-CEPAL, Junio de 1992a.

SARH/SPSC. *Clasificación y Grados de Diversificación de los Distritos de Desarrollo Rural por Cultivo*. Proyecto SARH-CEPAL, Julio de 1992b.

SRA/CEPAL/UC Berkeley. *El Sector Ejidal en la Agricultura Mexicana: Impacto de las Reformas, 1990-94* (draft report). University of California, Berkeley. December 1994.

SECOFI (Secretaría de Comercio y Finanzas). *Dirección General de Inversion Extranjera*. Investment tables , January-June, 1996.

Stanford, Lois. *Mexico's Fresh Fruit and Vegetable Export System: Recent Developments and Their Impact on Local*

Economies. Working Paper No. 12. Fresh Fruit and Vegetables Globalization Network. University of California, Santa Cruz, 1991.

USDA/ERS. NAFTA: Year Two and Beyond: A Report by the NAFTA Economic Monitoring Task Force. April 1996.

USDA/ERS. U.S.-Mexico Fruit and Vegetable Trade, 1970-92. Agricultural Economic Report Number 704, by Susan L. Pollack and Linda Calvin. April 1995.

USDA/NASS (National Agricultural Statistics Service). Tables on horticultural production and trade, 1993.

USDA/ERS. Agriculture in a North American Free Trade Agreement: Analysis of Liberalizing Trade Between the United States and Mexico. Foreign Agricultural Economic Report No. 246. September 1992.