

The Socio-Economic Impacts of NAFTA in Tlaxcala, Mexico

Shida R. Henneberry and Becky Nelson

Professor and former graduate research assistant

Department of Agricultural Economics, Oklahoma State Universityⁱ

Abstract: NAFTA has impacted farm commodity prices and labor allocations in Mexico. This study takes a close look at a rural/industrial region (Tlaxcala) in Mexico where the growth of post-NAFTA industrial employment opportunities has impacted the rural population and the agricultural economy. Through personal interviews and surveys, the impact of NAFTA on the interaction between agricultural and industrial sectors at the regional and household levels is examined.

Introduction and Objectives

The North American Free Trade Agreement (NAFTA), which was signed in December of 1992 and went into effect in 1994, is the most extensive free trade agreement short of a common market ever negotiated and is unique in its inclusion of both developing (Mexico) and industrial (Canada and U.S.) nations. This agreement is the first of its kind between nations with such extensive cultural, social and economic differences, and many fears have been expressed on the part of all countries involved as to the outcome of this integration. In particular, Mexico has feared that its small proprietorships, manufacturers, and agriculturists will be unable to compete against the large American and Canadian firms with their seemingly unlimited access to capital and ability to exploit existing economies of scale (Barajas, 1993).

ⁱ This study was partially funded from a grant from the Ford Foundation and Midamerica International Agricultural Consortium. The authors would like to acknowledge significant participation and contribution from Professors Emma Zepata Martelo and Veronica Vasquez Garcia from the department of rural development of Colegio de Postgraduados. However, the views expressed here are those of the authors and do not necessarily reflect those of the other contributing individuals or organizations.

This difference is particularly strong in the agricultural sector, and its inclusion in NAFTA has not been without debate. Desires to protect this sector for a variety of economic and cultural reasons have resulted in a long history of exclusion for the agricultural sector from past free trade agreements. This sector is seen as one the most vulnerable in the NAFTA agreement. From the US side, many have viewed the continued strength of NAFTA markets as one of the brightest spots for U.S. farmers, agricultural exporters, and the industries that support them (USDA, July 2001). Since NAFTA was approved in 1993, U.S. agricultural exports to Mexico have nearly doubled. Mexico imported \$6.5 billion of US agricultural products in 2000, making it U.S.'s third largest agricultural market (USDA, July 2001). However, although agricultural trade has increased in both directions under NAFTA, U.S. exports to Mexico have increased faster than imports from Mexico. The US agricultural trade surplus with Mexico was \$1.47 billion in 2000 (USDA, 2000).

In Mexico, changes in agricultural trade policy, along with other changes in the economic environment resulting from NAFTA have impacted commodity prices and have caused structural shifts in the rural/urban labor markets. Due to the vulnerability of the rural sector and with 23 percent of Mexico's population functioning in the agricultural sector, the possible effects of NAFTA's tariff reduction and the subsequent impact on farm commodity prices and labor markets have been the subject of widespread controversy.

In this study, we have taken a close look at an industrial/agricultural region in Mexico to examine the socio-economic changes during the post-NAFTA period. The general objective of this study is to increase the understanding of the impact of NAFTA on the interaction between the agricultural and industrial sectors at the regional and household

levels. The principal contribution of this study is the holistic evaluation of NAFTA upon a community at all levels, social and economic. The specific objective is to determine the economic and social impacts of the North American Free Trade Agreement on rural individuals and communities in the Xicohténcatl industrial corridor in the region of Tlaxcala, Mexico. The data for the analysis are collected from household surveys.

Tlaxcala was chosen for this research due to its traditionally high level of industrialization, which has stemmed from its advantageous location between the large markets of Mexico City and the seaport of Veracruz. While its economy is principally agricultural, its history of industrial activity has provided it with features such as infrastructure, and skilled labor, which make it particularly attractive to the myriad of industries considering Mexico for the location of facilities in the wake of NAFTA. In addition, the central location of the state within the Republic and isolated nature of many of the villages in the newly formed industrial corridors, leave many agricultural producers and communities somewhat virginal with respect to their exposure to industrial culture and outside influences. This is a characteristic somewhat less common among the industrial zones along the northern border of the country. This blossoming interaction between the peasant agricultural sector and the rapidly expanding industrial sector makes this state the perfect stage for analyzing NAFTA's impact on the agricultural - industrial relationship present in these communities.

