

Ten Years with NAFTA:

A Review of the Literature and an Analysis of
Farmer Responses in Sonora and Veracruz, Mexico



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Abstract: This report reviews recent literature regarding impacts of the North American Free Trade Agreement (NAFTA, launched in 1994) on maize and wheat farming in Mexico. A basic overview of maize and wheat production in Mexico is provided, along with a characterization of farming households. This is followed by descriptions of the economic conditions and period of domestic reforms in Mexico, of NAFTA reforms themselves (including predicted results and actual impacts in Mexico), of programs in Mexico to lessen negative impacts of economic liberalization, and of NAFTA in terms of US international trade policies. The final sections present case studies of NAFTA's impacts on wheat production in the Yaqui Valley, state of Sonora, and on maize production in the Totonacan region of Veracruz State, southeastern Mexico. The results suggest that cooperation and diversification have helped some farmers cope with economic changes under NAFTA.

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Part I. Another Look at NAFTA: The View from Mexico

More than ten years after its implementation, with pressure mounting from both farmers who seek to reform it and policy makers who hope to extend similar trade agreements across much of the western hemisphere, the impacts of the North American Free Trade Agreement (NAFTA) have been undergoing re-examination.

NAFTA is much touted as an example of the beneficial impacts of trade liberalization on both developed and developing country economies, a claim supported by data indicating growth in the manufacturing industry in Mexico and increased trade in agricultural goods in both Mexico and the United States. However, critics of NAFTA contend that increased income stratification, high levels of migration, and the multitude of farmers facing a flood of subsidized imports with which they cannot compete indicate the failure of NAFTA to raise Mexico's standard of living and level of economic development.

Mexico is considered a middle-income country and one of the wealthier Latin American nations, but this impression is based largely on disaggregated poverty statistics, which can give a misleading picture about welfare. While from 2000 to 2002 it appears that the percentage of poor people has been decreasing (SEDESOL 2003), there remain islands of extreme poverty in rural areas (Hodson, personal communication).¹ Moreover, income inequality has been on the rise since NAFTA took effect, as the top 10% of households have increased their share of national income, while the remainder have seen no change or have lost their income share (Audley et al. 2003). As will be emphasized in this report, it is important to keep in mind this income disparity and how it is reflected on a regional basis within Mexico. The differences in available resources

combined with disparities in farmers' socioeconomic status have greatly shaped the way farmers have responded to changing economic conditions under NAFTA. In some ways, NAFTA has augmented existing disparities.

Local conditions greatly influence the ways in which farmers are impacted by and respond to NAFTA, but studies in particular regions of Mexico can provide insight into situations confronted by similar types of farmers.² In many states, particularly in southern Mexico, farmers grow maize on small plots for home consumption or for sale in local or regional markets. Production is frequently done with manual and animal traction, and fertilizers and pesticides are applied as much as household incomes will allow. According to recent estimates, 40% of Mexican farmers produce under these conditions (Nadal 2000). While there is also income stratification in northern Mexico, private landowners frequently have much larger land holdings. In addition, agricultural production is often mechanized, industry-oriented, and reliant on both chemical inputs and irrigation. Along with differences in the style of agricultural production, the relationship of farmers to the international market varies by region. Farmers in northern states are often more directly impacted by price changes in agricultural commodities, because many of the products they grow are for export. Farmers further from the border who do not export their

¹ Dave Hodson is currently leading efforts in the area of poverty mapping at CIMMYT, Int. See a draft report of his research findings <http://www.cimmyt.org/gis/povertymexico/>.

² NAFTA has had disparate impacts on Mexican farmers. The case studies presented in this report were selected to provide examples of different types of farmers working under contrasting production conditions, on crops of different cultural and economic significance for Mexico. While these "glimpses" into the lives of farmers in Sonora and Veracruz cannot speak for the experience of all Mexican wheat and maize farmers, they may provide insight into the situations of farmers in other regions of Mexico who face similar production conditions.

produce may feel certain indirect impacts of NAFTA, particularly in terms of increased difficulties in marketing produce due to competition from imported products. These generalizations help to illustrate why NAFTA might affect different kinds of farmers in different ways and underline the need to examine various contexts to understand the overall impact of NAFTA on Mexico's agricultural sector.

This report begins with a review of recent literature regarding NAFTA's impacts on agriculture, particularly maize and wheat farming. A basic overview of maize and wheat production in Mexico is provided, along with a characterization of farming households. This is followed by a description of the economic conditions and period of domestic reforms in Mexico, which prefaced and greatly influenced the outcome of NAFTA. The next chapter focuses specifically on NAFTA reforms, their predicted results, and a more detailed analysis of the actual impacts—both short- and long-term—across various sectors of the Mexican economy. Included is a description of some programs designed to alleviate the impact of economic liberalization and a discussion of NAFTA in terms of US international trade policies.

One of the most important questions raised throughout this report regards the effect of NAFTA on different kinds of farmers. In their efforts to understand the response of Mexicans to NAFTA, Wise et al. (2003) noted that communities, civil society organizations, and local governments in Mexico have developed effective strategies for managing their relationship with the world economy, including seeking out market niches and participating in collective action to confront market-driven policies. Specific strategies employed by Mexican farmers are explored in the case studies presented in the third and fourth chapters. The first details the impacts of NAFTA on wheat production and the developing market for fruit and vegetables in the Yaqui Valley, state of Sonora, in northern Mexico. The second study examines NAFTA's effects on maize production in the Totonacan region of Veracruz State, southeastern Mexico, and farmers' strategies to confront changes in maize grain prices. The case studies suggest that cooperation in the production of basic grains and diversification—either into non-traditional crops or into products derived from basic grains—have helped farmers cope with economic changes under NAFTA.

Various approaches were used to assemble the information in this report. For the literature review, information came from analyses and progress reports of the World Bank, the North American Commission for Environmental Cooperation (CEC), and the Economic Research Service of the United States Department of Agriculture (USDA). Primary data were drawn from the Foreign Agricultural Trade of the US (FATUS) database supported by USDA. The report also presents analyses of primary data from a wide range of academic sources, research institutions (such as the International Food Policy Research Institute, IFPRI), and advocacy organizations such as Oxfam. Throughout the literature review, an attempt was made to draw upon both English and Spanish language sources and to look at literature that represented a wide range of perspectives on both the benefits and the drawbacks of international trade agreements, and of NAFTA in particular.

The case studies were written using information from published reports, along with 45 days of field research carried out between October 2003 and May 2004.³ Many site-specific insights on production were derived from the author's participation in a survey on gene flow conducted by CIMMYT in November 2003 in five Mexican states.⁴ During this survey, the state of Veracruz was selected for further research, in part because the local division of maize production between commercial and household uses provided insight into NAFTA's impacts from both producers' and consumers' viewpoints. Within Veracruz, the area surrounding the municipality of Coyutla was identified as a major center of trade in maize husks, while Jáltipan was selected as an area with more active participation in the trade of maize grain. The Yaqui Valley in Sonora was selected as a contrasting research site because it provided an example of intensive wheat production in close proximity to the US border. In addition, CIMMYT and Stanford University have co-produced a substantial body of work on economic and environmental changes in the Yaqui Valley over the last several decades, which served as an important resource for understanding the conditions faced by farmers.

³ See chapters for additional information regarding source materials.

⁴ In press.

During field visits to Veracruz and Sonora, over 50 semi-structured interviews were carried out with a range of actors from government, civil society, and farm communities. Interviews were conducted with representatives of the Mexican Secretary of Agriculture, SAGARPA, and government bodies established to manage NAFTA-related assistance programs. To obtain information about commodity chains for basic grains, representatives from agro-industries were interviewed, along with retailers and marketing intermediaries. Interviews were also carried out with managers and members of farming cooperatives, as well as with individual farmers. Three focus group discussions were conducted with farmers in Coyutla and Jálitpan, Veracruz, focusing on farmer participation in trade for maize grain and maize husks. While these regionally-focused studies are not representative of the experiences of all farmers in Mexico, the literature review and case studies presented here provide both an overview and a more focused examination of the ways in which international trade legislation has shaped the decision-making and livelihood strategies of a subset of Mexican maize and wheat farmers.

This report is intended for researchers and policy makers interested in the themes of trade liberalization, agricultural production, and social welfare. Analyzing the impact of NAFTA and the domestic reforms that took place prior to NAFTA's implementation is an important undertaking, because it can provide insights into Mexico's current economic situation and help answer lingering questions, including why Mexican farmers have not made the transition to crops for which they are supposed to have a competitive advantage, and what livelihood strategies farmers are adopting in the face of economic change.

The issues addressed in this report are not solely of relevance to Mexico and the United States. Mexico's experience with NAFTA can provide lessons for other countries seeking to support a development agenda within the framework of trade liberalization. Anticipating the welfare effects of trade agreements, such as Central American Free Trade Agreement (CAFTA) and the Free Trade of the Americas Agreement (FTAA), is an important task for all future trade partners, particularly countries with higher rates of poverty than those of Mexico. Policy-makers in

such countries can learn from the experience of Mexican farmers under NAFTA, working with farmers to support alternative livelihood strategies and creating the kinds of domestic infrastructure necessary to protect social welfare.

Maize and Wheat Production in Mexico

Mexico is the center of origin of maize, as well as a center of maize diversity. Maize is by far the most important crop in Mexico, both in area sown and for its cultural and subsistence roles. At the time of the NAFTA negotiations, maize production accounted for 60% of land under cultivation and a similar proportion of agricultural output by value, and was a source of livelihoods for over three million producers (Nadal 2000). Treated in folk cosmologies as the origin of the human race, maize is deeply integrated in Mexico's food culture and linked with Mexican cultural identity. Those who cultivate maize often consider it to be a way of life, not simply a livelihood. Farmers have maintained thousands of maize populations over centuries, conserving the traits that enable local varieties to tolerate adverse environmental conditions and that make them suitable for diverse uses.

Maize was afforded special status under NAFTA because of its key economic, cultural, and livelihood roles. Mexican farmers grow both improved and local varieties. The latter are named by farmers and recognized for specific traits (Bellon 1996; Smale and Bellon 1999). The genetic composition of local varieties is in constant flux, as farmers frequently cross them with improved varieties and hybrids or with other local varieties. The resulting genotypes do not always exhibit uniformity, stability, or distinctiveness, which are the qualities required in the designation of varieties by the Union for the Protection of New Varieties of Plants (UPOV) (1991).

Maize is the dominant crop in most of southern Mexico, where areas of high poverty and subsistence farming are concentrated. The type of maize most commonly consumed as food in Mexico is white maize, which generally has a fine texture and high flour content. However, farmers often plant multiple varieties of maize with distinct names and traits. In Mexico, yellow maize is used most frequently in animal feeds.

Mexico has two distinct sectors of trade for maize grain. Local maize varieties, which are an important staple in Mexican diets, are not necessarily traded commercially, but on a local or regional basis. Commercial maize production involves hybrids, both white and yellow, and takes place mainly in the northern states, particularly Jalisco and Sinaloa, in areas characterized by larger land holdings, irrigation, better infrastructure, and favorable growing conditions. As in many parts of the world, white maize has a higher market value than yellow maize, by as much as 25% (FAO and CIMMYT 1997; Matus and Puente 1990). NAFTA negotiations did not consider this price differential, a fact that has had important consequences for Mexico's small-scale maize farmers. In addition to distinct sectors for maize grain, there are also special markets for maize as forage and for maize husks, which are used in the preparation of tamales.

Wheat is of increasing importance in Mexico, particularly in the north, where most of the crop is produced. Most wheat is sold on commercial markets for use in processed foods: packaged breads and sweet rolls, as well as diverse products available fresh from corner bakeries (biscuits, rolls, sweet rolls). As in many developing countries, wheat consumption in Mexico has increased with urbanization (Rudiño 2004) and can carry connotations of economic status. Government subsidies of rustic rolls called *bolillos* have helped increase wheat consumption. In some areas this kind of bread is one of the cheapest things to buy, costing as little as a peso per roll.

Despite growing consumption, wheat production in Mexico has never reached the level of importance it enjoys in other countries, due in part both to the regional nature of production and the continuing importance of maize. Another factor has been the periodic outbreaks of the disease karnal bunt (*Tilletia indica*), to which bread wheat is particularly susceptible. This has limited exportation of Mexican bread wheats and led phytosanitary authorities to quarantine infected plots. Many farmers have switched to more resistant crops, such as durum wheat or barley. Finally, the scarcity of water in recent years has accelerated the transition to alternative crops. Barley for example not only requires less water than wheat, but also fetches high prices from the Mexican brewery industry.

Maize and wheat productivity and production systems have undergone many changes since the implementation of NAFTA (Figures 1 and 2). Levels of production have remained relatively steady, but changes in the structure of support and in market prices have interacted with cultural and environmental factors to transform the way the crops are produced, the types of farmers who grow them, and the crops' roles in household livelihoods.

Characterization of Farming Households

Because NAFTA has affected different kinds of farmers in different ways, it is important to describe the various types of Mexican farmers. The most common typologies, based on farm size and production level, do not precisely

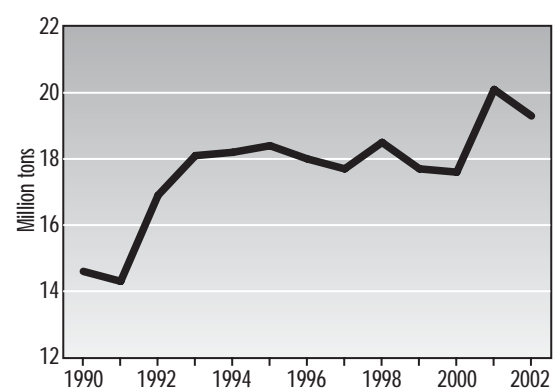


Figure 1. Maize production, Mexico, 1990-2002.

Source: SIACON, SAGARPA, Mexico

* 70% of annual production is from the spring/summer cycle

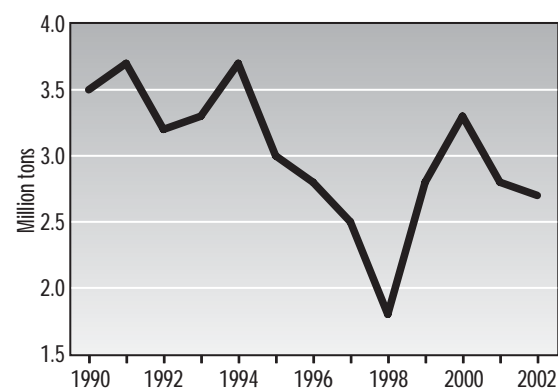


Figure 2. Domestic irrigated wheat production, Mexico, 1990-2002.

Source: SIACON, SAGARPA, Mexico

describe all farmers, but provide a way to look at the impact of economic reforms on roughly defined categories of producers.⁵ One of the classic typologies uses the area of land owned to characterize Mexican farmers as infrasubsistence, subsistence, equilibrium, or surplus producers (CEPAL 1982; Masera Cerruti 1990). This typology was updated using data from a 1991 agricultural census, shifting the focus from land ownership to the amount of grain produced (Bellon, personal communication).⁶ The typology was developed to describe maize producers, but can provide a general way to look at all Mexican farmers.⁷ The new schema classes farmers as deficit, equilibrium, surplus, or commercial producers (Table 1). Deficit producers are those who produce less than 1.5 tons of grain and regularly fail to meet their household requirements through agricultural production.⁸ Equilibrium producers grow between 1.5 and 3 tons of grain, which covers their household consumption needs most of the time. Surplus producers produce 3-10 tons of grain, and regularly have quantities left over for local or regional sales. Commercial farmers produce more than 10 tons of grain and make a living through the sale of agricultural produce. De Janvry et al. (1995) use a similar classification system to examine the impacts of NAFTA on the *ejido* sector,⁹ emphasizing the differences between

maize sellers and categories of non-sellers, including traditional non-sellers (deficit producers), non-sellers with livestock, and non-sellers with diversified crop holdings.

Another recent typology classifies farmers into commercial, intermediate, or subsistence producers (Nadal 2000). According to Nadal, who also used the 1991 census for his calculations, the first category comprises farmers who use improved varieties and fertilizers and who produce under both rainfed and irrigated conditions. Because of their advantages in farm size, access to resources, and occasional political ties, farmers in this category may have the capacity to switch production to more profitable crops under the incentives created by NAFTA. Intermediate farmers have smaller plots and a higher percentage of rainfed land. These farmers have more limited potential to modernize their production to compete with imports. The final category is the subsistence farmer. While these farmers produce mainly for household consumption, contrary to the connotation of subsistence farming, they do not exist in isolation from markets. Because they commonly rely on outside sources of income, sell small quantities of surplus grain, and purchase basic inputs, they are affected by price changes and market shifts such as those caused by NAFTA.

Table 1. Characterization of Mexican farmers.

Farmer type	Average crop yields per hectare	Capacity to adapt to economic change
Commercial	>10 tons	High – access to physical capital and resources, ability to experiment or change market strategy, occasional political connections
Surplus	3-10 tons	Medium – some access to resources, options greater depending on ability to organize to obtain credit, extension, and physical capital
Equilibrium	1.5-3 tons	Low – lack of resources for inversion, low levels of organization
Deficit	< 1.5 tons	Low – lack of resources for inversion, low levels of organization, resort to wage labor and migration

⁵ The last comparable data collected are from the 1991 Census. Therefore, while these farmer typologies still provide relevant categories, the percentages of farmers that pertain to each category have changed, in part due to economic reforms such as those related to NAFTA. Developing estimates that accurately describe the economic position of Mexican farmers will continue to be a struggle, until more recent household and agricultural data are collected.

⁶ See Bellon, Hodson, Flores (2003) unpublished First Progress Report: Project "The Determinants and Consequences of Gene Flow in Maize Landraces and Implications for the Livelihoods of Mexican Farmers". CIMMYT: Mexico.

⁷ Some categories do not fit as well for non-maize crops. For example, it is questionable whether there are subsistence wheat producers in Mexico.

⁸ In this case, a rural household was assumed to have an average of 4.5 members, a figure derived from the Encuesta Nacional de los Ingresos y Gastos de los Hogares (ENIGH) in 2002.

⁹ The *ejido* sector was established in the process of land redistribution that took place following the Mexican Revolution. (see p. 6 for further detail)

Defining a Context for NAFTA: Domestic Reforms

NAFTA was implemented when Mexico was attempting to regain control of an economy beset by low growth and high inflation. Important domestic changes were made to address economic stagnation and reduce the role of government support in agricultural production. Domestic policy changes and economic shocks augmented and occasionally overshadowed the impacts of NAFTA, making it difficult to identify direct causal relationships.

The domestic policy reforms introduced in Mexico during the 1980s were designed to revive the economy following the macroeconomic crisis that began in 1982. These reforms addressed the high levels of government intervention in the economy and in the agriculture sector in particular. Starting in 1983, the de la Madrid administration undertook the reform of the National Basic Commodities Company (CONASUPO), a state-trading agency that provided price supports to staple producers. Starting in the 1980s and continuing through the early 1990s, price supports provided by CONASUPO were removed for most crops. In addition, CONASUPO's participation in markets for oilseeds, maize, and beans was reduced, and consumer subsidies for bread and maize tortillas were diminished. In 1991, the Agricultural Marketing Board (ASERCA) was created to substitute for CONASUPO's participation in the sorghum and wheat markets. ASERCA created a program for wheat and sorghum that refunded to farmers the difference between the international price and a regionally-specific, pre-estimated "indifference price" (Yúñez-Naude 2001).

Given the political sensitivity surrounding maize and beans, crops essential to Mexican food security, the process of withdrawing support from maize and bean production was carried out incrementally. Up through 1994, the Agricultural Council established guaranteed prices for maize and beans. The relative security afforded by this guaranteed price for maize and beans made them much more attractive to farmers, leading to expansion in areas of commercial production through the early 1990s (de Ita 2003). In 1995, after the peso devaluation, price supports were eliminated and CONASUPO began to phase out its purchases of domestic production (Yúñez-Naude 2000; Yúñez-Naude and Barceinas 2002; Dyer-Leal and

Yúñez-Naude 2003). Starting in 1996, due to decreasing international prices for maize, Mexico reinstated various schemes of intermediate price fixation. However this lasted only until 1999, when CONASUPO was abolished entirely.

Other domestic reforms that took place during this time involved the divestment of government enterprises, which had mushroomed across all sectors, growing to 1,155 firms in 1982. These were privatized or eliminated, rapidly dropping down to 280 firms by 1990 (Johnson 1997). As a result, parastatals producing fertilizers, seeds and other inputs were shut down. Public extension services were eliminated, with the expectation that private delivery would replace them. Management of irrigation districts was gradually transferred to water user associations, with the introduction of increased fees, and water rights made transferable (Johnson 1997). Furthermore, the government undertook an extensive reorganization of the financial sector and eliminated credit subsidies. One of the chief financial institutions providing credit to farmers, BANRURAL, was dissolved, again with the expectation that commercial banking would fill the gap in credit provision (Yúñez-Naude and Barceinas 2002).

In 1992, the Constitution was amended to liberalize property rights in the ejido sector, established during the land redistribution that took place following the Mexican Revolution. This reform enabled *ejidatarios*—those holding ejido lands—to rent and sell their land, with the goal of promoting direct private investment and enabling farmers to participate in the private credit market (Appendini 1992). The change in land rights caused many landowners to rent their lands, resulting in greater land concentration, but creating little of the desired incentive for direct investment (de Ita 2003).

All of these changes together had a profound impact on farmer access to services and inputs. There was a sharp downturn in agricultural growth after 1986, which was the consequence of the decline in public investment, falling prices for crops, and rising production costs associated with the removal of subsidies. The loss of profitability in maize induced a series of adjustments among ejidatarios, who extensified their maize production as credit availability reduced access to purchased inputs (de Janvry et al. 1994). In addition, many ejidatarios began to participate in the labor market and in seasonal migration.

Perhaps most importantly, the revoking of government support and infrastructure for agriculture meant that farmers had little flexibility in accommodating the impending NAFTA reforms, which were intended to improve the efficiency and productivity of the agricultural sector.

These changes in domestic policy formed the backdrop of the measures that were implemented under NAFTA. While NAFTA was seen by Mexican policy makers as the continuation of a process of economic liberalization that had already begun, much of the capacity of farmers to cope with changes and benefit from the opportunities provided by NAFTA was undermined by the loss of infrastructure and available resources.

In 1994, the Mexican peso collapsed, leading to a recession that reduced the purchasing power of Mexican consumers. US agricultural exports to Mexico decreased sharply, while Mexican exports to the US rose substantially. The Peso Crisis and subsequent recession skewed many of the macro-economic indicators collected in 1995, making it difficult to ascertain the initial impact of NAFTA policies. For example, between 1994 and 1995, total exports of fresh and processed fruits plummeted from US\$197 million to US\$91 million (ERS/USDA 2002). However, 10 years later, with domestic reforms and the Peso Crisis situated in a historical context, it has become possible to study longer-term impacts of NAFTA reforms on the Mexican economy, in particular on the agricultural sector.

Part II. NAFTA Reforms and their Aggregate Impact

In 1986, Mexico became a full member of the General Agreement on Tariffs and Trade (GATT), but no major reforms were undertaken at that time in the structure of agricultural support, and support prices for surplus growers remained above international prices.

During the 1990s the Salinas administration began to integrate the agricultural sector into the process of liberalization that was occurring in other sectors of the economy. In 1994, Mexico became a member of NAFTA, which consisted of two separate agreements between Mexico and Canada and between Mexico and the United States. The idea behind the agreement was that, through dismantling trade and investment barriers, the flow of commerce and levels of foreign direct investment would increase. Mexico expected to gain from an inflow of investment to the manufacturing sector and the development of industries involved in assembly for export. While the consequences for the agricultural sector were more difficult to predict, some researchers (Nadal 2000; Yúnez-Naude and Barceinas 2002) hypothesized that:

- Agricultural imports and exports would increase due to the reduction of tariff and non-tariff barriers. Increased competition resulting from the opening of markets would lead to falling prices and growth in overall trade levels.
- The elimination of industrial protection would lead to a reduction of prices for agricultural inputs and physical capital.
- Trade liberalization would improve resource allocation, efficiency, and agricultural productivity. Liberalization was expected to discourage commercial maize agriculture in irrigated areas that lacked a comparative advantage for maize production. Instead, Mexico would shift into the production of goods such as fruits and vegetables, for which its farmers had a comparative advantage.
- Farmers producing importable goods would lower their costs to compete and the least productive farmers would shift out of agricultural production. The process of structural change would increase rural out-migration,

and surplus laborers would be absorbed by growth in the manufacturing sector.

- Consumers would benefit from the reforms by obtaining lower prices on goods such as tortillas, which had previously received government subsidies.

Analysis by financial institutions such as the World Bank concluded that agricultural protection in Mexico introduced significant distortions and large fiscal costs, along with providing substantial infra-marginal rents to better-off agricultural producers. Therefore, economic liberalization was expected to create substantial gains in efficiency. However, it was also recognized that there would be skewed distributional impact of agricultural liberalization and that interventions were required to protect those who lost out within the adjustment process (Levy and van Wijnbergen 1994).

A number of policy analysts predicted a catastrophic shock to farmers associated with the price reductions of maize under NAFTA. Many thought that subsistence maize growers would be hardest hit by reforms. Some models predicted that Mexico's maize output would decline as much as 20% and that as many as 700,000 Mexicans would leave the rural sector (Levy and van Wijnbergen 1994). As a result, subsistence growers and landless workers would suffer job losses and lower wages, and migration levels both within Mexico and to the United States would increase. To adjust to these changes, farmers faced two choices: either diversify toward non-traditional field crops and fruits and vegetables, or modernize production to obtain higher yields. Particularly with the loss of government support for agriculture, both options were restricted to farmers with sufficient resources to make the necessary investments in their own production systems.

NAFTA Reforms

NAFTA took effect on January 1, 1994. The agreement called for the elimination of tariffs on most basic crops in Mexico, Canada, and the United States. For crops of national importance, tariff-rate quotas (TRQ) were established, so that the transition to liberalization and adjustment to international prices would take place more gradually. A TRQ is a quota for a volume of imports at a favorable tariff. After the quantitative limit is reached, a higher tariff is applied on additional imports. Under the TRQ arrangement, each country is required to gradually expand each quota, while phasing out the associated over-quota tariff. In Mexico TRQs were established for the maize, dry beans, and barley, among other crops. The TRQ schedule for maize was particularly gradual; with an initial quota set at 2,500,000 tons, the quota was to expand by 3% per annum over a period of 15 years, which meant that not until 2008 would maize be traded freely. In addition, special safeguards were devised to offer added protection against import surges. Along with these reforms, a concerted effort was undertaken to make markets in each of the participating countries more accessible.¹⁰

To mitigate some of the distributional effects of NAFTA reforms, Mexico established a program called PROCAMPO. This was intended to provide a compensatory income transfer to producers of basic crops, including maize, beans, rice, wheat, sorghum, barley, soybeans, and cotton. According to Sadoulet and de Janvry (2001), "...the objectives were political (to manage the political acceptability of the free trade agreement among farmers), economic (to provide farmers with liquidity to adjust production to the new set of relative prices), and social (to prevent an increase in already extensive levels of poverty among smallholders and a rapid process of out-migration to the cities and border in the North)." The program was designed to last for 15 years, during which time transfers, decoupled from current land use as required by NAFTA provisions, were to be given on a per-hectare basis.

Short-term Effects

Although the NAFTA measures were designed to cushion the shock to Mexico's smallholders, several factors undermined the protection offered to farmers. In the first place, Mexico failed to collect the above quota tariff on maize imports, but instead exempted all maize imports from tariff payments after 1994, to lower prices and reduce inflationary pressures. Only in 2001 did Mexico levy a minor over-quota tariff of 1% on yellow maize and 3% on white maize (de Ita 2003). As a result, rather than protect domestic maize producers during the 15-year transition period negotiated in NAFTA, the Mexican government effectively compressed the adjustment period, converging the Mexican market with the international market and exposing farmers to international prices more than a decade earlier than anticipated (Nadal 2000). Using data from the Asociación Nacional de Empresas Comercializadoras de Productores del Campo (ANEC), Nadal (2002) calculates that between January 1994 and August 1996, domestic maize prices fell 48%, creating a tremendous shock to both commercial and subsistence maize farmers (Figure 3).

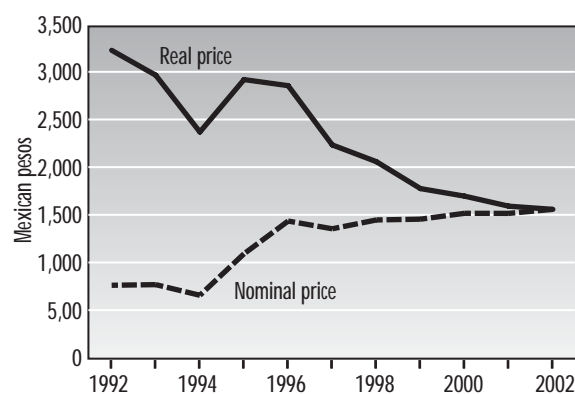


Figure 3. Nominal and real maize prices, Mexico, 1992-2002 (in pesos, base year 2002).

Source: Anuario Estadístico Agrícola, Servicio de Información y Estadística Agroalimentaria y Pesquera, SAGARPA, Mexico
Banco de Mexico: Índice Nacional de Precios al Consumidor

¹⁰ In addition to NAFTA requirements, Mexico's protection measures were also submitted at around the same time as reforms called for under the WTO. At this time there were only two main discrepancies between Mexico's commitments under NAFTA and under the WTO. First, greater quota access and lower off-quota tariffs are given to Canada and the US under NAFTA than are given to the rest of the world under WTO rules. Second, Mexico was required to maintain the 1995 quota levels and off-quota tariffs for other WTO members and reduce tariffs to favored nations by an average 24% during 1995-2000 (Yúñez-Naude 2002).

These problems were compounded by the 1994 Peso Crisis. In conjunction with rapidly opening the economy, Mexico relied on a policy of overvaluing the peso and containing real wages to reduce inflation (Dussel 2000). This temporarily stabilized prices but also contributed to an increasing deficit in the trade balance. While an exchange rate adjustment was postponed as long as possible to maintain exchange rate stability and attract foreign investment, the account deficit quickly became unsustainable. By December 1994, inflation reached 52% and interest rates rose high enough to bankrupt the banking system. At the same time, the GDP fell more than 6% and Mexico went into a severe recession (Nadal 2000).

Both commercial producers and consumers had difficulty adjusting to the new economic conditions. Farmers faced the economic shock without the government support on which they had previously depended. Although the peso devaluation helped farmers to face competition from US grain producers and increased the export of vegetables and fruits, it also set off an acute rural credit crisis. At the same time, domestic reforms had eliminated government assistance for extension, inputs, and infrastructure development. Price supports had been drastically reduced with the gradual dismantling of CONASUPO, and inflation reduced the real value of income support payments, such as those of PROCAMPO. Taken together, domestic reforms and the recession greatly restricted the ability of farmers to adjust to the market incentives created by NAFTA policies.

Contrary to expectations, consumers were also adversely affected by the NAFTA reforms, due in part to market distortions. Compiling data from several sources, including ANEC and the Banco de Mexico (Mexico's central bank), Nadal (2000) found that prices of tortillas increased over 1994-1999, and were about 33% higher in 2000 than they were when NAFTA was passed, despite the 47% drop in real producer prices. Government subsidies to maize flour producers had increased dramatically in the first five years following implementation, and industrial maize flour producers were allowed to import maize directly without paying the tariff rate quota under NAFTA. However, because of the low levels of competition among flour producers, manufacturers were able to continue to raise consumer prices despite the falling producer prices (Nadal 2000). As a result, NAFTA reforms had adverse impacts for both consumers and producers of maize.

Long-term Impacts

A decade has passed since the implementation of NAFTA and, whereas there is some agreement as to the economic shifts that NAFTA provoked, there is still disagreement about how data should be interpreted and what conclusions can be drawn about Mexico's economic well-being. World Bank researchers point to the growth in the manufacturing sector and increased exports of Mexican fruits and vegetables as evidence of economic expansion (Lederman et al. 2003). Others point out that the economic growth has been enjoyed by a limited number of beneficiaries, while most Mexicans, and in particular smallholder farmers, have struggled under the process of adjustment (de Ita 2003; Wise et al. 2003). Even among those who share the latter opinion, differing views remain as to whether the economic transition has actually been completed. Some researchers argue that the reverberations of NAFTA are still continuing (Nadal 2002), while others suggest that all possible shifts in the agricultural sector have already taken place (Dyer and Taylor 2002). Because no comparable data have been collected in Mexico since the census of 1991, it is difficult to support hypotheses about household-level impacts of NAFTA. Moreover, SAGARPA data paint a mixed picture of Mexico's economy and of the gains and losses experienced by various sectors.

Economic Growth

The greatest success claimed by NAFTA is the growth of Mexico's economy through the use of a foreign-direct-investment-led development strategy. However, data from Mexico's National Institute of Statistics, Geography, and Informatics (INEGI) indicate that economic growth has remained relatively slow in Mexico, with a per capita real growth of just 1.74% in the years following the implementation of NAFTA (Arroyo 2002). While there has been growth in exports, imports have surpassed those levels, leaving Mexico with a global balance-of-trade deficit. In the manufacturing sector alone this deficit ran an average of US\$11.4 billion during 1994-2002, in part due to the fact that both foreign and domestic manufacturing firms rely heavily on imported rather than locally-sourced inputs (Gallagher and Zarsky 2004). Moreover, Mexico's external debt has continued to grow, reaching 26.1% of the GDP in 2000 (Nadal 2003).

Mexico has seen growth in its manufacturing sector, particularly with the development of the *maquiladora* (assembly-for-export) industry, but this growth has remained largely isolated from other sectors of Mexico's economy. Maquiladora industries import parts and export finished products, providing few forward or backward linkages with the rest of the Mexican economy (Dussel 2000; Gallagher and Zarsky 2004). Currently, 93% of all inputs in maquila plants are foreign manufactured goods. Arroyo (2003) describes the pattern of this growth as the creation of highly competitive and lucrative enclaves or "modern islands" increasingly disconnected from the rest of Mexico's economy. Moreover, the benefits brought to Mexico's economy by the growth of the maquiladora industry seem to be relatively short-term. While investment in maquiladoras initially contributed to the creation of new jobs, about 30% of the jobs created in the 1990s have disappeared, as operations have relocated to lower-wage countries in Asia (Audley et al. 2003).

One key factor credited to NAFTA has been the growth of foreign direct investment (FDI) in Mexico (Figure 4). Much of this increase in FDI has been skewed toward the manufacturing sector, which along with financial services accounted for 75% of all FDI inflows into Mexico during 1994-2002 (Gallagher and Zarsky 2004; RNIE 2003). Of that investment, 28% has occurred under NAFTA in the form of mergers and acquisition, implying that there has been little generation of new enterprises (Dussel 2000; Gallagher and Zarsky 2004). The recent slowdown in FDI from the US in particular may be attributed in part to the sluggish growth and emerging opportunities in China.

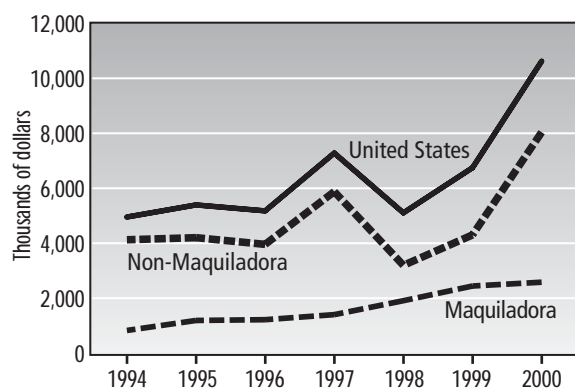


Figure 4. Foreign direct investment in Mexico, 1994-2000.

Source: Adapted from Audley et al (2003)

Despite significant increases in foreign investment and manufacturing, there has been little job creation. Gallagher and Zarsky (2004) found that 637,000 new manufacturing jobs were created between 1994 and 2002, or about 82,500 each year. However, due to demographic factors and the displacement of farmers, there are approximately 730,000 new entrants into the job market annually (INEGI 2003). In fact, in the wake of recent layoffs the manufacturing sector has seen a net loss of jobs since NAFTA took effect. According to Gallagher and Zarsky (2003), from the middle of 2001 through the end of 2002, foreign-owned firms dismissed 287,000 workers—one in five. Furthermore, many of the new jobs do not offer the benefits mandated by Mexican law. Real wages today are lower than when NAFTA took affect, and working conditions are still poor (Audley et al. 2003; Arroyo 2003). The development of Mexico's manufacturing sector has also created costs to the Mexican government in terms of environmental degradation (Nadal and Wise 2004). Some of the most pressing environmental issues compounded by NAFTA include solid waste management and water and air pollution (Nadal 2000; Ackerman et al. 2003; CEC 1999).

Agricultural Production

According to ERS/USDA (2002), NAFTA has added to the expansion of trade in grains and tempered reductions such as those that resulted from Mexico's recession in 1995. According to Naylor et al. (2001), during 1993-94 almost 90% of Mexico's farm exports were shipped to the US and Canada, and over three-quarters of its agricultural imports came from these two countries. Foreign direct investment in the agricultural sector has been skewed toward commercial activities and the northern states where most commercial production takes place. Of the US\$172 million (0.4%) invested in agriculture over 1999-2002, 95% went toward commercial farming activities and 89% was directed exclusively toward the states of Sinaloa and Sonora (Nadal and Wise 2004). Small-scale agriculture, on the other hand, has seen little support from this growth in FDI. Moreover, investment levels in agriculture as a whole have not surpassed 2% of agricultural GDP since 1993 (ERI 2001).

One of the strongest long-term impacts of NAFTA on the Mexican agricultural market has been the increased incentive for the production of fruits and vegetables.

Domestic production and Mexican exports of fruits and vegetables have grown considerably under NAFTA. Although some of the increase in trade can be attributed to increases in consumer demand in the United States, US imports of Mexican fruits averaged US\$586 million per year under NAFTA, up from US\$287 million during 1989-93 (ERS/USDA 2002).

Despite increases in production, shifting to crops of competitive advantage has not been an option for all Mexican farmers. While fruit and vegetable production have shown promise for some, the high levels of investment and infrastructure needed, as well as the seasonality and the volatility of foreign markets, act as barriers for many farmers (Gómez Cruz and Schwentesius 1993; Nadal 2000). According to de Ita (2003), changing agricultural policies oblige farmers to reorient their production strategies, but only larger-scale farmers with greater access to resources are able to respond agilely to new markets and incentives.

In the grains sector, the effects have been different. Under NAFTA, Mexico eliminated its import-licensing requirement and began to phase out its tariffs on US and Canadian wheat. This provided a stimulus for US wheat exports, which averaged approximately 1.3 million tons per year during 1994-2000, compared with 512,000 tons during 1990-93 (FATUS 2003). In contrast, Mexican wheat producers, unable to compete with trading partners in costs of production, have turned to crops such as malting barley, for which they are paid a higher price. Recent drought has also reduced wheat production. Commercial wheat is now grown mainly on irrigated lands around Ciudad Obregón in Sonora State, and chiefly comprises high quality durum wheat consumed in Mexico or exported to Peru, Italy, Algeria, or other countries. Rainfed wheat is grown in the states of Guanajuato, Mexico, Michoacán, and Tlaxcala.

NAFTA's impact on maize production has been particularly complex, given the various types of maize and the separate markets that cater to those types. NAFTA facilitated US corn exports, which grew from a pre-NAFTA average of 1.6 million tons to an average 4.3 million tons from 1994-2002 (FATUS 2003). Most of the increase in overall consumption in Mexico can be explained by the increased use of yellow maize as cattle feed, corn

sweetener for beverages, and flour for processed foods (Nadal and Wise 2004; Barkin 2002).

The production and trade of other grains has also affected trends in maize imports. Upon NAFTA's implementation, Mexico entirely eliminated its tariff on US sorghum. However, due to the greater access to US corn, many livestock producers in Mexico initially switched from sorghum-based to maize-based feed. In recent years, declining sorghum prices have acted to boost US sorghum exports to Mexico (Zahniser and Link 2002). Other factors beside market incentives have contributed to production decisions. A three-year period of drought in the late 1990s increased production of crops such as sorghum and barley, which require less water than maize or wheat.

One of the most interesting observations regarding maize production under NAFTA is that, in spite of increased levels of imports from the US (Figure 5) and a sharp drop in maize prices, Mexico's maize production has remained fairly stable with only recent indications of a slight decline. Several studies have found that the area under maize has actually expanded and productivity increased. According to Yúñez-Naude and Barceinas (2002), average maize yield under irrigated conditions increased from 3.13 t/ha during 1983-1990 to 4.94 t/ha over 1994-2000; average yield on rainfed land increased from 1.58 t/ha during 1983-1990 to 1.83 t/ha during 1994-2000.

There is little consensus about why maize production did not slump under NAFTA, as had been predicted.