Agricultural Liberalization

While the agricultural sector is included in the NAFTA agreement, it does hold a unique position in that two separate bilateral agreements were negotiated versus one single trilateral agreement. The agreement phases out existing tariffs over a 10-year period, and

also alters the previous agricultural trade restrictions into tariff-rate quotas, and then over a 10 to 15 year period phases out the over-quota tariffs. This latter method applies principally to import sensitive products, and includes a majority of the crops produced by Mexico's subsistence farmers. These crops include corn, beans, and barley -- which have the following quota system for Mexican import: 2.5 mil. MT (US) and 1000 MT (Can), 50000 MT (US) and 1500 MT (Can), and 120000 MT (US) and 30000 MT (Can) respectively, and the following over-quota tariffs: 215%, 139%, and 128% respectively (Hufbauer, 1993). Over the first six years this tariff will be reduced by 24% of its base level, and the remaining tariff is then phased out in equal annual reductions.

As can be seen from Table I, these tariffs have supported a great chasm between domestic and international prices in Mexico. In general, this has raised the price of basic grains in Mexico much higher than the world price, and maintained the price of fruits and vegetables much lower. In fact, partial motivation for the Mexican governments agreement to these tariff reductions has been attributed to the need to provide cheaper grains and reduced food prices to the growing numbers of urban poor.

The popular press has helped spread fears that the Mexican producer will no longer be able to compete in an expanded market which includes competition from both U.S. and Canadian producers. Barajas (1993) has compared the current process of tariff reduction to the trade liberalization process enacted among basic grains in the 1980's which resulted in a sharp increase in the quantity of these commodities imported from U.S. producers. This has been taken to indicate that without trade barriers, the Mexican producer is non-competitive due to his inability to produce these commodities at the same price as his

northern competitors. This has been attributed to factors such as economies of scale, limited access to credit and technology, and reliance on traditional production practices.

In such a production environment, the inaction of NAFTA trade liberalizations is expected to have negative implications for the viability of the Mexican agricultural sector and rural community as a whole. As small farmers are forced off their land due to falling prices, increased rural-urban migration would result, further undermining the rural community. However, such a scenario ignores vital aspects of the Mexican production system. In 1991, 34% of all agricultural land holdings in Mexico consisted of 'minifundidos' or small holdings of less than two hectares (OECD). These holdings are farmed principally by subsistence level producers, whose production never enters the formal marketplace. An additional 17% of landholders have access to between 2 and 5 hectares (OECD) and while the majority of these do not fall under the heading of subsistence farmers, they can be classified as only semi-commercial. In this case it is only that production in excess of the family's consumption requirements which is put up for sale.

Together these two groups account for 51% of Mexican farm enterprises, indicating that a large portion of the agricultural enterprises are either entirely insulated from the formal marketplace, or are only marginally participating. It is also interesting to note, that due to their subsistence or semi-commercial nature, those producers which are excluded from the formal market are also the poorest producers. Due to this marginal interaction of the resource scarce portion of the rural population with the formal market, it is hypothesized in this study that the price impacts of NAFTA on the agricultural community will be minimal. Increased competition from foreign producers providing these

commodities at a lower price should not affect the economic viability of a producer whose product never enters the market.