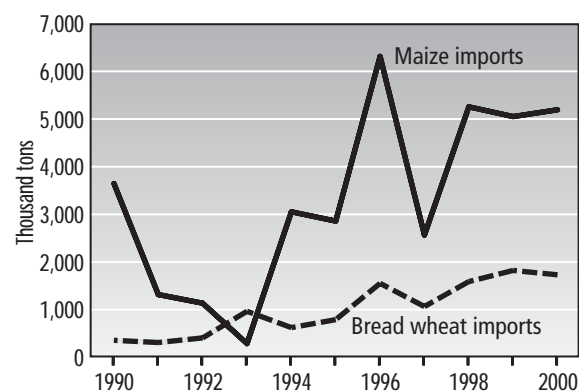


Figure 5. Grain imports from the USA by Mexico, 1990-2000.

Source: Adapted from Puente-Gonzales, 2003

Understanding this is important because it provides insight into the condition of over three million producers for whom maize provides the main source of livelihood. Some researchers propose that because farmers who produce on rainfed lands are isolated from markets, they have not been affected by changes in the price incentives brought about by NAFTA, and therefore have not changed their production patterns. For example, de Janvry et al. (1995) predicted that surplus growers would be seriously affected by NAFTA reforms but that market failures would buffer subsistence producers from falling prices. In contrast, Nadal (2000) suggests that while intermediate-level farmers, who suffered a decline in credit and infrastructure support, have begun to leave the maize sector for different livelihood strategies, larger farmers with access to irrigated land, hybrid crop varieties, and mechanization have actually expanded production to profit from price structures for agricultural products. According to Nadal, poor farmers have also expanded production under NAFTA to make up for the lower prices they receive when selling their maize and the higher prices they face as consumers. These farmers remain in subsistence maize production partly out of an inability to convert to other crops. Nadal concludes that the full impacts of NAFTA have not yet been realized, and that the economic stress on the poorest producers will reach a threshold beyond which a future decline in maize production can be expected.

Dyer and Taylor (2002) put forward still another hypothesis to describe the response of heterogeneous households to NAFTA's reforms. They concluded that the local maize sector restructured rapidly in response to NAFTA and, as a result, future levels of maize production were unlikely to drop. Based on evidence from the Sierra Norte de Puebla, they found that the reference price of maize set by Diconsa¹¹ in the early 1990s greatly reduced the profitability of maize, causing commercial maize producers to pull out of production. As maize prices dropped and commercial growers scaled back, local rental rates and wages fell, so that subsistence growers were encouraged to expand subsistence maize production and to go into livestock production. Eventually, only the most competitive producers and a large group of subsistence maize growers continued to produce maize. Because of the entrance of less efficient farmers, total maize output decreased even

while the land under production remained constant. Even as production patterns shifted, maize consumption increased as incomes dropped and households substituted local and homegrown foods for purchased foods. Dyer and Taylor (2002) described these changes as a "retreat into a subsistence economy." The findings of Sadoulet and de Janvry (2001) confirm that this process took place in ejidos, with the result that households became more dependent on non-agricultural self-employment, livestock production, and migrant remittances than on income from agricultural and wage labor.

Unable to earn sufficient income from commercial maize production, farmers have been forced to devise cooperative strategies to overcome market competition or to change crops, where possible. An increasingly common tactic is to divide family energies into pursuing several different income-earning strategies at once. In this case, remittances and wages from off-farm labor help to subsidize the agricultural production carried out by family members remaining on the farm. Another approach, commonly found in the north, is to leave agriculture altogether. The reform of the Ejido Law gives ejidatarios the option to rent or sell their land. This has enabled many to use their land to obtain PROCAMPO payments while relying on other non-agricultural strategies to earn a livelihood. In addition, reform of the Ejido Law has encouraged the fragmentation of land previously under collective ownership and allowed for its subsequent consolidation under agro-industries (de Ita 2003; Appendini 1992).

Environmental Impacts

Research has been undertaken to document the environmental impacts of NAFTA, but there are still few definitive answers about what these impacts have been. One of the fears of environmentalists was that NAFTA would cause "a race to the bottom," as environmental standards were undercut in an attempt to make production cheaper. While this fear has proved to be exaggerated, there is a possibility that NAFTA is encouraging the "globalization of market failure," or a situation in which cheaper prices do not capture external costs (such as environmental pollution) and benefits (such as biodiversity conservation) generated by countries participating in international trade (Boyce 1999).

¹¹ A government-supported institution with the responsibility to insure the provision of basic goods to marginal zones.

Mexico may not have become the pollution haven that many feared, but neither has participation in NAFTA encouraged the improvement of environmental standards for the manufacturing sector. Gallagher and Zarsky (2003) cite a World Bank study showing no correlation between foreign ownership and firm-level environmental compliance in Mexican industry. Moreover, the overall growth of economic activity corresponds to higher levels of pollution in Mexico, despite the development of less pollution-intensive industry (Gallagher and Zarsky 2004). Concurrently, real spending on the environment has declined by almost 50% since NAFTA took effect (Wise et al. 2003). The Mexican government estimates that the economic costs of environmental degradation have amounted to 10% of the annual GDP, or US\$36 billion per year (Gallagher and Zarsky 2003).

The environmental impacts linked to NAFTA have also been relatively negative in the agricultural sector. The restructuring of the agricultural sector following NAFTA encouraged many producers to intensify production, causing concern about agrochemical impacts from fertilizers, herbicides, and pesticides, as well as unsustainable levels of irrigation, erosion, and potential effects on biodiversity (Ackerman et al. 2003; CEC 1999; de Ita 2003; Nadal and Wise 2004). De Ita (2003) contends that commercial liberalization under NAFTA has placed pressure on basic grain producers to achieve levels of productivity as high as those in the United States, causing them to adopt practices such as monoculture and heavy use of chemical inputs. According to Audley et al. (2003), farming is the leading source of pollution in Mexico, and NAFTA has helped to encourage a shift in the pattern of fertilizer consumption toward large-scale, intensive operations. Another area of concern regards the impact of NAFTA on soil conservation. Intensification of commercial production and the extension of small-scale production into more marginal areas have accelerated soil erosion (CEC 1999; Nadal 2000; Nadal and Wise 2004).

The impacts of NAFTA on biodiversity have also been observed carefully, in particular because of Mexico's important role as a center of maize diversity. Migration and weakening social institutions brought on by the declining profitability of agricultural production are thought to be reducing the cultivation of farmer varieties and thereby contributing to genetic erosion (Nadal 2000;

Nadal and Wise 2004). While no extensive evidence has been collected to substantiate this claim, according to Sánchez et al. (2000), native maize cultivars of maize are being lost as farmers adopt modern varieties in areas of commercial production, such as the states of Jalisco, Sinaloa, Sonora (where more than 70% of the area is sown to hybrid seed), and Tamaulipas, as well as the Bajío Region. Aside from the loss of genetic diversity, a more pressing problem may be the unraveling of the socio-cultural systems that maintain maize diversity. Migration and social change have accelerated the loss of traditional knowledge and management practices that underpin the conservation of native varieties (Bellon et al. 2003; Nadal and Wise 2004).

Social Welfare

Though Mexico is considered an emerging economy, regional economic and social disparities have actually widened under NAFTA. In the past two years, poverty levels have declined slightly, but poverty remains important in rural areas, particularly in the south and in those states with high indigenous populations (SEDESOL 2003; World Bank Group 2004). A more important trend in Mexico following the implementation of NAFTA is the rise of labor income inequality. According to Wise et al. (2003), the richest 10% of the population currently receives 42% of the national income. In addition, the real minimum wage has dropped more than 60% and has lost 23% of its buying power (Arroyo 2002).

A shortage of jobs may be one reason for the decline in economic well-being. According to Arroyo (2002), 6.2 million jobs were created since 1993, whereas the labor force grew by more than 10 million over the same period, leaving almost four million people without employment. Moreover, the manufacturing sector, which was supposed to be a source of new jobs, showed a net loss of 0.3% employment, despite a 45% growth in productivity (Arroyo 2002). Due to job shortages, low wages, and the lure of opportunities abroad, out-migration from rural areas to both Mexican cities and the USA has increased.

According to Taylor and Dyer (2003), NAFTA could have affected migration in rural Mexico in three ways: first, by creating new markets for cash crops grown in Mexico; second, by creating new competition for crops grown in

Mexico; and third, by affecting macroeconomic stability in Mexico, as reflected in the peso-dollar exchange rate. In response to reductions in staple price supports and reduced wages, rural households respond by shifting resources out of staple production and into competing activities, such as migration. Following market shifts households have protected themselves by diversifying activities and relying on income subsidies such as PROCAMPO (Taylor, Yúñez-Naude and Dyer 1999). Data indicate that, although there have been no sharp increases, migration levels have increased steadily throughout the 1990s (Figures 6 and 7). Furthermore, migration of family members has become an integral part of household livelihood strategies, and remittance income often allows farmers to continue to cultivate maize, despite the crop's low profitability. The continued importance of cultivating maize reflects the difference between its market price and its actual value to Mexican farmers, for whom it is a cultural symbol, a way to achieve food security, and part of personal identity.

Programs to Alleviate the Impact of Economic Liberalization

The redefinition of the role of the state in Mexico's agricultural sector opened an institutional vacuum only partially filled by the private sector. Many crucial services are accessible only to larger commercial farmers with connections or finances to participate in programs

promoting agricultural commercialization. Assistance for smaller-scale farmers takes the form of targeted welfare interventions, often for the most marginal rural households. According to Sadoulet and de Janvry (2001), much of the ejido sector falls between these two extremes and is thus left without institutional support, precisely when such services are needed to modernize maize production and diversify cropping patterns toward higher value crops.

The PROCAMPO program established by the Mexican government in 1994 provides a significant subsidy to farm households. During the fiscal year of 2004, PROCAMPO payments were made to approximately 2.7 million farmers, which made for a total expenditure of over 13 billion pesos (Figure 8; approximately US\$1.2 billion) (SAGARPA 2004). Currently recipients of PROCAMPO can use their payments as collateral against which to borrow from commercial banks, enabling households to take advantage of the cash in generating new income. Though PROCAMPO serves as an important income support, there are drawbacks to the way the program is structured. Because PROCAMPO payments are proportional to the area under cultivation, they are received disproportionately by large landowners. Moreover, many small-scale farmers never registered to receive PROCAMPO in the first place. Officials in state-level PROCAMPO programs cite diverse reasons, including illiteracy, misunderstanding of the program, or fear of being held accountable for the resources (Yiebra

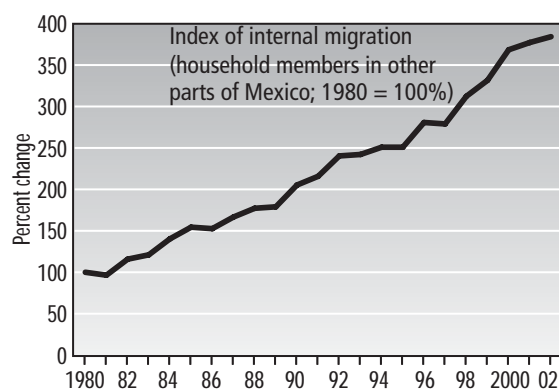


Figure 6. Index of internal migration from rural Mexico, 1980-2002.

Preliminary, National Rural Household Survey (ENHRUM), 2003

* This is not the full ENHRUM sample, but includes 20 communities from the five ENHRUM regions

** Reproduced from Taylor and Dyer (2003)

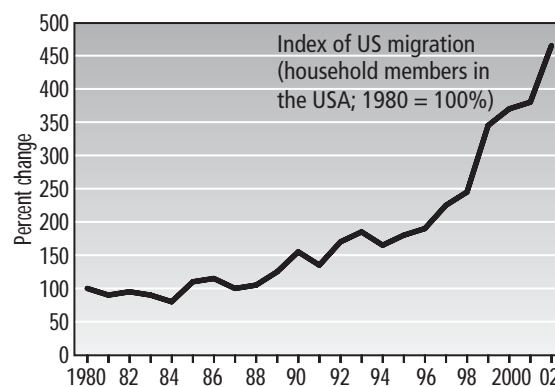


Figure 7. Index of international migration from rural Mexico to the USA, 1980-2002.

Preliminary, National Rural Household Survey (ENHRUM), 2003

* This is not the full ENHRUM sample, but includes 20 communities from the five ENHRUM regions

** Reproduced from Taylor and Dyer (2003)

personal communication; Gonzalez, personal communication). In Zoateopan, Puebla, Dyer and Taylor (2002) found that PROCAMPO did not benefit a generation of younger farmers who had recently entered into agricultural production and thus never registered to receive the support. In addition, they found that only the wealthier farmers in the area were able to afford the fixed costs of paperwork and bribes to receive their payments. There is an initiative underway to reach the many farmers who remain outside the program through a second, massive registration initiative (Yiebra personal communication). However, because the PROCAMPO program is officially targeted to end in 2008, many farmers and government officials are relying on the hope that the Mexican government will establish another program to provide continued support to farmers in the face of international competition.

A series of programs established following PROCAMPO have also played an important role in supporting farmers struggling with economic and institutional change. *Alianza Para el Campo* was established in 1996 by the federal government to promote agricultural productivity, investment and commercialization, and production of strategic crops. Many Alianza programs use a system in which the government and farmers co-invest in projects. Alianza programs serve an important role in restoring the provision of particular agricultural services to farmers, but they have had mixed impacts. A recent evaluation (FAO/

SAGARPA 2003) suggests that Alianza programs have largely benefited medium-level farmers with landholdings of 10 to 100 hectares, while reaching far fewer smallholders. Moreover, in some areas, biases in the way financial support is distributed provoke increased polarization among small and large-scale farmers (de Ita 2003).

While PROCAMPO and Alianza focus mostly on agriculture, there are also programs that specifically target social disparities. One such "safety net" is PROGRESA. Implemented by the Secretary of Social Development (SEDESOL) and known as *Oportunidades* as of 1997, the program provides income to sustain household expenditures and ameliorate the effects of contractions in local economies. It focuses on education, health, and nutrition, and has been found to be one of the more successful programs in reaching rural households (Skoufias 2005). At the end of 1999, PROGRESA covered approximately 2.6 million families or about 40% of all rural families in Mexico (IFPRI 2004). Most families receive PROGRESA resources based on whether or not they have children in school.

Because small-scale farmers in particular continue to face problems associated with the government's withdrawal from the agricultural sector, producer organizations constitute an increasingly important source of services and aid in reducing transaction costs. As discussed in the following case studies, in many of the more marginalized areas of Mexico, farmers have turned to NGOs, the private sector, and cooperative organizations such as farmer associations to meet their needs.

Mexico in an International Context

While many have judged NAFTA to be successful in terms of the overall benefits to the economies of member countries, the uneven distributional impact of NAFTA within Mexico has created a substantive domestic counterreaction (Wise et al. 2003; Schwentesius et al. 2003). Farmer demonstrations have occurred throughout the past decade, inspired both by the fear of the possible impacts and by the actual results of trade reforms. On November 12, 2002, 12 national and regional peasant organizations launched the campaign *El Campo No Aguanta Más* (literally, "the countryside can't take

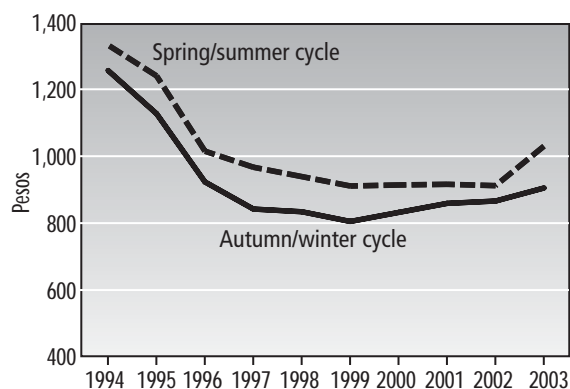


Figure 8. PROCAMPO payments per hectare, in real terms (pesos, base year 2003).

Source: ACERCA

* in 2003, in the Autumn/Winter Cycle, areas less than 5 ha. receive 1,030 pesos/ha.

anymore”), which requested among other things the renegotiation of the agricultural sections of NAFTA. This movement led eventually to the development of *Acuerdo Para el Campo*, a document developed by the government to end the protests, but which was viewed as little more than a palliative (Navarro 2003).

Another context in which the NAFTA model was reevaluated was the 5th Ministerial meeting of the World Trade Organization held in Cancun, Mexico, in September 2003. During the meeting, Mexico joined with other developing countries in calling for the reduction of agricultural subsidies, which they claimed make it difficult if not impossible for developing countries to compete with industrialized nations in agricultural production. The walkout of the Group of 21, a group of powerful developing countries, further highlighted the role of agricultural subsidies in skewing the beneficial impacts of international trade agreements, such as NAFTA. According to IFPRI (2003), protectionism and subsidies by industrialized nations cost developing countries US\$24 billion annually in lost agricultural and agro-industrial income. Latin America and the Caribbean in particular lose about US\$8.3 billion in annual income from agriculture.

To understand the disadvantages that Mexico faces from developed country subsidies, it is useful to look at the differences in the subsidy levels for agricultural production between the United States and Mexico. Maize is one of the most heavily subsidized crops in the USA. Using US government data on costs of production, Ritchie and Murphy (2003) found that in recent years, US maize has been exported at 20-33% below the costs of production, mainly due to the influence of US farm policies and oligopolies in international trade. Producer subsidy equivalents (PSEs) are aggregate measures of support that provide an indicator of the value of gross transfers from consumers to agricultural producers. The OECD defines the PSE relatively broadly to include “market price support” (MPS), an estimate of the non-subsidy support for producers that includes tariffs, price supports, and quotas. While it appears that Mexico supports their maize farmers

with a PSE of 47% for the 1998-2001, a level that exceeds the US PSE of 46% for the same period, according to Wise (2004) this gives a misleading picture.¹² Wise shows that if you eliminate MPS and look at subsidies alone as a percentage of farm income, Mexico’s PSE drops to 28%. Another source of distortion in comparing subsidy levels comes from the fact that farm size and average yields per hectare are higher in the US, so that measuring subsidies as a percentage of farm income overstates Mexican support levels. According to Wise, looking at subsidy levels on a per hectare basis results in a support level for Mexico of US\$93 per hectare, which is one-third of the US level (Wise 2004).

In meetings to discuss trade liberalization, the USA, like most industrialized countries, frequently claims its willingness to negotiate for the drastic reduction of US subsidies on the condition that other nations follow suit. However, the 2002 Farm Bill raises expenditures compared to the previous bill, in addition to extending support to new crops and undermining the decoupling of subsidy payments from production and market prices that had been achieved in the 1996 legislation. According to Orden (2003), the USA and several other countries are finding clever tricks to meet the letter of their WTO commitments without substantially changing the support provided to agriculture. The USA in particular is using an exemption for non-commodity-specific support to reduce the probability that their payments will count against the limit of trade distorting subsidies that are allowed by the WTO. Therefore, the USA continues to support the theory of trade liberalization and the extension of international trade agreements such as NAFTA, while doing very little to reform the domestic policies that collectively distort agricultural production and world prices.

From individual farmers to international economic institutions such as the World Bank and the World Trade Organization, many of the prescriptions for policy development focus on the elimination of developed-country subsidies to agriculture to relieve the plights of small-scale agricultural producers. An alternative

¹² Although Mexico eliminated most of the government policies that would constitute market price support (MPS) in 1994, the PSE figures calculated by the OECD continue to show high market price support. Wise attributes Mexico’s MPS levels, as calculated by the OECD, to the use of a distorted reference price for maize. If reference prices are adjusted by dumping margins suggested by Ritchie and Murphy (2003), Wise shows that Mexico’s market price support becomes negative for the period of 1998-2001 as a whole. He suggests that this corroborates evidence that Mexican farmers are reducing their own prices below the costs of production to compete with imports.

perspective is offered by Wise (2004), who suggests that neither subsidy elimination nor tariff reduction is likely to help small farmers in Mexico because of their relationship to international markets. Wise argues that even if subsidies are reduced and market access is improved, Mexican maize farmers will gain little relief from competition with low-priced imports. His theory is supported by an IFPRI study that models the estimated price effects from the elimination of all developed country subsidies, including export subsidies, and which projects only a 2.9% increase in maize prices by 2020 (IFPRI 2003). Instead, Wise (2004) suggests that policy reforms should focus on three principal goals of reducing export dumping (which includes reducing the subsidies that contribute to dumping), reducing global commodity overproduction in key crops, and reducing the market power of agribusiness conglomerates. This proposal differs from many in its recognition that further trade liberalization contributes to the problem of commodity price deflation. It suggests that rather than increasing the power of the free market, what might be needed is the restoration of some government involvement in economic regulation along with expanded protections in international trade.