However, price effects are not the only manner in which NAFTA threatens to alter the rural community. Even if production is unaffected by prices, the growing presence of industrial corridors throughout Mexico and the changing demand for labor can draw upon rural labor pools, changing not only the distribution of labor in the agricultural sector but also providing an alternative work environment of questionable quality. It is also important to note that the social impacts of NAFTA on the rural community by way of labor restructuring are not expected to influence all household members equally. Due to varying economic activities and labor distributions, the effects are expected to vary by age and gender. Many works have hypothesized that trade liberalization presents a more distinct threat to peasant women due to various reasons including but not limited to:

- 1) The female's need to compensate for absent male labor as men emigrate in search of opportunities in other sectors when the agricultural sector becomes non-viable with increased competition,
- 2) The existence of trends towards double-duty, in which women tend to take on additional work in the non-agricultural sector to supplement the family income, yet continue with all their previous household, familial and production responsibilities at their previous level, resulting in a dramatic increase in the female workload, and
- 3) The poor work conditions present in factories utilizing primarily unskilled female labor.

Despite these negative repercussions, which have the ability to prejudice the process of liberalization against the female gender, researchers have found in some cases that this process can actually better the position of the rural women. This betterment is principally due to her increased access to her own resources as a result of her interaction with the formal market, and secondarily as a result of augmentation in overall family income. While the gender biases of trade liberalization may be uncertain, it is obvious that excluding gender from a study proposing to evaluate this process would be inappropriate, and such an attempt could not accurately evaluate the impacts of trade liberalization on the community as a whole.

Whether effecting traditional gender relations, labor distributions, agricultural practices, or cultural and political activities, it is obvious that the process of trade liberalization has the ability to impact the rural community on a variety of levels. A comprehensive evaluation of NAFTA's impact on the rural sector (by way of both price effects and changing industrial labor demands) is necessary to indicate in which manners this policy is affecting peasant welfare and production systems, and to help indicate any areas which might ease this transition to free trade for those people most at risk.

REGIONAL CHARACTERISTICS

The communities under study in this research are all fairly isolated agricultural communities surrounding the industrial corridor of Xicohténcatl in the state of Tlaxcala. Tlaxcala, the smallest state in the Mexican Republic, is located strategically between the large markets provided by Mexico City to its west, and the seaport of Veracruz to its east. This location has been historically advantageous to its industrial development. The process of industrialization in this state has a long history, with its roots in the colonial construction

of various textile works. While these early works were drastically changed with the nineteenth century adoption of British technology and large scale industry, the unique combination of rural communities and peasant agriculture with an extensive manufacturing base has a long tradition in this area. As a national industry, textiles previously enjoyed heavy trade protection. It has been hypothesized that this protection has weakened Tlaxcala's textile industry, making it less competitive with few quality control measures (Gonzalez, 1991). Due to these concerns, the probable impacts of NAFTA on Tlaxcala's domestic industrial sector are uncertain, and the ability of this sector to compete in a global market is unknown.

While doubts surround the fate of Tlaxcala's national textile industry, this sector, while the oldest, is not the sole foundation of Tlaxcala's industrial base. Local politicians have taken advantage of the state's location, services, and experienced labor pool to promote the state as an ideal location for new industries, both foreign and domestic. Towards the goals of advancing economic growth and increasing employment by way of industrialization, the state of Tlaxcala has developed nine major industrial zones throughout the state, all of which are accessible to the necessary services such as transportation (by way of highway and/or railroad), water, electricity, waste management, and labor pools.

Employment Opportunities: These industrial corridors provide a combined employment for over 22,000 people, and house over 150 factories [Secretaria de Desarrollo Industrial (SEDI), 1997]. Sixty-seven percent of these factories manufacture products for exportation, and 22.5% of the factories have taken advantage of the temporary importation policies which allow for the temporary importation of inputs, utilization of local labor for

fabrication, and re-exportation of the final product duty free (SEDI, 1997). While the trade liberalizing effects of NAFTA will reduce the reliance on such programs, the large portion of factories currently utilizing this resource indicates that a duty free export environment would be beneficial for Tlaxcala's industrial base.