Biosafety Issues

In addition to US agricultural policy, changes in Mexican biosafety policies may affect the future of NAFTA in Mexico. Phytosanitary regulations are a major tool used to limit trade from another country. The United States currently does not allow the importation of several agricultural products from Mexico due to concerns about the possibility of spreading diseases. Though in the past phytosanitary regulations have hampered the ability of many developing countries to export their commodities, in future the tables may be turned. There is increasing concern in many sectors of Mexican society about potential problems from the importation of genetically modified maize grain to the area of origin and center of genetic diversity for this crop. In particular, there is concern about the unknown ecological impacts of genes from genetically modified maize introgressing into Mexican landraces or the wild relative of maize teocintle, either through the natural exchange of pollen or through farmer management practices, which often encourage gene flow (Bellon and Berthaud 2004). The development of legislation in Mexico that requires the separation and testing of maize imports for transgenic content could have strong impacts on the export costs of US maize. In addition, if the burden of paying the costs for labeling is placed on the companies that use imported maize, such as milling and tortilla industries, these costs may be passed on directly to the consumer in the form of higher tortilla prices. These developments would necessarily affect levels of maize importation, the international price of maize, and the desirability of domestic maize for Mexican industries.

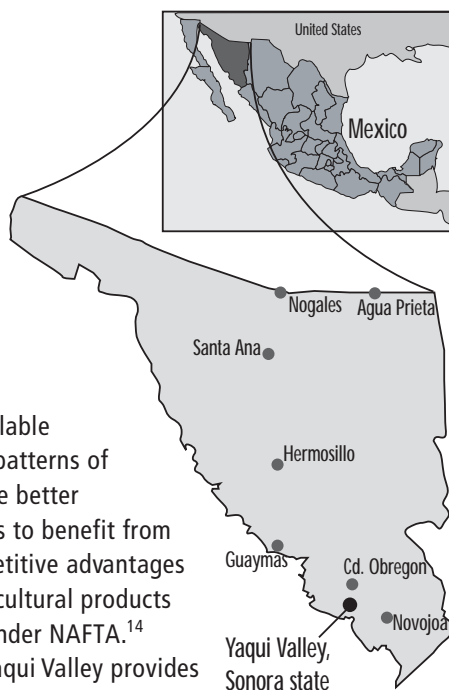
Part III. Wheat Production in the Yaqui Valley¹³

While NAFTA's impact on wheat production in Mexico has not been as severe as it has been on maize, it has acted—along with a range of factors including climate and domestic policy reform—to alter the structure of production and marketing channels for wheat. To a large extent, phytosanitary restrictions, the high costs of production, and competition with partner countries have caused Mexico to turn toward markets other than the USA for the exportation of wheat. Moreover, drought and the lure of new export opportunities have decreased the area planted to wheat and caused some farmers to attempt to diversify into new crops. Nevertheless, farmers remain tentative about giving up wheat for high value crops such as fruits and vegetables, given their high costs of production, uncertainties of climate, and the risks inherent in trading on international markets.

The Yaqui Valley in the state of Sonora is a major center of wheat production (see map) and the focus for the following case study. There are other states, including Sinaloa and Baja California, where the environmental

Wheat is an important crop in northern Mexico, and though its role in trade with the United States has been limited, changes in that trade depict some of Mexico's problems in the competitive production of basic grains.

conditions, available resources, and patterns of investment have better enabled farmers to benefit from Mexico's competitive advantages in trade of agricultural products with the USA under NAFTA.¹⁴ However, the Yaqui Valley provides an interesting case study, not only for its role in history as the birthplace of the 2nd Agrarian reform and the cradle of the Green Revolution, but also because the state has many of the attributes, such as intensive production systems, irrigation,¹⁵ and proximity to the USA, that could make it a competitive trade partner in international markets. Changes in the Yaqui Valley since the implementation of



¹³ Apart from what is directly cited, this chapter was written with input from several sources. In 1994, CIMMYT in collaboration with INIFAP and the Center for Environmental Science and Policy of Stanford University published a study of the impact of policy reforms on farmers in the Yaqui Valley during 1990-1996/97. The study provided important background information for my own observations. Similarly, a paper published by Ana de Ita Rubio on the Impacts of NAFTA on the production of basic grains in Sinaloa (2003) provided an important reference point for the experience of other Mexican states with high levels of commercial production. Many of the personal perspectives were obtained from interviews with researchers, union workers, and farmers, carried out in collaboration with Dagoberto Flores from March 28-April 3, 2004 in Ciudad Obregón and the Yaqui Valley. Some of the most useful insights and production data came from Dagoberto himself, who has come to know the Yaqui Valley over the last 30 years of work as a researcher with both CIMMYT and Stanford University. CIMMYT researcher Pedro Aquino also supplied information on international trade and the organization of production in Sonora.

¹⁴ This statement should be qualified by noting that in Mexico, while some states have fared relatively well under NAFTA, only the farmers of a certain economic level, usually with access to large land holdings and resources, have been able to take advantage of new trade opportunities. Small-scale farmers, on the other hand, found it more profitable to rent their parcels than to continue farming. For an excellent discussion of Sinaloa's experience with NAFTA reforms, see de Ita Rubio (2003).

¹⁵ This also makes the Yaqui Valley highly susceptible to climate, environmental, and hydrological changes, as will be elaborated further.

NAFTA provide insight into the potential of Mexico's agricultural sector, but also into some of the key obstacles facing farmers in the production of basic grains and the search for alternative crops. Diversification into fruits and vegetables for export is just out of reach for many farmers in the Yaqui Valley. Many who now produce for export have done so because they have been able to capitalize on financial and technical support from foreign partners.

Review of NAFTA's Impact on Wheat Production

NAFTA's impact on wheat trade in Mexico has been relatively limited, given the relatively small quantity of wheat produced in Mexico and the difficulties of exporting it. Since the implementation of NAFTA, Mexico's wheat production has fallen while imports have increased. According to Dorantes et al. (2001), the fall in Mexico's wheat production is due primarily to a lack of water, the decreased profitability of the crop, and the susceptibility of bread wheat to disease. Due to outbreaks of karnal bunt in the 1990s, much of Mexico's domestic wheat production shifted to durum wheat. Mexican bread wheat yields are higher than those in the USA and Canada, but the high costs of irrigating wheat and extending yearly price supports to farmers make Mexican bread wheat domestically uncompetitive in comparison with American and Canadian exports. Moreover, the large distances between the areas of production and consumption in Mexico elevate transport costs and thereby negate the potential advantage of utilizing domestic production for processed wheat products (Dorantes et al. 2001). While Mexico's bread wheat output has fallen, the overvaluation of the peso and the growing demand for wheat products have rapidly increased Mexico's imports of bread wheat, making Mexico increasingly reliant on the USA for its wheat supplies.

Regarding durum wheat, although Mexico is not one of the world's largest producers, its production of this crop has risen substantially since the 1990s. One of the greatest problems the country faces is to locate markets for exporting grain production that exceeds domestic demand. The USA tends to import low-cost durum wheat from Canada, so Mexico has exported to Peru, Algeria,

and, most recently, Italy. These transactions are increasingly facilitated through multi-nationals, including the American-based conglomerate Cargill, which stores and markets a growing share of Mexican grains.¹⁶

Although the future of wheat production in Mexico is uncertain due to the recent scarcity of water, farmers remain strongly attached to wheat because the market for the crop is much more stable than the markets for high value fruits and vegetables (Flores, personal communication). Despite this, recent water shortages are forcing farmers to move more quickly to alternative products and production methods.

The Yaqui Valley: A General Description

The Yaqui Valley in some ways represents a microcosm of the many forces that have shaped agricultural production in Mexico over the last ten years. A clear understanding of historical factors in the Yaqui Valley is important for contextualizing the economic changes that have taken place there since the 1990s.

There are two important sectors in the Yaqui Valley; the private sector and the public sector, or the ejido. The ejido sector was established by Land Reforms in 1937 and in 1976, which left the Valley divided among ejiditarios (55%), private landowners (41%) and colonists (4%) (Naylor et al. 2001). Compared to private farmers, ejiditarios have smaller land holdings, in some areas averaging as little as 5 hectares. Though the government has strongly supported ejidos, their function and efficiency has been greatly hampered by their small scale, lack of resources, and problems with corruption. These factors, along with the changes in land-ownership rights described below, have led to the decline and eventual break-up of many ejidos. The collapse of the ejidos has in turn led to the increased concentration of land, as ejiditarios turn to the rental market for greater income security (de Ita Rubio 2003; Gonzáles 1996).

As described above, the reform of the Mexican food system during the late 1980s and early 1990s involved the reduction of government involvement in agriculture through the downsizing and eventual dismantling of CONASUPO, the privatization of the Mexican Fertilizer

¹⁶ See the example of AOASS's collaboration with Cargill, discussed in more detail below.

Company (FERTIMEX), and the removal of credit subsidies supplied through BANRURAL. Along with these reforms, in 1992 operational authority for irrigations systems was decentralized, and Article 27 was put into effect, giving ejidatarios the right to sell and rent their land. These reforms took place before NAFTA, but their impacts and those of NAFTA are linked in the sense that the reforms completely changed the structure and costs of production when Mexican agriculture was being called on to compete in international markets. According to Gonzáles (1996), economic liberalization left states like Sonora much more exposed to the effects of external economic change. Farmers in the Yaqui Valley in particular suddenly became much more vulnerable to macroeconomic policy swings and global market volatility (Naylor et al. 2001)

One of the major differences for farmers in post-NAFTA agricultural production involved the sources and prices of inputs. In the Yaqui Valley, fertilizer—once subsidized by FERTIMEX—was suddenly available only through private producers. Naylor et al. (2001) note that, with the elimination of subsidies, the real price of urea almost doubled between 1988 and 1996, and that the ratio of wheat to urea prices fell by 30% in that same period. The change in prices was aggravated by the collapse of the peso, which increased the prices of imported farm inputs. While these changes did not have an immediate effect, they gradually started to change farmer practices. In a 1997-98 survey, Naylor et al. (2001) found that farmers had started to reduce fertilizer use in response to lower grain prices.

Current grain production depends almost totally on inputs from international industries (López 2000). Similarly, many of the fertilizers that are used today in the Yaqui Valley come from American agro-chemical suppliers through unions or from agricultural supply stores, and their prices have risen substantially (Figure 9). According to Jorge Castro, current head of the *Patronato para la Investigación y Experimentación Agrícola del Estado de Sonora* (PIEAES), this rise in prices has taken place across all inputs; not just fertilizer but also seed, water, machinery, and diesel fuel. The high costs of production, particularly for fruits and vegetables that require expensive pesticides and fungicides, may inhibit farmers who would otherwise be eager to experiment with diversification.

The scarcity of production credit is another constraint in the Yaqui Valley. According to Naylor et al. (2001), during the 1994-95 cropping season, interest rates rose 30% in real terms, causing many farmers to default on interest payments. This, in turn, drastically limited their capacity to obtain loans for subsequent cropping seasons. In 1994-95 new lines of credit in the form of dollar-based loans became available to large-scale, private farming operations through the government financial entity Fideicomisos Instituidos en Relación con la Agricultura (FIRA), but ejidatarios and small-scale farmers were largely excluded from dollar-based contracts (Naylor et al. 2001). Private farmers have more recently enjoyed access to credit largely through their affiliation with credit unions, of which there are at least 14 authorized in the Yaqui Valley. However, to this day, ejidatarios and small-scale farmers continue to struggle to obtain adequate credit to finance production (de Ita 2003; Flores, personal communication). The emergence of new credit and marketing institutions has therefore been essential in determining which farmers continue producing in the Yaqui Valley and in spurring land consolidation.

Faced with credit constraints, high production costs, insufficient water, low crop prices, and a shortage of machinery, many ejidatarios are wondering whether they can afford to continue producing at all. A number of ejidos in the Yaqui Valley are gradually disintegrating, as increasing amounts of ejido land are either rented (for periods up to 30 years) or permanently sold to private owners, a process encouraged by the reform of Article 27

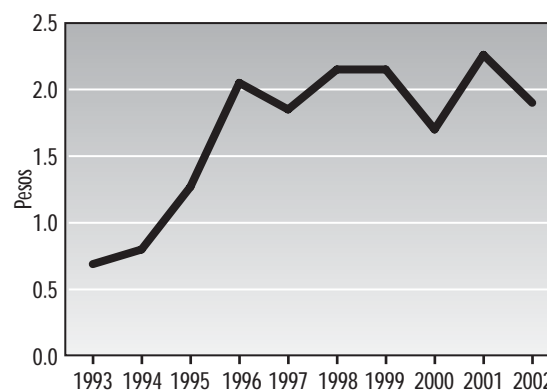


Figure 9. Change in urea prices, Yaqui Valley, Sonora State, Mexico, 1992-2002 (real prices, 2002=100). Source: Fertilizantes Tepeyac, Fertinal, Union Cajeme

in 1992. In the remaining ejidos, many farmers have given up on collective production and operate more or less independently. According to a survey on land rental markets from 1998-99 cited by Naylor et al. (2001), 70% of the ejidatarios interviewed were renting out their land, and 96% of these rentals were to the private sector. This in turn has increased the scale of privately-owned operational units in the Yaqui Valley and, as in other northern states, has led to the rise of neo-latifundistas, the large-scale, often absentee landowners who have concentrated land ownership during various periods of Mexico's history.¹⁷ In 1990, the size of a typical ownership unit in the Yaqui Valley was about 25 hectares for privately owned farms and about 10 hectares for ejido land (Puente Gonzáles as cited by Naylor et al. 2001). Pedro Brajcich, the general manager of PIEAES, estimated that 60-70% of landowners hold 5-50 hectares, while 30-40% own 50-1,000 hectares (Brajcich, personal communication). Those are large holdings with respect to other regions of Mexico, but small in comparison to those of US farmers, who have a 3.5:1 yield/area advantage in wheat. In this regard, Brajcich notes: "it make us very inefficient."

Changes since NAFTA

Previous to NAFTA, farm profitability in the Yaqui Valley depended to a large extent on policies protecting grain production. According to Naylor et al. (2001), the largest distortion arose from the trade and marketing protection given to bread wheat and winter maize. However, by 1996 durum wheat had replaced bread wheat and subsidies had been dramatically reduced. As farmers were exposed to the international market, the effects of global price swings began to play an important role. Starting in 1992 and throughout the 1990s, international commodity prices for a number of commodities began to fluctuate dramatically. During 1991-96, international prices for wheat, maize, soybeans, and cotton rose 37%, 55%, 11%, and 5% respectively. During 1996-1999, they fell by 37%, 46%, 27% and 34% (Naylor et al. 2001). In addition to market volatility, the arrival of white fly to the Yaqui Valley led to the loss of soybean, which had been a profitable spring/summer complement to the wheat that was planted in fall and winter. An ideal replacement for soybean was never found, and in many parts of the Yaqui Valley, farmers started to grow one crop per year, a trend that was

encouraged by the lack of available water for irrigation. The combination of higher production costs, fewer harvests, and lower crop prices together eroded the profitability of agriculture.

While changes in international and domestic economic policy have greatly affected agricultural production in the Yaqui Valley, currently the most important force shaping farmers' decision-making in Sonora is the climate. The Yaqui Valley is in the throes of a ten-year drought, and 2004 was the first year that no water from the Alvaro Obregón Dam reservoir was authorized for crop irrigation. As a result, only farmers with the resources to pay for water from the region's 200 private and public wells were able to plant. The scarcity of water has led to a major shift in the areas devoted to particular crops. With no access to affordable water, many farmers have opted to grow rainfed safflower, sometimes at great financial risk (Flores, personal communication). The area sown to safflower increased six-fold during the 2003-2004 cycle to a total of 61,137 hectares, most of which is rainfed (SAGARPA 2004; Table 2). Some of the safflower is sold to a local oil producer, but much of the excess production is unlikely to have a readily accessible market.

The drought has had other important impacts in the Yaqui Valley, in particular on the pace of crop diversification. Though some farmers have begun to seek out water efficient crops and newer production technologies, the risky production conditions have provoked caution among farmers who, under more favorable circumstances, might have ventured into fruit and vegetable production. While the Irrigation District cites plans to install another 200 wells, the recuperation of the reservoirs of the Angostura, Plutarco E. Calles, and Alvaro Obregón Dams will determine what can be planted in the Valley in the future (Leonardo, personal communication).

Table 2. Area (hectares) sown to various crops, Yaqui Valley, Sonora, Mexico, 2002-04.

Crop (ha.)	Wheat	Safflower	Maize	Beans	Vegetables
2002-2003	159,703	9,895	24,117	0	8,996
2003-2004	8,334	61,137	16,617	640	7,861

Source: SAGARPA, Comision Nacional del Agua, Distrito de Riego 041 (CNA)

¹⁷ See de Ita (2003) for a description of this process in Sinaloa.

Support Programs

Following NAFTA, as one of the most productive agricultural areas of Mexico, the Yaqui Valley was a focal point for government support programs. PROCAMPO, one of the most important of these assistance programs in monetary terms, is distributed based on the area planted to certain basic crops. Because average land holdings are relatively large in northern states with high levels of commercial agricultural production, farmers there receive a high proportion of the resources from this program. According to SAGARPA (2004), half the 2 billion pesos (approximately US\$190 million) delivered in the autumn-winter 2003-04 cycle of PROCAMPO were distributed in the northern states of Sinaloa and Tamaulipas. Despite this, in an analysis of PROCAMPO over 1994-1997, Sadoulet et al. (2001) claim that direct transfers fell short of compensating for the fall in income in the North-Pacific region, in part due to the fact that agriculture in the north is more technological and diversified than in other parts of the country.

Although there are no formal stipulations for the use of PROCAMPO funds, the money is ostensibly for day-to-day agricultural production. In a nationwide survey involving 43,973 farmers, SAGARPA found that the most common use for PROCAMPO is for the preparation of land and the purchase of seed and fertilizers, but the second most common use is to pay for food, clothes, medicine, and transport (2002). These secondary uses are particularly common in the ejido sector. For farmers in the Yaqui Valley, the direct support has come to represent an important part of basic household income. According to SAGARPA, for 24% of the farmers surveyed, PROCAMPO represents approximately half their annual income (2002). Felix Gonzáles, who is responsible for implementing the PROCAMPO program in the Yaqui Valley, voices a common sentiment when he insists that the government will have to devise another way to support farmers beyond the expiration date of the PROCAMPO program. It is necessary, he claims, so that Mexican farmers can compete with peers in other countries where agricultural production is heavily subsidized. However, many farmers in the Yaqui Valley are quick to add that income transfers are not enough to support the local economy. Based on his study of regional change in Sonora, Gonzáles (1996)

suggests that "...it is necessary to create...a productive base capable of generating well-paid jobs and a process of self-supported economic growth."

In addition to PROCAMPO, several other programs have been important sources of post-NAFTA support. Farmers who were forced to leave land fallow due to a lack of water are receiving support through an agreement among SAGARPA, the Fideicomiso de Riesgo Compartido (FIRCO), and farmer organizations. According to this agreement, farmers are paid 905 pesos per hectare of land that could not be sown. Those who rented land that could not be planted due to drought received the additional payments this year, on the condition that they excuse their leasers from paying rent the following year. In addition to this special support, farmers are entitled to funds from an emergency program designed to enable them to harrow fallow land twice to prevent weeds. The programs are not without drawbacks. According to Felix Gonzáles, by the end of March 2004, 25% of the drought relief checks for fall-winter cycle had not been sent. Moreover, according to a recent survey, 60% of private farmers have received resources for one harrowing, but will not receive funds for the second round for lack of government resources (Flores, personal communication).

Organization as a Tool

Farmers have faced difficult times in Mexico as they confronted rising production costs, falling prices, and international competition. Though encouraged by the government to take advantage of export opportunities under NAFTA, the implementation of domestic policy changes has left many without the necessary support programs, capacity building initiatives, or investment opportunities. Farmers with large holdings, private resources, and political connections have been able to take advantage of trade opportunities, but medium- and small-scale farmers have been left to seek out other sources of support. Many farmers have responded to their increased vulnerability by seeking strength in association. Organizing and working cooperatively have proven to be important tools for obtaining much needed inputs, technical services, and marketing assistance. Unions and farmer associations have provided crucial help for farmers to cope with increased vulnerability in an international market and the eroding profitability of farming.

Farmers associations are abundant in the Yaqui Valley (Table 3), though few attempts have been made to classify them or to gauge their importance to the agricultural sector. Most are regional organizations, often farmer-owned and, for the most part, politically independent. Many existed before NAFTA, starting from the late 1970s when they helped private farmers to leverage better prices in negotiations with CONASUPO. The *Asociación de Organismos de Agricultores del Sur de Sonora* (AOASS), headquartered in Ciudad Obregón, is one of the largest associations, representing 7 individual organizations and 3,500 farmers. Ciudad Obregón is also home to 24 rural production societies (RPS), as well as the *Unión de Ejidos Colectivos Yaqui-Mayo* (UECYM). In addition to these

farmer associations, credit unions serve an important organizational function. Some of the larger ones in the area include the *Unión de Crédito Agrícola de Cajeme* (UCAC), which has 408 active associates; and the *Unión de Crédito Agrícola del Yaqui* (UCARYCSA), with 1,440 associates.¹⁸

Credit unions are even more important today than in the past, not only because they provide basic services formerly offered by parastatal organizations, but also because they serve as facilitators for government assistance programs and as a buffer between individual farmers and the market. One of the basic services offered by credit unions includes timely procurement on credit of agricultural

Table 3. Farmer organizations in the Yaqui Valley, Sonora, Mexico, 2003.

Type of organization	Sector	Example	Primary function	Positive qualities	Negative qualities
Credit Union	Private	Union Cajeme	<ul style="list-style-type: none"> - Marketing assistance - Low-cost inputs - Insurance 	<ul style="list-style-type: none"> - Increase economic efficiency - Politically independent 	<ul style="list-style-type: none"> - Powerful influence over farmers - Lack adequate information regarding price
Farmers associations	Private	Asociación de Productores de Hortalizas del Yaqui y Mayo	<ul style="list-style-type: none"> - Marketing assistance - Technical support 	<ul style="list-style-type: none"> - Give farmers market leverage - Management of agricultural products 	<ul style="list-style-type: none"> - Lack adequate information regarding price
Farmers associations	Public	Coalición de Ejidos Colectivos del Río Yaqui Mayo	<ul style="list-style-type: none"> - Marketing assistance - Low-cost inputs - Insurance 	<ul style="list-style-type: none"> - Give farmers market leverage - Management of agricultural products 	<ul style="list-style-type: none"> - Corruption - Unable to provide credit
Rural Production Societies	Public	La Cuchilla	<ul style="list-style-type: none"> - Marketing assistance 	<ul style="list-style-type: none"> - Receive direct support from government programs 	<ul style="list-style-type: none"> - Lack of information regarding market tendencies
Congresos	Both	UNORCA	<ul style="list-style-type: none"> - Political influence 	<ul style="list-style-type: none"> - Help to locate markets - Give political leverage to farmers 	<ul style="list-style-type: none"> - Manage political power - Corruption
Alianzas Campesinas	Both	COPRICOM	<ul style="list-style-type: none"> - Marketing assistance - Low-cost inputs - Technical assistance 	<ul style="list-style-type: none"> - Assist farmers in the <i>ejido</i> sector in increasing efficiency of production 	<ul style="list-style-type: none"> - Manage political power - Corruption
Despachos	Both	Empresa Integradora del Maíz Calidad Veracruz S, de R.L. de S.V.	<ul style="list-style-type: none"> - Provision of agricultural extension to farmers - Increasingly involved in provision of inputs, and project development 	<ul style="list-style-type: none"> - Help to organize farmers and demonstrate the benefits of organizing 	<ul style="list-style-type: none"> - No formal experience, not prepared to teach farmers - Manage political power - Not responsible to other institutions

¹⁸ More systematic research is required to understand the role of farmer associations in Sonora at the level of farmer participation, in the percentage of the state grain trade that they manage, and in providing other services and inputs to farmers. In particular, data including the number of members of farmer organizations and their total market share would help to demonstrate their importance in Sonora's agricultural economy.

inputs such as seed and agro-chemicals. However, the full range of roles that unions play is much more complex, from providing farmers with marketing assistance, extension services, and price information, to offering credit and crop insurance policies. Marketing services in particular are one of credit unions' more important functions, enabling farmers to obtain better prices for their grains by reducing the commission on sales. As a result of their interaction with credit unions, farmers are generally able to produce and market their crops more efficiently, an important advantage in an environment of falling commodity prices.

To meet the need for scientific input and agricultural research, both unions and farmers clubs have served as forums for private landowners to share technical innovations and to learn about alternative crops and production techniques (see example "Crop Diversification: The Road Ahead," p. 27). Jorge Castro is a member of a farmers club named the *Club de Productores Locos* or Club of Crazy Farmers, a group of 20 farmer-innovators that belong to the Unión UCAY. The group meets to exchange ideas and experiences regarding avant-garde agricultural experiments. In addition to being an avid promoter of these types of farmers clubs, Jorge Castro himself has undertaken a number of innovative projects. One that proved particularly prescient was the use of recycled water for crop irrigation, now an increasingly common practice in the Yaqui Valley. In the face of water scarcity, farmers associations have also spurred the search for agricultural alternatives. Recently, members of UCARYCSA, UCAC, UCAINSA, the Unión de Yaqui, and the Patronato para la Investigación y Experimentación Agrícola del Estado de Sonora, A.C., made an exploratory trip to citrus cooperatives in Spain, in the hopes that aspects of both the business model and citrus production techniques could be applied successfully in the Yaqui Valley.

Farmers associations have served in the Yaqui Valley as important entry points for many post-NAFTA government assistance programs. In fact, many programs require applications to be submitted as proposals from organized groups, due to the greater facility, accountability, and impact of working with groups over individuals. *Apoyos y Servicios a la Comercialización Agropecuaria* (ASERCA) is an organization created by the Secretary of Agriculture in 1991 to promote the commercialization of agricultural

production and administer PROCAMPO. Farmer associations have been important in facilitating four key government programs in support of (1) the purchase of agricultural insurance, (2) the promotion of contract agriculture, (3) the collective storage and marketing of harvests, and (4) the establishment of federally inspected slaughterhouses.¹⁹ Many such programs are designed so that only organized groups and farmers with large holdings can take advantage of them. For example, the agricultural insurance program offers contracts for producers with minimum yields of 136 tons of grain (ASERCA 2003). For small-scale farmers, whose harvests average 4-5 t/h, meeting the minimum requirements requires organizing to pool individual harvests.

Organization at the international level has facilitated farmers' interactions with foreign partners and entrance into international markets. One example of this is in the marketing of Mexican wheat. After CONASUPO was dismantled and governments price guarantees withdrawn in 1992, there reigned a period of relative chaos, with fierce competition between different unions involved in commercializing wheat. Because there were few industrial buyers, those in the market were able to negotiate highly advantageous terms (Favela, personal communication). Prior to 1994, wheat had never been exported from Mexico. However, with the advent of NAFTA and the increasing openness of agricultural markets, farmers turned their sights toward foreign markets. In 1994, several important unions in Obregón began to consolidate efforts in marketing wheat through the formation of the *Asociación de Organismos de Agricultores del Sur de Sonora* (AOASS).

AOASS focused much of its effort on obtaining contracts for Mexican grains, particularly for durum wheat. In 1998, the association partnered for the first time with Cargill, an American company that acts as an international grains broker, to form a joint marketing venture called PROAOASS. AOASS is the majority shareholder and owns the physical assets (elevators, grain storage facilities, etc.), while both organizations share the financial risk and information on markets and margins. In 2002, Cargill's agreement with AOASS called for the company to market

¹⁹ These programs are officially called, "coberturas agrícolas," "pignoración de cosechas," "agricultura por contrato," and "apoyos a rastros tif."

500,000 tons of durum wheat from AOASS members (Cargill 2002), an arrangement that helped Mexican farmers to break into international markets. Describing the importance of the partnership, Ben Smith, manager of Cargill's grain business in Mexico, said: "It was difficult convincing farmers to do business with a big, American company that was looking to set up shop. We concluded that working with the cooperative was the key to working in the state of Sonora." (Cargill 2002).

These kinds of partnerships were one of the benefits expected by Mexico's government to result from free trade agreements. Although more common in the manufacturing sector, the frequency of such arrangements also increased within the agricultural sector. Whether they represent equitable and sustainable partnerships remains to be seen, particularly if continuing drought in the Yaqui Valley prevents farmer associations from meeting their obligations in production contracts. Moreover, there are examples in which the strength of the multinationals places Mexican farmer associations at a disadvantage. According to de Ita (2003), many farmers' organizations that have infrastructure and experience in marketing do not have the liquidity to enter into government-subsidized grain storage schemes. As a result, they become the tools of the large multi-nationals who pay them lower prices for grain collection and storage than they would receive directly from the government. Moreover, the concentration of the market enables grain buyers to place downward pressure on the prices that farmers receive, further skewing them away from the actual costs of production (de Ita 2003).

Farmer associations can provide farmers with market leverage, but can also serve as instruments of political control. Most associations formed by private farmers in the Yaqui Valley are politically independent, but often are more successful when they have access to high-level political connections. Moreover, some large-scale regional organizations and small-scale farmer associations use their influence over farmers to amass political power, often by trading services or allowing participation in agricultural projects in return for votes. There is evidence that the larger farmers associations in Sonora have declined somewhat in power over the past decade. Evidence of strain has been noted in important credit unions, which, according to Gonzáles (1996), is a sign of deterioration in

Sonora's production model and of the growing agricultural crisis spurred by economic liberalization.²⁰

The public sector has its own farmer associations, but ejiditarios often face a much more difficult struggle to obtain basic agricultural services. Obtaining credit in particular remains a large problem because the closing of BANRURAL left many farmers in arrears²¹ and unable to obtain credit. *Despachos* are private individuals or organizations that provide agricultural services, assist ejiditarios with the provision of credit and inputs and with soliciting funds from government assistance programs. The individuals who run these organizations retain a great deal of power over those who seek their services, contributing to the culture of cronyism and corruption already rife within many ejidos. Ejiditarios unable to obtain the required support for agriculture are increasingly turning to the rental market and seeking alternate sources of employment. Moreover, as they leave the organizations through which they are supposed to access government benefits, they become increasingly isolated from public support programs.

Crop Diversification: The Road Ahead

One of the major goals of NAFTA was to effect Mexico's transition toward the production of the crops for which they had a "competitive advantage." While Mexico has never been able to compete very effectively in grain production with Canada or the USA, the quantity of cheap labor in Mexico made the export of fruits and vegetables seem like a plausible and potentially profitable alternative under NAFTA. Toward this end, the government has invested in programs under both Alianza and ASERCA, which support the reconversion of lands previously devoted to primary commodities, as well as the promotion of "strategic" crops such as citrus, avocado, prickly pear, and canola. With unstable markets and the looming water crisis, farmers themselves have started to realize the hazards of relying solely on basic grains. Why then has the pace of transition to crops of competitive advantage proceeded more slowly than expected in the Yaqui Valley?

²⁰ Gonzáles (1996) cites violent confrontations between members of UCAY in Ciudad Obregón reported in *Opinión*, May 30, 1993, *El Imparcial*, April 29, 1993, and *De Acá*, May 27, 1993.

²¹ The term most commonly used for this is "*Cartera vencida*."

Naylor et al. (2001) identified farmers' responses to domestic policy changes, the initiation of NAFTA, and some of the biological and financial shocks that Mexico experienced during the early 1990s in terms of three major changes in agricultural production patterns. These include the development of the livestock sector, the emergence of aquaculture, and the production of higher-value crops, including fruits and vegetables.

The growth of the livestock sector during 1991-96 was fueled in part by the change in subsidy policies under NAFTA, which lowered grain prices. According to Naylor et al. (2001), wheat became increasingly important as a local livestock feed, and up to half the Valley's wheat output was used for feed by the 1990s. The recent decline in wheat production has had important impacts on the livestock industry. Many farmers in the Yaqui Valley continue to maintain some livestock, as the profits they earn from this activity are much higher than from the sale of basic grains. However, the scale of these operations remains relatively small, and only a small percentage of farmers in the Valley participate (Flores, personal communication). With the increasing scarcity of water, farmers with larger operations have acted to insure their grain supplies against future shortages.²²

Aquaculture in the form of shrimp farming emerged in the late 1990s and became popular among ejidatarios who had what they thought to be low-value parcels near the sea. Shrimp farming went through a small boom, as private groups became interested in the profits and elbowed into the competition. Shortly following the peak in production, there was a downswing caused predominately by domestic and international competition, as well as disease and unsanitary maintenance practices. Coincidentally, Ocean Gardens, one of the main marketers of Sonoran shrimp, was based in the Twin Towers in New York, and the events of September 11, 2001, temporarily halted production and marketing activities. Aquaculture is currently reviving and may continue as an important future source of income.

One of the prospects of greatest promise under NAFTA, both for Sonora and for Mexico as a whole, was the expanded production of high-value crops, including fruits

and vegetables. Production of these crops was encouraged in the Yaqui Valley by new economic openness, increased urbanization, and rising per capita incomes, which allowed for investment in new production technologies (Naylor et al. 2001). However, for several reasons the area under vegetables and fruit did not expand as quickly as anticipated (Figures 10 and 11).

Underlying Mexico's participation in NAFTA was the assumption that, because Mexico had ample supplies of cheap labor, it would have a competitive advantage in the production of labor-intensive crops. However, the availability of labor in the Yaqui Valley has been

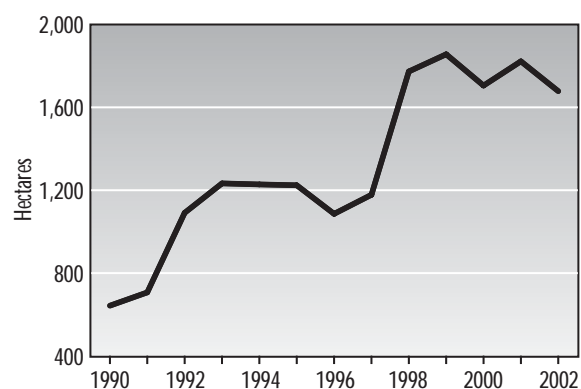


Figure 10. Area sown to perennial fruits, Yaqui Valley, Sonora State, Mexico, 1990-2002.

Source: SAGARPA, Comision Nacional del Agua, Distrito de Riego 041 (CNA)

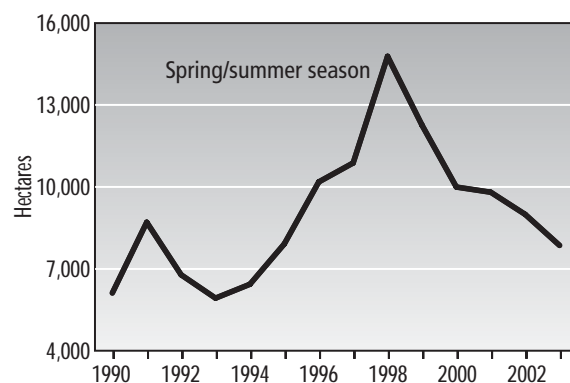


Figure 11. Area sown to vegetables, Yaqui Valley, Sonora State, Mexico, 1990-2003.

Source: SAGARPA, Comision Nacional del Agua, Distrito de Riego 041 (CNA)

* Spring - Summer ** Autumn - Winter

²² The price of wheat has actually increased dramatically in the 2003-2004 cycle, because only 8,334 hectares were sown, as opposed to the 2002-2003 cycle's 159,703 hectares.

diminishing in recent years, due to the drought and the lack of profitable employment, both of which have encouraged migration to the USA. The lack of a local labor force has led employers to look further afield, sometimes bringing in groups of workers from villages in states with large indigenous populations, including Guerrero and Oaxaca. Most of these laborers are unable to afford the crossing into the USA and are willing to accept low wages and poor working conditions because of the limited employment opportunities in their home areas. The price for a day's labor in the Yaqui Valley is 70 pesos, which is the equivalent of US\$6.20.²³

Another factor that has hampered fruit and vegetable production is the lack of specialized production knowledge. For certain crops, particularly those not traditional in Mexico, technical knowledge about pests and diseases is often lacking. Projects for fruit and vegetable production, particularly those involving technologically advanced greenhouses, require the assistance of a project biologist or someone with specific knowledge about the pests and diseases for the particular crop.

The most important barrier to diversification into fruits and vegetables is the level of investment required. This issue is increasingly on farmers' minds, as drought causes them to rethink their production strategies. Farmers in the Yaqui Valley have been attracted recently by the prospect of utilizing greenhouses or shade houses to produce fruit and vegetables. Ideally greenhouses or shade houses can reduce ambient temperatures and, if combined with aspersions or drip irrigation, can be relatively water efficient.²⁴ The major obstacle, particularly for greenhouses, is the cost. Constructing a greenhouse runs approximately 100,000 pesos (slightly less than US\$10,000) per hectare (Cornejo, personal communication). Added to construction costs are those required for chemical applications, which are particularly intensive for fruits and vegetables not grown organically.

Government programs exist to help farmers make these kinds of investments and technological changes, particularly under the programs of both ASERCA (see the example of citrus below) and Alianza para el Campo.

However, the levels of resources needed for greenhouse construction are far beyond the reach of small-scale and many medium-scale farmers. Compounding the problem of high initial investment is the insecurity of fruit and vegetable markets. Farmers in the Yaqui Valley have experienced market volatility first-hand, when surges in the production of products such as melon or onions caused prices to drop and forced farmers to leave crops to rot in the field. Another common problem is the lack of a market altogether. Making contacts across the border is difficult but essential, when there is a plentiful harvest.

One response to the problem of market insecurity has been the rise of contract agriculture. An important impetus to this comes from private companies, which not only facilitate contract production but provide technology, infrastructure, and investments that farmer associations lack. Since NAFTA, rural production societies in the Yaqui Valley have in some cases served as important focal points for foreign investment, partnerships, and technology transfer. La Ceiba de la Cuchilla is one example, in which an ejido-based producers' association partnered with an Israeli company to build greenhouses for tomato production. The company provided not only construction materials, seed, irrigation, and greenhouse technology, but also training and market contacts. While La Ceiba sometimes has trouble meeting the strict quality standards of its American buyers or obtaining a profitable price for its tomatoes, it is one of the few examples of an ejido-based group that has been able to enter into the export market. The insecurity of vegetable markets makes contract production attractive, but foreign direct investment in Mexican agriculture remains relatively low, and there are few foreign partners who participate in contracts with Mexican farmers. Moreover, farmers cite difficulties in working with foreign partners, such as overly high standards for agricultural products.

Turning to Citrus

In addition to annual fruits and vegetables, farmers in the Yaqui Valley are looking into citrus fruits as alternative crops. Citrus crops are being promoted by Alianza para el Campo under a program of direct support to producers for reconversion of land devoted to basic grains, and integration in value-added chains. One of the reasons

²³ This information was collected in March, 2004.

²⁴ The problem remains that most farmers who do not have wells or live

citrus is so promising is that Sonora does not suffer infestation of fruit flies, one of citrus' most common phytosanitary problems elsewhere. Citrus trees take 5 to 6 years to begin producing and require an investment of approximately 50,000 pesos (US\$ 5,000) per hectare (Rubalcava, personal communication). Many farmers are planning to take advantage of the Alianza program, which enables them to pay the interest for their citrus projects after five years, when the orchards are actually producing. Some ejidos are getting in on the citrus boom far ahead of their private counterparts. According to Luque Favela of AOASS, ejido organizations are in many senses more organized when it comes to diversifying their harvests. Many already have greenhouses and have started to invest in citrus orchards, whereas private farmers are just starting exploratory research.

Alejandra Peraza Rubalcava, director of COPRICOM, an ejido-based rural producers' society, is a strong advocate of citrus crops for Yaqui Valley producers. Fifty rural production societies associated with COPRICOM are participating in a project to grow 425 hectares of oranges, with technical assistance from universities in Florida and California. The next phase of the project will involve the development of a citrus-processing industry, so that when prices for the unprocessed fruit fall, the ejido's citrus can be funneled into juice production. In this way, COPRICOM hopes to avoid the problem of market gluts and unstable commodity prices.

While diversification into citrus looks promising, farmers may have trouble exporting citrus fruits to the USA because of the strength of Florida's citrus industry, which has annual sales of US\$1.6 billion and employs nearly 90,000 people (San Martin and Brand 2003). Under NAFTA, there were special provisions for citrus granting a 15-year phase-out on import tariffs and a snapback provision, in which tariffs are reinstated if there are shifts in price and import volume. Citrus exports from Brazil were recently subject to an anti-dumping order from an international trade court and the imposition of an excise tax, which provides protection and support to citrus products processed in the USA (Trade Policy Monitor 2002). This and similar incidents suggest that international trade is "free" only when it does not impinge on the interests of the stronger producer groups.