Of all nine industrial areas, the largest corridor is the Ciudad Industrial Xicohténcatl in which over 19% of all Tlaxcala's industrial corridor factories are located, and which provides 27.5% of all industrial corridor employment opportunities. This industrial park is located in an isolated rural area approximately fifteen minutes to the northeast of Apizaco, a small city that provides much of the labor force for the corridor. While a large portion of the labor force does commute from Apizaco and other nearby cities, there are still plentiful employment opportunities for residents of smaller nearby agricultural communities. The types of opportunities available vary by industry, and in Xicohténcatl the principal industries consist of chemical production and clothing fabrication along with the traditional industry of textile manufacturing. The chemical industry has distinct employment patterns from those of clothing and textiles. The chemical industry tends to offer employment opportunities directed towards both young and mature males, while the laws also restrict the length of the work day, and establish a minimum wage. This minimum wage is regularly updated to keep even with inflation and is currently approximately 35 pesos for an eight-hour workday.

The industrial positions are often accepted by young people who commute from a large number of nearby villages whose economies are principally based in agricultural production. While some of these villages enjoy economic activities apart from agriculture, the agricultural sector is the principal (and in many cases the exclusive) employment sector

for those who do not commute to participate in the industrial sector. It is hypothesized that the interaction of this population base, which has traditionally depended on subsistence agricultural practices, with the industrial sector will vary from village to village due to differences in resource endowments.

Regional Climatic Factors: The distinct resource endowments cause agricultural practices to vary widely among villages, and can cause measurable changes in yields, profitability and eventually the overall sustainability of the system. The most important resource endowment in determining production patterns across the area is that of water availability, which is affected by rainfall patterns. It is the seasonality and distribution of these patterns that serves as the guiding force behind production systems in the area. As can be seen in Figure I, rainfall is present only in the growing season from April through October. This results in a water deficit throughout the dry season, and little to no soil moisture. This factor results in a heavy dependence on the arrival of the rainy season, as crops cannot survive in the dusty soils without supplemental moisture.

Surveys on Production Characteristics: To facilitate and focus the process of data collection, the study was limited to rural communities surrounding the industrial corridor of Xicohténcatl in the northern part of the state of Tlaxcala. Due to the isolated nature of the area and population, preliminary surveys and interviews were conducted over a 6 month evaluation period in 1998. A two month period of intensive data collection was conducted in early 1999 which included interviews with producers at all levels of household production, in addition to industrial representatives.

Field research was conducted in 5 rural communities in the region with a principal focus on the small mountain town of Emiliano Zapata, and including supplementary data

collection in the villages of Capula, Zotoluca, Santa Fé La Troje, and Lázaro Cárdenas. These communities were evaluated based on their differences in agricultural activities, labor migration, and natural resource endowments in order to have a sampling of communities representative of varying conditions. An overview of general community characteristics is presented in Table II. These characteristics demonstrate the wide variability in the socio-economic frameworks of communities in this area. This variety in the communities under study assisted in determining how these various external factors influence producer and community response to policy and macroeconomic changes.

Due to the isolated nature of these villages and the distrusting nature of many residents, survey data was difficult to collect. Total survey participants included only 20 households. The in-depth interviews with a small number of individuals with whom a trusting and open working relationship could be developed was the more effective data collection method, and the results seemed more dependable. The conglomerate survey results are presented in Table III. These data indicated that a large majority of the area residents relied on agricultural production for a majority of their income (100%). Plot sized averaged at 4.25 hectares, of which 63% was planted in corn. The subsistence nature of these producers was reflected in that 80% of the corn harvest was destined for household consumption. This number is low only due to the influences of the towns of Lázaro Cárdenas and Zotoluca which due to varying resource bases (irrigation and large plot sizes, respectively), have overall yields which exceed family consumption needs. The other three villages included in the study produce on a purely subsistence basis.

Moreover, interviews were conducted with industry officials, community leaders, campesinos, housewives, and factory workers to collect additional data. These interviews

not only provided necessary information regarding labor allocation for the Linear Programming model, but they also brought out many of the social and economic concerns of local residents. Some of these interviews were transcribed in their entirety, while others are only summarized in the results section. The information gathered from this process came from three different groupings of interviews. The first grouping includes industrial interviews, the second campesino interviews, and the third includes various interviews with rural women. This variety in the types of interviews conducted provided for a rounded picture of the industrial/agricultural interaction to develop.