Personal Perspectives on NAFTA in the Yaqui Valley

The Yaqui Valley was positioned to receive many of the benefits from free trade and some of the most direct and detrimental market impacts. Generally speaking, the Yaqui Valley has fared relatively better during the first 10 years of NAFTA than other parts of Mexico. While smaller-scale farmers have been hurt by the reforms, particularly in terms of the costs of production, mid-scale and large-scale private farmers have relied upon private resources and the support of farmer associations to maintain their production levels and begin experimenting with high-value crops. Water shortages, over and above the changes brought by market liberalization, are having an immense impact on farmers' livelihoods. Continuation of the drought could speed the transition to alternative crops or take many farmers out of agriculture altogether, exacerbating already high levels of migration.

Although many producers in the Yaqui Valley have a superficial understanding of NAFTA, acquired for the most part from television and radio commentary, those who have considered its affect on their lives often express feelings of betrayal by the government for having entered into an agreement which was not made on a level playing field. Many feel that Mexico is hampered not only by disadvantages in agricultural production, but by the high level of subsidies afforded US farmers and blockades imposed by the US on free trade. In addition, farmers in the Yaqui Valley claim that NAFTA has had negative impacts on their ability to market products, both in terms of the lower prices they receive for their goods, which reflect neither the quality of the products nor the high costs of production, and in terms of the standards for export, which are often too high for them to achieve. Many have despaired of Mexico ever catching up to its trade partners and, according to Luque Favela, see the situation as one in which the government is simply helping farmers to survive from day to day, rather than to take advantage of new trading opportunities or reach a competitive trading status.

As has been discussed at length, crop and income diversification are among the strategies that farmers are using to cope with current economic conditions. Migration is another option that has become increasingly common.

Both manual laborers and individuals with technical training and education are seeking better paid employment abroad, often as unskilled laborers. Along with family and work connections, the main factor that determines the ability of laborers to cross the border is cost. In Nogales, the price of an illegally assisted crossing runs from US\$800 to 1,500.

Remittances from migrants are increasingly important to Mexico's economy. The central bank of Mexico reported that remittances in 2004 exceeded US\$16 billion and showed an annual growth of 24% (Banco de México 2005). Moreover, emigrants who return to Mexico often bring savings to invest in the construction of a home or business. However, the benefits of migration for the Mexican economy may involve trade-offs for migrant families themselves, particularly in terms of cultural identity and family cohesion.

Summary

One of the major objectives of NAFTA from the Mexican government's point of view was to modernize agriculture, increase productive efficiency, and reduce the high cost of agricultural subsidies. While many of these changes have taken place within the Yaqui Valley, along with these benefits participation in NAFTA has incurred social consequences that, though predicted, have largely gone unaddressed by government policy.

On the positive side of post-NAFTA developments, diversification is slowly starting to occur in the Yaqui Valley, particularly with the help of private investors. Although foreign direct investment in agriculture has not risen to the same extent as in other sectors of Mexico's economy, foreign companies interested in the promotion of modern production technologies have played and will continue to play an important role. Current changes in agricultural production in the Yaqui Valley are as much a result of environmental factors as of government policy. According to Luque Favela, "it has unfortunately required the problem of drought to advance the process of diversification," as farmers are finally starting to realize the importance of having different kinds of crops and multiple income-earning activities, to cope with adverse climate and market conditions.

The Yaqui Valley has also experienced some of the more negative aspects of openness to international markets in the post-NAFTA years, particularly in terms of social dislocation among small-scale private farmers and within the ejido sector. PROCAMPO and the other farmer support programs established to address the fallout from NAFTA reforms have not provided adequate support for farmers already in precarious economic positions. The experience of the Yaqui Valley with NAFTA suggests that, even in areas considered favored in terms of economic and environmental resources, farmers have had difficulty making the livelihood transitions necessary to participate in international trade.

Part IV. Maize Production in Veracruz²⁵

Maize production has become a rallying point for many Mexican farmers, both as a symbol of national pride and of resistance to the dictates of the global marketplace. Maize production has also become more profoundly associated with poverty, as most small-scale farmers have stubbornly struggled to eke out a living growing a crop for which they have no “comparative advantage.” One NAFTA outcome that differed most from general expectations was the continued stability of maize production in Mexico—with area under maize actually expanding—despite a flood of imported maize and a subsequent, sharp drop in maize prices. An analysis of farmers’ responses in Veracruz suggests that, rather than shifting out of maize production, many Mexican farmers have instead worked to find new ways to make the sale of maize profitable. In addition, farmers have altered their livelihood strategies to adjust to current economic conditions by taking advantage of new niche markets under NAFTA.

Veracruz has areas of commercial maize production and others where almost all production is for home consumption and/or sale in local markets. Because the state has a range of types of farmers, examining the

In many ways, the story of maize under NAFTA is much more dramatic than that of wheat, because of its cultural importance in Mexico and its role as staple food crop.

impacts of NAFTA on maize production in Veracruz helps to shed light on the varying strategies to cope with lower maize prices. Unlike in the Yaqui Valley, there have been few studies documenting changes in agricultural production in the region before or since NAFTA. Therefore, much of the

analysis here depends on field observations and farmers’ own historical accounts.

Veracruz has invested in the diversification of products for export and in programs to facilitate contract production, but most farmers in the state remain outside export channels. Rather than rely on government support, these farmers have instead developed cooperative and value-added strategies to squeeze more profit from their maize grain. Conversely, in the Totonacan region of Veracruz, small-scale maize producers are actually entering into the export market with a by-product of maize. These farmers are working to satisfy the growing demand for *totomoxtle* or maize husks, fueled in part by the growth of immigrant communities abroad. During a time when maize values have dropped, the growing market for maize husks has created new incentive for production of maize and the conservation of criollo maize varieties.²⁶

²⁵ In addition to direct citations, this chapter was written with input from several sources. Much of the work is based on interviews with farmers, employees of government institutions, local-level officials and extension workers, carried out over the months of October through May of 2004 in various regions of Veracruz, particularly in the Totonacan region to the north and the municipality of Acayucan in the south. In addition, general orientation, insights, and regional data were provided both by Dagoberto Flores and Alejandro Ramírez of CIMMYT and Ingeniero Alejandro Colorado based in Coyutla, Veracruz. Dagoberto Flores in particular brought to my attention the significance of maize husks and the growing domestic and international market for this product. Finally, an aid to thinking objectively about the effect of NAFTA in marginalized areas is the MSc thesis of Lisa M. Roberts (2003) that describes the impacts on small maize producers in Guerrero state.

²⁶ There are practically no primary data on production levels or market size for maize husks. This does not detract from their importance to farmer livelihoods in the Totonacan region of Veracruz and for farmers in Puebla, Mexico, Tlaxcala, and various other states in Mexico. The lack of data could be attributed to the fact that husks are a maize by-product of regional importance, and that they have a relatively small share in international agricultural markets. However, with continued migration and the growth of Latino communities in the USA, the domestic and international markets for maize husks are growing. Further research is needed on the size of maize husk markets, the levels of farmer participation in them, and the economic impact of the husk trade.

Veracruz: A General Description

While it is not one of the poorest states, Veracruz is considered by the Mexican government to be a marginal state with pockets of poverty that overlap areas dominated by indigenous populations (see map). Veracruz is one of 10 states in Mexico with the highest proportion of indigenous peoples, including Totonacos, Huastecos, Tepehuas, Otomíes, Popolucas, Mixtecos, Zapotecos, Mixes, Nahuas, Chinamecos, Mazatecos, and Zoques. According to the latest census by INEGI (1998), 754,300 people speak indigenous languages, or 10.9% of the total population.

Although sugar cane and citrus are important cash crops in Veracruz, maize production is still one of the most common occupations in the state. Veracruz is the 6th highest

national producer of maize, with an area of 669,238 hectares (SEDARPA 2003). Approximately 40% of maize production is for household consumption, while 55% is sold to the flour industry, nixtamal millers,²⁷ and state or national level tortilla makers (Table 4; SEDARPA 2003). Although farmer maize varieties are more common in Veracruz, hybrids are used in about 20% of maize production. Veracruz has some commercial maize production, but few farmers produce on the scale found in northern states where the most competitive commercial maize growers are located.

Commercial maize production is practiced mostly in the southern part of the state, by medium-scale farmers. Some of the more important commercial maize growing areas include Los Tuxtlas, Llanos de Sotavento, Acayucan, and Jáltipan. In these areas, it is common to find both hybrids and hybrids that have gone through creolization, a process by which improved varieties are exposed to farmer management, seed selection, and hybridization with landraces (Bellon and Risopoulos 2001). Yields in the best producing areas of Veracruz can reach as high as 7 tons per hectare; however, in most of the state average yields are lower than 2 tons per hectare. There are traditionally two planting seasons, but the lack of rain in autumn–winter season, in combination with the loss of topsoil from the burning of crop residues, has greatly reduced the harvest from the second planting in recent years. As a result, many farmers have given up on a second planting, and instead use the 6 months of fallow time to migrate north where they find temporary employment in the maquiladora industry, returning home in time for the spring planting. Other common income-earning activities in Veracruz's southern region include sorghum production and cattle-raising.

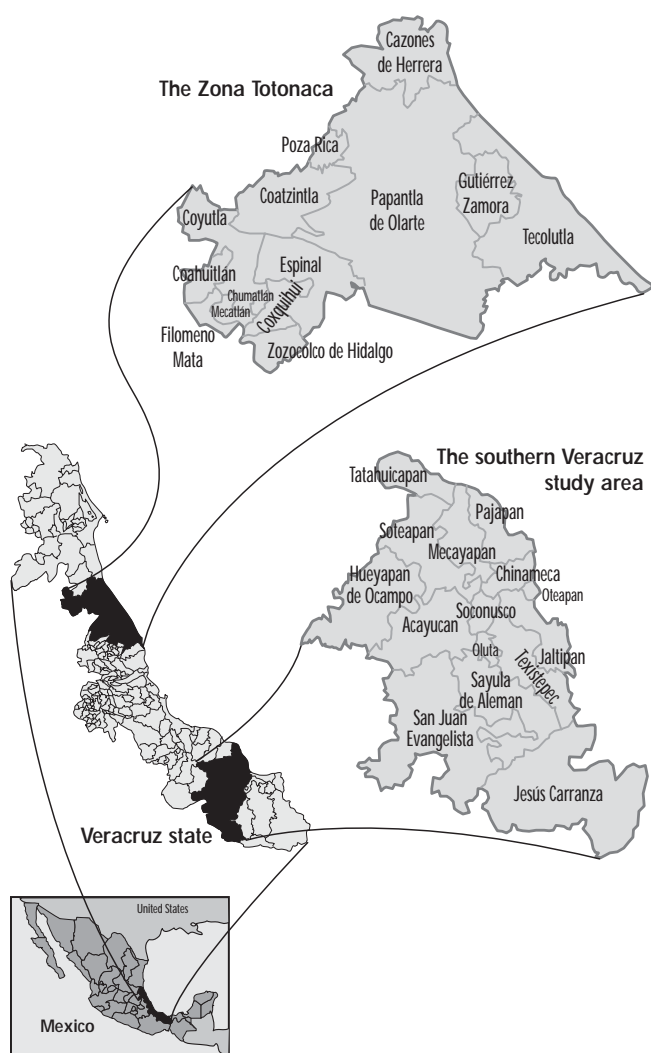


Table 4. Use of maize, Veracruz State, Mexico.

Destination	Percent production used
Household consumption	40%
Flour industry and nixtamal millers	55%
Export	<5%

Source: SEDARPA, 2003.

²⁷ *Nixtamal* is the mixture of maize grain, lime, and salt that is milled to make the dough used for home-made tortillas.

Many northern midaltitude regions in Veracruz are dedicated to what has been termed as “subsistence production” of maize. The Zona Totonaca lies in northern Veracruz in the area of Papantla, which once was known as the vanilla capital of the world. The Zona Totonaca is inhabited primarily by Totonacos, although there are also pockets of other indigenous groups, particularly the Otomi. It is isolated from many services, though most communities have electricity, clinics, and primary schools.

Although maize production in the Zona Totonaca is mostly for household consumption or for sale in local markets, small quantities of maize are sometimes sold in regional markets. The maize varieties grown in this area are primarily criollo or local varieties kept by families over generations. In this area, land holdings are small and are prepared manually. Fertilizers are mostly organic, and pesticides are used when household incomes will allow. High levels of rainfall in the region sustain two maize cropping seasons: spring-summer (June-December) and fall-winter (December-June). In addition to agricultural production, many families augment their income either through off-farm employment in larger cities, or as day laborers in larger farms, orchards, or ranches.

Due to its steep and irregular topography and isolation from regional markets, the region does not produce large quantities of cash crops. Important exceptions are citrus, coffee, and banana. Citrus fruits are crops of major importance in Veracruz, though the price is low and most output is sold on national markets, rather than being exported to the USA. Coffee has lost much of its market value because of worldwide overproduction.

NAFTA's Impact on Maize Production

Maize was treated as a special case under NAFTA because of its importance as a staple food crop. Under NAFTA provisions, Mexico had an extended transition period during which tariffs on maize imports were to be lowered at regular intervals, and penalties could be charged on the imports that were above the approved quota. Before NAFTA was implemented, macroeconomic models had predicted that maize output would decline up to 20% (Taylor and Dyer 2003). It was also suggested that while production would continue on irrigated lands, commercial

maize growers in rainfed areas would be hurt by falling grain prices and would either make their production more efficient or shift to other activities. Subsistence growers and landless workers, on the other hand, were expected to suffer job losses and lower wages, and would likely be forced to seek alternative employment.

Following NAFTA's implementation, maize production did not decline. Instead, despite increases in US maize exports, domestic maize production actually increased, as irrigated areas became more productive and the area devoted to rainfed maize production expanded, with farmers squeezing as much production as possible out of marginal lands (Figure 12). Whereas falling maize prices spurred commercial farmers to produce more efficiently and displaced farmers who could not compete, NAFTA's effects on rainfed producers are not as easy to interpret. One hypothesis, examined here in the context of Veracruz, is that the rainfed maize sector restructured following liberalization, so that maize production became a subsistence activity, while farmers channeled resources into other crops or income-earning activities (Dyer-Leal and Yúñez Naude 2003).

Changes under NAFTA

Agricultural production in Veracruz does not fall neatly into the categories of rainfed subsistence or irrigated commercial production. While almost all maize production in Veracruz is rainfed, farmers in different parts of the state exhibit varying degrees of market integration. After NAFTA, farmers in the south who were producing for

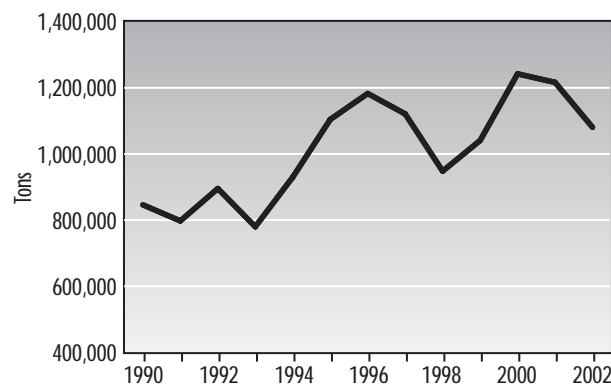


Figure 12. Maize production, Veracruz State, Mexico, 1990-2002.

Source: SIACON, SAGARPA, Mexico

commercial sale were able to achieve neither the efficiency nor the output to compete against grain producers in the north of Mexico or imports from the US. Because of their proximity to the city of Veracruz, a major port for American grain, NAFTA created strong competition for local grain producers. Moreover, loose regulation of import quotas caused local markets to flood with imported grain, leading to a drop in prices (Figure 13). At the same time, farmers who were augmenting household income by working as wage laborers suffered drops in wages. Many of the small-scale farmers in the area turned to cattle-raising or labor opportunities in the north to cope with falling grain prices (Figure 15).

In more marginal areas in northern Veracruz, farmers were more insulated from changes in the national price of grain, in part because they were not big commercial producers to begin with. However, in the Zona Totonaca, as in many more isolated areas of Mexico, there is still a degree of market participation, as families sell or purchase small quantities of surplus grain for household needs. Before the disappearance of CONASUPO, many maize farmers in the Zona Totonaca had sold their maize to Diconsa at a guaranteed price. Following the disappearance of CONASUPO, selling maize grain was no longer profitable, but farmers continued to produce maize for household consumption and for sale at local markets (Figure 14). Following NAFTA, the falling price of grain affected these local-level sales, causing farmers to look toward alternative crops for income or to expand into other income-earning activities. A few farmers began producing

vegetables, such as chili and tomatoes, for regional markets; however, their numbers remained limited due to unstable prices, pest and disease problems, and the long distances to market. Other farmers opted to plant citrus fruits or searched for jobs as wage laborers, either on larger citrus plantations or in cattle ranches closer to the coast (Figure 15).

Farmers in Veracruz were not as strongly affected as farmers in Sonora by rising production costs following domestic reforms, largely because most farmers sow their saved seed and use much less chemical fertilizer or pesticides than large-scale commercial growers. By contrast, farmers were greatly affected by the loss of reliable sources of credit. Prior to NAFTA, most ejidos and

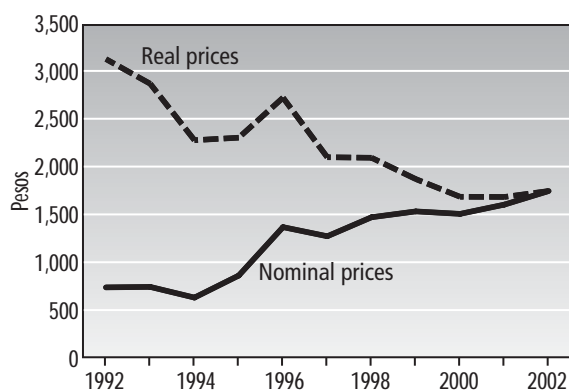


Figure 13. Mean rural price for maize grain, Veracruz State, Mexico, 1992-2002.

Source: Anuario Estadístico Agrícola, Servicio de Información y Estadística Agroalimentaria y Pesquera, SAGARPA, Mexico.

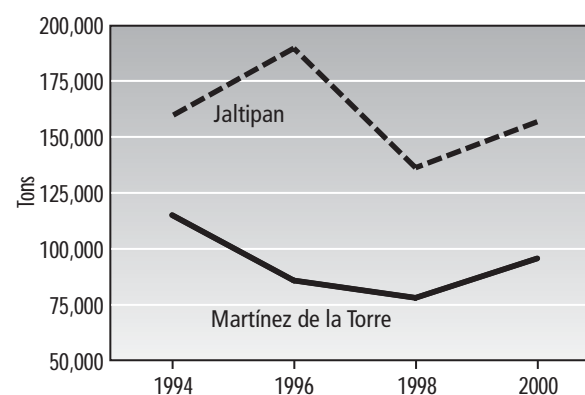


Figure 14. Maize production, Martínez de la Torre and Jaltipan Districts, Veracruz State, Mexico, 1994-99.

Source: Veracruz en Cifras, various years.

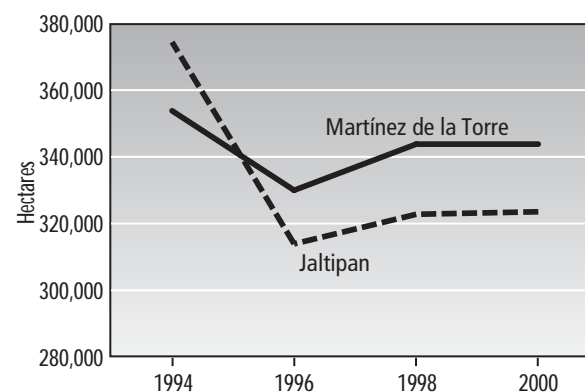


Figure 15. Area dedicated to cattle ranching, Martínez de la Torre and Jaltipan Districts, Veracruz State, Mexico, 1994-99.

Source: Veracruz en Cifras, various years.

small producers received credit through Banrural. When Banrural was closed, small-scale farmers were forced to seek other sources of financial support, including middlemen and private despachos. Many farmers still lack access to credit, and this remains a barrier for diversification into alternative crops.

Support Programs

PROCAMPO has played an important role in supporting farmers in Veracruz. Although the resources received in Veracruz are small relative to areas in the north where land holdings are larger, they have a greater impact due to the generally small-scale, low-tech nature of agricultural production in the state. In 2003, 396 million pesos (approximately US\$34 million) of PROCAMPO resources were distributed to 126,666 farmers covering 414,011 hectares in marginal municipalities (ASERCA 2003). This amount represents a subsidy of approximately US\$269 per person and approximately US\$82 per hectare. For maize producers who earn approximately US\$300 per hectare from the sale of maize grain and husks, this is a substantial amount of support (Table 5).

One problem with the implementation of PROCAMPO in Veracruz is that many farmers never registered to participate when the program was first established in 1993. Although there was an initial period of registration that lasted until 1995, many farmers were either not convinced or were unaware of the benefits of participating. According to Alberto Yiebra Martínez, supervisor of cadres for eight municipalities in the Zone Totonaca, the major reasons were fear and misinformation: "Many thought that they would have to give back the money and that the government would have rights over their land. After all, this was the first program of this type to put resources in the hands of the people." To rectify this situation, ASERCA is organizing additional sessions to register farmers for the five remaining years of PROCAMPO.

A recent addition to PROCAMPO is a program called PROCAMPO Capitaliza, which enables farmers to obtain their remaining five years of PROCAMPO cash transfers in one lump sum. The purpose is to provide farmers with enough capital to invest in more costly items, such as vehicles or farming equipment, to remedy disadvantages in transport or infrastructure. PROCAMPO Capitaliza has

the potential to become an important resource, particularly for farmers interested in producing export crops. However one story told by Roberto Russ of the *Unión de Maiceros del Centro y Sur de Veracruz*, a farmer association in South and Central Veracruz, indicates that some may be seizing the opportunity merely out of desperation. Russ tells of a town in southern Veracruz where a group of farmers contracted the services of a technician to solicit PROCAMPO Capitaliza on behalf of its members. Upon receiving the funds, the whole group used the money to pay for assistance to cross illegally into the USA. In reference to President Vicente Fox's frequent reference to Mexican immigrants as "national heroes," Russ counters with the statement: "They ought to protect farmers so that they don't go abroad. The heroes should be the ones that stay here and pay taxes."

Apart from PROCAMPO, government resources from the Program Alianza para el Campo are solicited by farmer associations and distributed through national and state government bodies, municipal officials, and ejido administrators. Many different kinds of projects are supported by Alianza, but the most common ones include grants for developing small businesses to process and market agricultural goods. In addition to Alianza programs, several government dependencies were established to support agricultural production in the state of Veracruz, including the *Secretaría de Desarrollo Agropecuario, Rural Forestal, Pesca y Alimentación* (SEDARPA), and the *Secretaría de Desarrollo Económico del Estado de Veracruz*, which focuses on more marginal farmers. In the Zona Totonaca, the *Comisión Nacional para el Desarrollo de los Pueblos Indígenas* (CONADEPI) also runs the Fondo Regional fund, through a group of representatives of 12 communities, which approves resources for projects in indigenous communities.

In Veracruz, as in many parts of Mexico, resources for farmers are disbursed through channels that can be influenced by corruption and political cronyism. Whereas soliciting project money is one way farmers can gain access to financial resources, the granting of project funds also serves as an efficient tool for political manipulation. In project proposals, it is common to find "community-based" projects that have an oversight committee populated purely by members of a single individual's family. In addition, projects managed through municipal

Table 5. Costs of maize production, lowland zone of Veracruz State, Mexico, spring-summer cycle 2003-04.

Activity or input (unit)	Unit Cost (pesos)	Maize grain*		Maize forage*		Fresh maize**	
		Quantity	Total cost (pesos/ha)	Quantity	Total cost (pesos/ha)	Quantity	Total cost (pesos/ha)
Soil preparation							
Disk Harrow	250	0	0	1	250	1	250
Plow	450	0	0	1	450	1	450
Harrow	250	0	0	1	250	1	250
Furrow	200	0	0	1	200	1	200
Cleaning with machete (pesos/work day)	60	8	480	0	0	0	0
Sowing							
Mechanized	200	0	0	1	200	1	200
Manual (work days) 60	6	360	0	0	0	0	0
Seed (pesos/kg)	\$3/kg criollo maize	20	60	0	0	20	700
	\$35/kg hybrid maize						
Cultivation							
Manual weeding (work days)	60	6	360	0	0	0	0
Weeding (animal-drawn plow/tractor)	200	0	0	2	400	2	400
Fertilizers							
Urea (kg)	3.0	100	300	100	300	100	300
18-46-00 (kg)	3.7	50	185	50	185	50	185
Amonium Sulfate (kg)	2.2	250	550	250	250	250	250
Cost of application (\$/work day)	60	2	120	2	120	2	120
Herbicides							
Harmony (grs 120)	120	20	120	20	120	20	120
Esteron 47 (lt)	65	1	65	1	65	1	65
Hierbamina (lt)	60	1	60	1	60	1	60
Applying herbicide (\$/work day)	80	1	80	1	80	1	80
Harvest							
Cutting the ear (work days)	60	9	540	9	540	9	540
Cutting fresh maize (work days)	60	0	0	0	0	12	720
Selling fresh maize (work days)	60	0	0	0	0	6	360
Transport of ears (number of trips)	100	3	300	3	300	100	300
Husk removal (work days)	60	5	300	5	300	300	300
Grain removal (work days)	60	9	540	9	540	540	540
Cost of packing (\$/pack)	10	0	0	100*	1,000	0	0
Harvest of fresh maize (ears)	60	0	0	0	0	0	0
Harvest of husks (number of rollos)	1	1,200	1,200	0	0	0	0
Total production costs - w/out husk			4,420		5,610		6,390
Total production costs - w/ husk			5,620				
Total income per product							
Grain (kg/ha)	1.60	3,000	4,800	4,000	6,400	3,750	6,000
Husk (\$ rollos)	3.50	1,200	4,200	0	0	0	0
Forage (packs)	12.00	0	0	100	1,200	0	0
Fresh maize (ears)	1.00	0	0	0	0	6,000	6,000
Net utility (\$/ha) grain - fresh maize							-390
Net utility (\$/ha) grain			380		790		
Net utility (\$/ha) grain + husk			3,380				
Net utility (\$/ha) grain + forage					1,990		
Net utility (\$/ha) fresh maize + grain							5,610
Net Utility (\$/ha) grain hybrid maize							1,610

* criollo maize ** hybrid maize.

Sources: Personal communication, Ing. Alejandro Colorado of Coyutla Veracruz and Cader of SAGARPA of the municipality of Espinal Veracruz. 20 farmers interviews from Arenal community, interviewed as part of a study on gene flow, CIMMYT, November 2003. This table was compiled by Dagoberto Flores, CIMMYT research assistant, and research associate Alejandro Ramírez López.

channels are sometimes used as a patronage tools, such that approval often depends on the whether the members of the project are of the same political party as the administration in power.

In addition to the fact that project money often come with strings attached, the complexity of soliciting project grants makes them relatively inaccessible to many marginalized communities. Farmers often have to hire the services of private technicians for assistance in forming legal entities and for putting together project proposals, which require both extensive preparation and solid business plans. Submitting proposals and receiving funds requires frequent travel, as papers must be submitted in satellite offices of government dependencies or in the capital city, Xalapa. In addition, members of approved projects often have to participate in weekly meetings to monitor progress. In summary, if farmers do not have the connections, the resources, or the know-how to court the various government dependencies for financial support, they are frequently either manipulated by middlemen or left out of the game.

As in Sonora, the termination of public extension programs in preparation for NAFTA left a gap in the provision of services to small-scale farmers in Veracruz. This gap was later partially filled by private individuals, known as either *técnicos* or *despachos*. While originally hired to provide extension support to farmers, the function of *despachos* has evolved to include a number of other services, including provision of low-cost inputs, credit, and the development of proposals to solicit government funds on behalf of farmer groups (see example of the grain cooperative below). Because of their utility to farmers and the fact that they are not accountable to any government entity, *despachos* can often wield tremendous power, providing services in return for favors and political support. Though there is great potential to abuse this power, the operators of some *despachos* protest that, not only are they honest businessmen, but they are helping to fill an important void. According to one: "The problem is only when somebody wants to gain an indecent profit. But what I do is clean and transparent. The government uses me as an intermediary because they can't get the resources out to farmers."

Marketing Help

The distribution and primary processing of grains is one of the most concentrated sectors in the world (de Ita 2003). Three major cartels operate in Mexico: Cargill, in collaboration with Continental; Archer Daniels Midland (ADM), in collaboration with Maseca; and the group formed by Minsa-Arancia-Corn Products International. According to de Ita (2003), in 2001 half the 6.1 million tons of imported maize were absorbed by transnational companies. Because of the volumes they purchase, these transnationals can influence domestic prices in Mexico. In the face of the tremendous market power of the transnational cartels, Mexican farmers depend greatly on the assistance of producer associations to pool their grain harvests and provide marketing assistance and leverage.

A limited number of large-scale, politically independent farmer associations offer credit union services in Veracruz, but this type of organization is largely lacking among small-scale farmers, particularly in more marginal areas. As a result, farmers in Veracruz have sought services such as marketing assistance through other channels. The isolation of many communities, the lack of infrastructure, and the limited government support have made the marketing of agricultural goods a chronic problem. One of the results is that in most areas of Veracruz, a long chain of middlemen has developed between primary producers and the final consumers of maize grain. Middlemen have assumed an essential role in linking farmers to markets by buying at the local level and reselling in regional markets. In addition to fulfilling transport needs, middlemen help to ease cash constraints in communities, often paying in advance for goods and providing farmers with short-term, small-scale loans. Although this sector has developed partly in response to farmers' needs, farmers frequently blame their lack of profits on middlemen, who keep their purchasing prices low to earn as much resale value as possible. One of the main goals of grain producers has been to figure out ways to avoid the commissions charged by middlemen, selling directly to the final users of grain, who often buy at better prices. However, the market for many agricultural goods is competitive, and the fees charged by middlemen often reflect the real costs and accrued risks of taking goods from the field to the market.

While middlemen provide marketing services to most small-scale farmers, there are also several government dependencies in Veracruz designed to help farmers make use of some of the export opportunities that came into being with the advent of NAFTA. One such organization, the Comisión Veracruzana de Comercialización Agropecuaria (COVECA), was initiated by the governor of Veracruz to provide a free service to farmers interested in producing a variety of crops for export. The mandate of COVECA is to create direct links between farmers and buyers. This service is important because, in addition to a lack of investment funds and insufficient harvests, many farmers do not produce export crops because they have no contacts or assured market for their goods in the USA. Similarly, many of COVECA's contacts on the American side are large-scale companies looking for ways to enter into the Mexican market. To meet the needs of both sides, COVECA works through trade fairs to link Mexican farmers with US buyers such as Walmart and Sam's Club.

The process that COVECA follows generally starts when a group comes to their offices in the port city of Veracruz to solicit help with a project for production of a particular product. Staff members will go to the community to determine what the product is and to verify the conditions and volume of production, as well as the numbers of farmers participating. Before the process can go ahead, COVECA must assist farmers in forming a legal group, which enables them to solicit money under a number of government programs. COVECA's responsibility is then to locate a buyer for the product, and to make follow-up visits for the next two-to-three years until farmer groups can manage the projects on their own. Although COVECA administrators are obligated to address any request they receive, they end up working on relatively few projects due to the fact, that unlike other government dependencies or NGOs, they do not give money to the groups they work with. As a result, the groups that participate in the process are not solely interested in government handouts.

COVECA is one of a large number of organizations in Veracruz that are attempting to find places for farmers in niche markets. However, other kinds of networks and connections play an important role in the provision of basic services for farmers. Particularly in areas isolated

from market centers and populated by high concentrations of indigenous people, family and community connections have always provided an important, informal network for obtaining inputs or for selling and obtaining maize grain.²⁸ In some areas, farmers are also starting to organize themselves into cooperatives, in an attempt to develop a greater share of market power.

Grain Cooperatives

Following NAFTA, low prices, small harvests, and the power of marketing middlemen left farmers with little possibility of making a profit from the commercial sale of maize grain. In 1999, a small group of farmers headed by a man named Noe Andrade came together with a group of unemployed agronomists to find a way to make commercial maize production profitable. These nine individuals started an organization now known as the Unión de Maiceros del Centro y Sur de Veracruz, based in Piedras Negras. One of its aims was to obtain enough grain to sell directly to industrial users, thus avoiding the commissions charged by middlemen on small-scale individual sales. The Unión also wanted to focus on the market chain for maize, adding value to the basic grain. In working toward these goals, the union has expanded in multiple directions, providing the inputs, extension, credit, and insurance for farmers to improve their production capacity. The Unión has also sought to modify some of the planting practices of its members, altering the density of planting, and the utilization and the types of fertilizers applied, to obtain higher yields.

The Unión currently operates in 17 municipalities in the regions of Piedras Negras, Isla, and Acayucan, all in Veracruz and areas which have traditionally been involved in commercial maize production. Many of the 1,500 participating farmers are relatively poor members of local indigenous groups, who produce on plots ranging from one to five hectares. One basic activity that the Unión promotes is the organization of rural production societies, made up of 10-100 such farmers. These are not juridical entities but solidarity groups, each of which has a representative in the Unión. The Unión follows the progress of production and markets the harvest via the development of bulk contracts for maize grain. Their goal

²⁸ See Badstue et al. (2002) for a discussion of the role of social networks in seed transactions in Oaxaca.

is to locate buyers willing to pay a higher price for locally produced white maize grain, which is of higher quality than yellow maize for tortillas and other Mexican foods and which does not have the damage commonly incurred in importing.

Unlike smaller farmer associations (see example of the Empresa Integradora below), the Unión prefers not to work with Mexico's powerful maize milling companies, such as MINSA and MASECA, citing several practical and moral reasons. One is that these companies tend to mix imported and local grains, ignoring the price differential between white and yellow maize types. Another is that the large companies' monopoly on the maize grain market threatens the smaller-scale milling associations, which tend to pay more for locally produced maize. The Unión also resents what they see as a revolving door between the large firms and certain government dependencies that promote the marketing of Mexican crops. According to Russ: "The government dependencies do not accept criticism, and they use only certain channels of distribution. They will give us support if we sell to Walmart, but we prefer to sell to domestic markets." Accordingly, the Unión has sought to sell directly to the smaller-scale milling associations that use the high quality grain for nixtamal, rather than maize flour. Eventually, they hope to construct their own mill to keep the profits generated by the added value of processing grain to make tortillas.

In addition to the grain projects, the Unión is also working on two other ways to obtain more value from maize production. One is through the harvest and sale of fresh maize on the cob. The market for fresh maize is relatively small and few farmers are able to produce for it; however, the price of fresh maize is much higher than that of grain. Farmers who sell both fresh maize and maize grain earn approximately three times the net profits of farmers who sell grain alone. As with all agricultural products, the market for fresh maize ears is subject to supply and demand fluctuations, but fresh ears take less time to produce. In Acayucan, some small-scale producers with high yields and access to irrigation are combining the production of fresh maize with the use of maize for forage. Under an ASERCA program, after producing two to three hectares of fresh maize, farmers can receive government-subsidized livestock, fatten it with a diet of maize stalks, and sell it after 3 or 4 months, in the process earning income in several different ways.

While the Unión de Maiceros is larger and more successful than many of its counterparts, there are also smaller farmer associations that are using similar strategies to obtain more value from maize production. The communities of Acayucan, Veracruz, have traditionally produced small volumes (10-20 tons) of maize, and farmers selling as individuals have been susceptible to the market pressure generated by middlemen. To overcome the disadvantages of selling in small quantities, several communities decided to organize into a producers group with the help of a despacho. In 2001, 1,200 farmers from 20 communities organized to form the *Empresa Integradora del Maíz Calidad Veracruz*. Shortly after forming, they began to work with COVECA to organize the production and sale of larger volumes of maize. At the time of this writing, they had a contract to produce 5,000 tons of maize for MINSA. In addition to receiving 1,700 pesos per ton (500 pesos more than offered by middlemen), members of the Empresa Integradora are receiving an added 150 pesos per ton from ASERCA, as a bonus for selling as part of an organized group.

While advantageous from the farmer's viewpoint, small producer groups' ability to fulfill the demands of companies like MINSA is questionable. MINSA imports 15% of its maize from Veracruz, and the rest comes from states with higher levels of commercial maize production (Diaz, personal communication). In Veracruz, MINSA buys from various groups, but the total quantity of maize they purchase remains low. This year the Empresa Integradora has managed to supply MINSA with only 2,000 metric tons, due to problems with the harvest and with the participating communities themselves, some of which abandoned their commitment to MINSA to sell to middlemen. Moreover, MINSA has very high quality standards, and can reject shipments that do not meet them. These obstacles are not discouraging to the manager of the Empresa Integradora, Odón Rodríguez Aguilar. Like the Unión de Maiceros, his vision is that his group will eventually sell directly to milling associations: "If you think of maize as grain alone, there is nowhere left to expand," he says. "You have to think instead about how to derive products from it. Don't think of only five pesos more; you must envision a more integrated development."

Farmers are increasingly trying to enter into cooperative arrangements to overcome the drawbacks of small-scale production. Some of the larger-scale farmers' organizations, such as the *Asociación Nacional de Empresas Comercializadoras* (ANEC) are encouraging this practice. ANEC is the principal national coalition of small and medium-sized grains producers, and has been working to develop local and regional markets for basic grains. In Veracruz the impacts of organizing go beyond just the members of farmers associations, actually extending to the farmers and middlemen who work in close vicinity. Once farmers start receiving higher prices for their grain, middlemen have no option but to match that price or lose their suppliers. However, despite these advances, the organization and activism of farmers is relatively recent, and groups such as the *Empresa Integradora* still benefit a relatively small proportion of farmers. Increased capacity building and financial support for producer cooperatives could contribute greatly to their impact on the livelihoods of small-scale farmers.

Revaluating Maize: The New Market for Maize Husks

Both its tropical climate and position between low and high altitude areas are two important factors explaining the rich crop diversity in the Zona Totonaca (Flores, personal communication). Farmers plant maize, coffee, vanilla, citrus, coffee, and sugarcane. They also harvest a number of other crops including *chayote* (a type of squash), sesame, beans and wild lentils, and rely on foraged foods such as *quelites* (leafy greens) and wild potato. Although farmers produce a wide variety of crops, much agricultural production in the marginal zones of Veracruz goes toward feeding the household. Farmers who grow cash crops often sell in regional markets or to middlemen, who transport goods to more distant markets in Mexico City or Puebla.

Following NAFTA, the diversification of crop production helped farmers in Veracruz to secure alternate sources of household income. Many currently sell small quantities of citrus fruits, pimiento, chili, and tomatoes in local or regional markets to augment their earnings. The conversion program promoted by the International Coffee Organization has been particularly important to coffee growers, who suffered a strong economic crisis when

coffee prices fell well below production costs. The conversion program provides financial support to farmers who use old coffee orchards to plant pimiento or vanilla. Selling fruits and vegetables has become an important alternative to selling maize grain, but most of this production remains small-scale and informal. Farmers able to produce on a larger scale usually have access to other sources of income, such as livestock, which allow them to take the risks involved in planting higher-value crops.

With production for domestic markets relatively limited, production of crops for export would seem to be even more out of reach for small-scale farmers. Common problems that prevent farmers from taking advantage of newly established export opportunities include difficulties producing enough to interest potential buyers or meeting the quality standards required for export. Most farmers find it challenging to establish marketing contacts abroad, and cannot afford the costs of transportation or infrastructure development (packing facilities, nurseries, greenhouses, etc.) for large-scale production.

Despite these obstacles, NAFTA has led to one unexpected instance of marginal farmers linking into international markets. In the Zona Totonaca, farmers are producing maize husks for export. The husks are used domestically and have been marketed regionally for many years, but in the last decade the export market has seen substantial growth, due largely to the demand of Latino communities in the USA. Not only do the immigrants crave foods, like tamales, that are symbolic of home, but these foods are increasingly part of US cuisine. The USA has its own maize husk industries in the southwest that contract Mexican farmers, but the bulk of the industry is Mexican-owned.

The most common use for maize husks is for wrapping tamales, a maize-based dough filled with chilies, meat, vegetables, cheese, or sometimes sweet ingredients and steamed in the husk. Maize husks can also be used for handcrafts; some of the most common include dolls and flower figures. Important areas of maize husk production include the region around the municipality of Chalco in the state of Mexico, Atlixco in the state of Puebla, and Tetela and Cuautla in the state of Morelos. Other states where husk production and marketing have been documented include Jalisco, Colima, Nayarit, Michoacán, Oaxaca, and Tamaulipas (Long and Villareal 1998).

Product Differentiation

Most Mexicans in maize-growing areas utilize the entire maize husk, which is easier for making tamales. Maize husks exported to the USA are cut off at the base using a carpenter's saw, making them more uniform, lighter, and easier to pack for export. Because transport is such a major concern for farmers in this region, production for these "disked" husks has developed in towns along major trucking routes or with good vehicle access. In the more remote villages of the Zona Totonaca, the emphasis is on the production of whole husks for use in Mexico.

Separate production processes have developed for the husks, according to their ultimate market destination. The production process for domestically-used husks revolves around the household. The husks come from maize ears that have been sown and harvested by a family group, and the leaves are removed mostly by women and children. The activity is uncompensated, except in the sale of the final products, and therefore tends to be done whenever there is free time. The husks are packed into bundles of between 15 to 20 husks called *manojos*. The *manojos* are grouped into bundles of four, called *rollos*. These *rollos* are collected by buyers within towns and later sold to middlemen who travel among villages generating packs of 150 *rollos* called *pacas*, which they transport to markets near Mexico City or directly to the Central de Abastos, Mexico City's wholesale market. The local price for maize husks varies from about 5 to 7 pesos per *manejo*, depending on market conditions.²⁹ According to one middleman, when markets are good, she and her husband take 50 *pacas* to market 3 times a week, earning 50 pesos (around US\$4.50) gross profit per *paca*. In the Zona Totonaca, there is fierce competition among middlemen, and to establish a reliable clientele, middlemen will attempt to form personal relationships with their suppliers, often paying them in advance for their weekly sale.

After being transported to urban centers, the husks are sold directly or are sorted and repacked according to quality. The method of packing varies regionally, and to consumers is symbolic of the quality of the leaves. In the

Central de Abastos, the various types of *rollos* are sold at different prices, reflecting the differing number of leaves per pack. *Hoja de Piña*, the most common packing form in Veracruz, generally containing 60 husks, and is sold at around 8 pesos per *rollo*. *Dos Gajos*, which costs 13 pesos for a *rollo*, is a common packing method from Morelos that utilizes 80 husks. *Reilete* or pinwheel, a style common to Puebla, is made up of 60 husks and costs around 12 pesos. The leaves in the more costly *reilete* are considered to be of higher quality, due to their lighter color and finer texture. However, many tamale makers in Mexico City prefer *dos gajos* as a more economical option. *Pacas* can weigh up to 45 kilos and sell for 750 pesos (around US\$70).

Husks for export go through an entirely different production process, which may be managed all the way from the planting of the maize to the point when the final product is sold. Unlike the process for whole husks, the various production tasks are separated, designated to employees, and paid for by the hour or number of kilos produced. While many of these jobs are delegated to men, particularly "dangerous" tasks such as disking, women and children continue to be involved in the production process as laborers. Working in packing plants in particular constitutes an important source of employment for women, especially those who have very little schooling (Long and Villareal 1998). To begin the process, a farmer may be given a contract to produce a certain quantity of maize. Once the maize is harvested, the first task is to disk the maize as described above. The work is entirely manual, and pays around 5-10 pesos per kilo, depending on the quality of the leaves. The saw itself can cost as much as 200 pesos. The next step is to bleach the maize leaves by sealing them in an oven filled with a gas produced by burning sulfur. This procedure may have to be repeated up to three times to get the leaves white enough.³⁰ Next leaves are sorted by quality and packaged for export in plastic bags with labels to identify their brand. Both the packing and the price of husks for export is determined by weight, rather than by quantity. High quality leaves are sold for as much as 12 pesos per kilo.

²⁹ All of these prices were noted in early 2004. The prices are seasonal, and have gradually risen over the last 10 years.

³⁰ Individuals who work in the ovens are repeatedly exposed to the sulfuric gas, which burns the eyes, nose and throat, and may cause more lasting health problems.

After packaging, disked leaves are transported by truck to cities such as Guadalajara and Monterrey, where they are rerouted either to the border or for domestic markets in areas that do not produce maize.

Economics of Production

The profitability of maize husks for export depends in part on economics of scale. Many farmers interested in selling for export realize that it is not in their best interest unless they obtain a sizable harvest. Production for export is an entrepreneurial activity that requires investment in the purchase of the saw and presses for the maize leaves, the purchase of the maize to be disked and the bags for packing, payment for the employees, and obtaining transport to market. As a result, most small-scale farmers produce husks only for domestic consumption, reducing overhead costs and leaving packing and transport to middlemen. Those with resources for export production tend to be wealthier entrepreneurs who live outside of the communities in which the maize leaves are processed. So while the production of maize husks has changed household livelihood strategies in the Totonacan region, it has done so mostly by enabling small-scale farmers to augment income by selling whole husks in regional markets or by working as wage laborers in the production of disked husks for export. Nevertheless, communities are increasingly taking note of the profits earned by private companies involved in export production and are soliciting funds to start their own community-based enterprises.

The lower price of maize grain has made maize husks a profitable option in the Zona Totonaca: in fact, farmers can make almost nine times more from the sale of grain and husks than from selling grain alone (Table 5). While some farmers look at maize husk production as an added source of cash, others have turned to it as their main source of income. The added income from maize husks therefore has the important impact of encouraging the region's farmers to continue growing maize as a cash crop as well as a staple food.

Ecological Impacts

The growth in the market for maize husks has had some important consequences for maize production in the Zona Totonaca, which contrast with the ecological and environmental impacts that NAFTA was expected to produce. As noted previously, the increase in migration following the implementation of NAFTA reforms led to the expectation that, with the displacement of farmers, criollo varieties and traditional knowledge related to maize would be lost (Nadal 2003). While this has definitely occurred in some parts of Veracruz, and indeed throughout Mexico, there is reason to believe that in the Totonacan region use of farmers' varieties may have been reinforced by changes in market opportunities. Maize husks are produced using criollo varieties, found by farmers to give husks of better quality in coverage and weight than husks of hybrids. The new-found value of maize husks has given farmers a market incentive to continue to produce traditional criollo varieties.³¹

While the impact of this market incentive on maize production has generally been positive, the impact on maize diversity in the region is not as clear. Because of its variable climate and topography and diverse indigenous populations, the Zona Totonaca continues to have a great diversity of criollo varieties, including *maíz arroz*, *ancho blanco*, *olote delgado*, *media semilla blanco*, *chiquito blanco*, *olotillo blanco*, *argentino blanco*, *amarillo*, *negro*, and *pinto* (Flores, personal communication). The varieties most commonly used for the production of maize husks are *maíz arroz*, and *maíz argentino* (a creolized modern variety), which are thought to have both the best yield and the best husk quality. The area planted to these varieties is extensive, but further research is required to determine whether they are supplanting other farmer varieties. However, because farmers in the Zona Totonaca continue to produce a wide range of varieties for specific uses, it is unlikely that maize husk production alone will contribute to local genetic erosion.

³¹ In her PhD study on the local maize race *Jala* in Nayarit Mexico, Rice (2004) also found that the market for husks has influenced the criteria for desirable maize characteristics toward varieties with abundant husk coverage. However, rather than *criollo* types, farmers prefer improved varieties in this particular region. As a result, Rice suggests that the husk market in Nayarit has encouraged farmers to invest in improved seed where they might not otherwise have done so.

Another impact of the new market for maize husks has been on the selection practices that farmers use to replenish the following season's seed supply. Most farmers in the region base their selection on the size of the cob and the cleanness and size of the kernels (Flores, personal communication), but a new practice has developed in which farmers select ears based on husk quality. The desirable characteristics that farmers look for in selecting ears include a *punta aguda*, or a sharp point indicative of longer maize husks, as well as maize cobs that are *suave*, which denotes the soft feeling produced when squeezing slender cobs with thick leaf production.³² Because the use of these selection criteria over time may lead to production of smaller ears with more husk cover, over the long run farmers run the risk of reduced grain yields. Moreover, removing the husk from harvested maize potentially increases post-harvest grain losses due to insect damage (Bergvinson, personal communication). The fact that potential yield losses from selection and storage practices do not deter farmers in the Zona Totonaca from the production of maize husks underlines the fact that husks, rather than grain, are taking on primary economic importance as a cash crop in the local household economy and thereby reducing the chances that maize production by small-scale farmers will disappear.

In Veracruz, similar to other areas of Mexico, primary commodities go through boom and bust cycles, as markets become saturated with particular products and prices begin to fall. Both the domestic and the international markets for maize husks have grown steadily over the past decade and will likely continue to increase along with the growth in immigration to the USA. The market for maize husks is both seasonal and susceptible to the common problem of overproduction. In terms of its potential to relieve rural poverty, participation in the production of husks for domestic consumption is likely to be a temporary solution, particularly if it prevents farmers from developing a longer-term, diversified production strategy. To progress in husk production for export, farmers will also need greater access to financial resources and transportation infrastructure, which, until now, they have only been able to obtain sporadically.

Personal Perspectives on NAFTA in Veracruz

Very few farmers in marginalized areas have heard of NAFTA, but even farmers in the most isolated areas have an increasing sense that they are participating in a global community and that international forces can pose real threats to their livelihoods. The fear of competition from Asia is particularly acute in Mexico. In a community in the Totonacan Region, one farmer asked worriedly if the Chinese had started to export maize husks. "I read it on the web," he replied in response to the skepticism of his neighbors. While some worries may seem far-fetched, they are increasingly real in a country that has seen the stagnation of its maquiladora industries due to Asian competition. The realization that all countries are linked through forces of global trade is increasingly common, even among those farmers who sell predominantly in local markets.

Instead of a sense of victimization, there is an increasing sense that farmers are gathering their forces to fight back against the impacts of global trade. While political activism against NAFTA has been common in the past decade, reaching a peak with the demonstrations of the movement *El Campo No Aguanta Más*, the more recent forms of resistance are of a more subtle and practical nature. According to Odón Rodríguez Aguilar: "We are entering into globalization. The price changes on the stock exchange have to affect us. We either evolve or we disappear." Many farmers hope that by changing the organization of agricultural production, they can find a way to make themselves once again relevant to the Mexican economy. Many also reject the idea that Mexico should transition to other crops based on the dictates of the global marketplace. With a history of centuries of maize production and being a center of maize diversity, Mexican farmers may well raise the question posed by Roberto Russ of the Unión de Maiceros: "If we in Mexico do not have a comparative advantage in the production of maize, then what exactly do we have a comparative advantage in?"

³² Husk cover is a quantitative trait, meaning that several genes are involved in its inheritance. Husk cover can be improved through breeding, provided maize plants are grown under low density to allow the expression of protruding ears. Similarly Long and Villareal (1998) note that in Jalisco it is common practice for the owners of husk packing plants to encourage farmers to use a certain variety of maize or to provision a particular kind of seed, suggesting that farmers in large-scale husk production may lose the incentive to grow their own criollo varieties.

In Veracruz in particular, the goal of many farmers is to create economic conditions that will allow people to continue to make a living from farming rather than being forced into migration. According to Russ this is based on the idea that "...if farmers earned enough locally from the production of maize, they wouldn't have to leave the country. They earn 700 pesos per week here, but they risk their lives in order to earn 70 pesos daily. Three hundred Veracruzanos died while crossing the border last year. The people who go over there lose their identity—they do not belong here anymore."

Summary

The fall in maize prices following the implementation of NAFTA reforms caused the restructuring of the agricultural sector in Veracruz. Despite predictions of the decline of maize production, many small-scale farmers remained in the agricultural sector, cobbling together a livelihood through the production of maize and the sale of various crops, through various off-farm jobs, and through the contributions of family members working both domestically and abroad.

While the impacts of NAFTA and the lack of effective social safety nets have adversely impacted farmers in Veracruz, many also appear to have been surprisingly resilient in weathering the economic changes and in grasping new trade opportunities. Now, 10 years later, commercial maize production is going through a sort of resurgence, as farmers in southern Veracruz fight to make it a viable income-earning activity. Nor in northern Veracruz have farmers forgone the production of maize. Instead, they are capitalizing on new export opportunities involving the sale of maize husks. Throughout the state, farmers have increasingly turned toward cooperation and collaboration as tools to survive and even thrive in conditions of economic upheaval. Farmer organizations and cooperative marketing strategies have gained importance as farmers struggle to replace public services with their own networks. Whereas the Mexican government expected NAFTA reforms to restructure and remove small farmers from the agricultural sector, coping with the new conditions of agricultural production has ironically made many of these farmers stronger and more willing to fight to be considered a part of Mexico's economic future.

Part V. Conclusion

Achieving this control has meant different things for the Mexican government and for the Mexican people, and the mixed results of the transition process are evident in the widely polarized visions of how NAFTA has generally impacted Mexico. While many cite the success of the trade agreement in building economic growth and efficiency, others note that the benefits achieved under NAFTA have not been uniformly distributed, and that the transition process has done more harm than good to much of Mexico's population.

As with much economic policy, there were tradeoffs anticipated from NAFTA. For the Mexican government, participation in NAFTA required acceptance of the social and other costs associated with reducing state supports for agriculture; moving to large-scale, heavily capitalized operations; and turning Mexican farmers into competitive players in international markets. These costs, involving the social dislocation and increased vulnerability of small and medium-scale farmers, were considered by many an inevitable part of the changes needed to realize the vision of modernity and prosperity attainable through participation in free trade.

Ten years following the implementation of NAFTA, many of the changes sought by the Mexican government have taken place or are gradually getting underway. Increased efficiency in basic grains production, the diversification to high value crops for export, increased levels of foreign investment in the manufacturing sector, and the employment of new technologies for agricultural production have taken place in many parts of Mexico. At the same time, high levels of migration, increased social stratification, and the continued existence of marginalized farmers producing under similar or worsening conditions

*Wise et al. (2003)
suggested that, even
before NAFTA, Mexicans
recognized economic
integration as inevitable,
and their challenge was to
gain some measure of
control over the terms
under which it took place.*

suggest that the goals of economic growth may have been undermined by the adverse social consequences of economic reforms.

Understanding the experience of Mexican farmers under NAFTA is important for several reasons. First, it reminds us to question the models that lead us to

believe in certain economic outcomes. For example, the inability of NAFTA reforms to shift farmers out of small-scale maize production was due in part to a failure to consider the shadow values of maize. These values make maize particularly difficult to replace in the lives of Mexican farmers. Secondly, looking at the ways in which farmers responded to NAFTA can provide insight into farmer strategies in response to economic instability. Along with traditional social assistance programs, these kinds of locally-generated approaches can be supported as a means of building economic strength from the inside out. Finally, looking at Mexico's experience with NAFTA provides an opportunity to consider what kinds of policies are necessary and should accompany the development of future trade accords, to protect the most vulnerable members of society.

Policies to protect the vulnerable in trade agreements should be developed at the local and national level within participating countries, and by global institutions such as the WTO. Despite NAFTA's having been in effect for over 10 years, both Mexico and the USA must continue to formulate policies that mitigate the adverse impacts of trade reforms and strengthen the links between trade and development. For Mexico in particular, in light of the decline of sectors such as the maquiladora industry, it is important to rethink the role of international trade as the main source of growth in the domestic economy. The following policy recommendations are geared toward

Mexico's situation but have relevance for other countries seeking to prevent adverse social impacts and to uphold a development agenda in the context of trade liberalization.

1. Redesign social safety-net programs.

An important consideration for future policy development in the context of free-trade negotiation is how to reduce the social costs of economic liberalization, including those experienced by farmers in Mexico. Programs such as PROCAMPO have mitigated the impacts of increased production costs and lower agricultural commodity prices. PROCAMPO is scheduled to end in 2008, leaving many farmers without government support. Mexico must look into the options for extending PROCAMPO or, preferably, devising new cash transfer programs that address some of PROCAMPO's current limitations. In particular, a method is needed to avoid skewing the distribution of resources between northern and southern states. PROGRESA, a cash transfer program that focuses on the extremely poor, has had some success in improving the education, health, and nutrition of rural households. Many features of PROGRESA could be incorporated into a new cash-transfer program targeted to small-scale farmers.

2. Expand the provision of credit, extension support, and basic inputs.

Although cash transfers help cushion the vulnerable from economic shock, they may not be a sustainable way of promoting economic resiliency. Farmers in both productive and marginal areas have benefited from new niche markets and export opportunities, but the continued lack of credit, extension services, inputs, and infrastructure, particularly in marginal areas, still prevents many from availing themselves of such opportunities. Private sector and cooperative organizations have partially filled the gap, but much more could be done. Access to credit, particularly for ejiditarios and small-scale farmers, remains low. Working on ways to develop micro-credit programs could be one way of extending credit to small-scale farmers without increasing their dependency on despachos or politically-affiliated entities. In addition to traditional sources of credit, the creative management of migrant remittances is of increasing importance in Mexico and other developing countries. Use of remittances for community development projects and for locally-managed lending harnesses the power of remittances for social development (see the example of migrant clubs in Wise et

al. 2003). In addition to credit, extension services are needed to build farmers' capacity to grow alternative crops. Unions, despachos, and even private companies have provided new production technology to farmers, but expanding extension services to marginal communities and producers' associations is an important step to increase farmers' participation in new production opportunities.

3. Increase support for locally-developed livelihood strategies.

Farmers have responded to the declining availability of services and inputs by creating associations, community projects, and new marketing strategies. These forms of cooperation have made it possible not only to continue producing basic crops efficiently, but to take the risks required to profit under free-trade conditions. There should be increased support for farmers' strategies to cope with economic transition. This could involve training on cooperative organization, increased government assistance for farmer-led production and marketing organizations, and the establishment of programs that help link farmer groups to domestic and foreign buyers. Because of the increasing importance of supermarkets in Latin America and Mexico in particular, it is essential to develop programs that help producer groups meet the quality standards for large domestic markets. In addition, the viability of particular niche markets or added-value strategies requires further examination; feasible options should be encouraged through the provision of credit and technical expertise.

4. Ensure equal application of current trade laws.

Groups disenfranchised by international trade agreements can often address their grievances by working within the context of those agreements. Recent evidence shows developing countries actually making use of the institutions that govern and enforce free trade to protect their own interests. Brazil, for example, successfully brought suit against the USA for unfair protection of its cotton industry, a ruling that will eventually have a positive impact for small-scale farmers in many cotton-producing countries in Africa and South America. Mexico may be able to follow a similar strategy, protecting its markets from genetically modified maize imports by arguing that they violate biosafety standards. According to Nadal and Wise (2004), there have been increased calls for

Mexican restrictions on genetically modified maize imports, following publication of a report by the North American Commission for Environmental Cooperation that confirmed the discovery of Bt transgenes in traditional maize varieties. Legislation requiring segregation and labeling of genetically modified maize grain imported from the USA would dramatically shift the position of Mexican maize farmers and could serve as another point of leverage on the US economy within the context of both NAFTA and the WTO.

5. Reduce developed country subsidies for agriculture.

Reducing subsidies for maize production in the United States would help to remove the downward pressure on grain prices in Mexico. Although Mexican farmers who are not involved in commercial grain production may not be greatly assisted by the elimination of subsidies for US maize farmers, small-scale farmers elsewhere who produce commodities for export stand to gain tremendously. Moreover, reducing subsidies in developed countries would help to reduce global overproduction of key crops and thus stem export dumping.

6. Increase government flexibility within trade agreements.

Some view the failings of international trade agreements such as NAFTA as a reason to increase the pace and scope of economic liberalization. An alternative viewpoint is that the pace of market liberalization could actually be slowed, and a certain amount of market authority returned to national governments. Maintaining policy flexibility would enable governments to craft innovative or socially-conscious programs without the fear that they will be subject to dispute-settlement measures. Moreover, reintroducing a certain amount of national sovereignty in food production and the agricultural sector may enable countries better to protect farmers and other vulnerable

groups (Wise et al. 2003). One example of this approach in the context of trade legislation would be the exclusion of vulnerable crops or sectors in recognition of their roles in ensuring food security. Another would involve re-establishing a set of derived, nationally-applied prices that reflect farmers' actual costs of production. Both initiatives would require higher levels of government involvement in the agricultural sector, a suggestion that contrasts sharply with current thought regarding the market as the most efficient regulator of the economy. However, as is apparent in the left-leaning governments of many Latin American countries, there is both an awareness of alternatives to market liberalization and the desire to assert more national control over local processes of economic growth and social development.

Statistics related to economic growth can be interpreted in many ways, but the experiences of Mexican farmers with NAFTA tell a truth about the damage that international trade policy can inflict on the livelihoods of the most vulnerable. The use of trade to support development, a strategy currently promoted by the USA and many international agencies, does not take into sufficient account inequalities at both national and international levels, or social and economic factors that prevent individuals from taking advantage of new opportunities. Because NAFTA has been used as a model for the development of new trade accords such as CAFTA, which is to be implemented in parts of Latin America where poverty is more severe than in Mexico, national governments should consider strategies that protect at-risk groups and that build the resiliency of vulnerable sectors. Moreover, even as it promotes increased trade liberalization, it is the responsibility of the international community to protect human rights, to provide assistance that enables vulnerable populations to respond to economic transition, and to support countries that seek to develop socially-conscious national policy.

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