The campesino interviews, which took place over a six month period, provided most of the detailed labor allocation data with respect to crop activities such as timing of soil preparation, fertilization, planting, weeding, tilling, harvesting, and food processing. In addition to the timing of production activities, the associated labor requirements were also discussed in detail for the construction of the enterprise budget. Producer interviews covered all input requirements for the major crops produced in the area, focusing on labor. Labor and capital requirements for the different crops were found to vary distinctively by type of production: Rain-fed vs. irrigated, organic fertilizer vs. inorganic, and land preparation, using tractors vs. animal power. In addition to labor and capital requirements, yields also vary across activities. Producers indicate that organic vs. inorganic fertilizers does not noticeably affect yields, except in that there is more room for error with the organic methods, reducing damage with over application. The greatest difference is between irrigated and rainfed lands.

Post-NAFTA Changes

Changes in Commodity Prices: Price data was collected for a fifteen-year period from 1980 to 1995 for each of the commodities produced in the agricultural communities in the Xicohtencatl area (with the exception of betabel, or turnip, for which price data was not available). The price data, presented in Figure II, shows that NAFTA is most likely associated with falling prices in corn and basic grains. This indicates a high that it will be resource poor producers, without access to irrigation or humid lands, which will be disproportionately damaged by NAFTA induced price changes.

Changes in Industrial Demand for Labor: Changes in industrial demand for labor was conducted in a similarly informal manner. Interviews with the industrial sector and appropriate governmental agencies provided information with respect to the expansion of the industrial sector, growth in the job market in the industrial sector, and an estimate of approximately what quantity of this expansion is reasonably attributable to NAFTA.

The industrial corridor of Xicohtencatl has expanded greatly in the past 15 years, and much of this expansion (which has occurred in large part in recent years) has been attributed to NAFTA. As seen in the Figure III, the number of jobs available in the corridor has almost tripled since 1993, the last year before NAFTA was enacted. In addition, the number of operating factories in the corridor has also nearly doubled in the four years of available data since NAFTA implementation. This recent growth almost equals the sum total of all growth which had previously occurred over the first 16 years of the corridor's 20 year life-span.

While rapid increases in both the number of operating factories and quantity of employment available are visible upon the implementation of NAFTA, there are other

contributions to the industrial sector, which are not quite as obvious. The Fideicomiso indicates that firms with foreign backing have performed better through periods of domestic economic crisis due to the national firms limited access to capital and to foreign markets. Therefore, as post NAFTA expansion has included a large number of firms operating with foreign capital, it is expected that this will lend more stability to the employment offered in the corridor, and help adjust for problems domestic firms may be facing.

In addition to data over industrial expansion and increased demand for labor, the interviews revealed an interesting trend in local labor markets. While interviews conducted with industrial representatives and officials in the Ciudad Industrial de Xicohtécatl revealed several social characteristics about industrial employees, the most interesting by far was that of gender composition. An interview with the personnel manager with Linda Vista, a clothing factory, revealed that the majority of employees are young females, with an average age of 22-24.

This factory is not unique in its heavy employment of female labor. One of the managers with the industries in Xicohtécatl, indicated that many industries express a preference for female labor due to their more accurate attention to detail, promptness in arrival, and willingness to work overtime. While only 46% of the corridor's total employees are female, in four out of five of the corridor's largest employers, women provide the majority of labor requirements. These factories are the only large-scale firms in the corridor, with no other individual firm employing more than 250 employees. As a group these firms employ 5113 workers, or 77% of the corridor's total labor force, and

their hiring patterns with respect to gender strongly affect the job prospects available for the off farm allocation of labor for rural families.

The Economic Impacts: A programming approach is used to compare the impacts of hypothesized NAFTA induced changes in prices and industrial demand for labor on the Tlaxcalan household production strategy and income level. The model is developed at the household level, with household defined to include all extended family members living and working from a single shared resource/income base. The farm household is assumed to allocate its available resources (land, labor, and capital) among various income earning alternatives to maximize its returns. The completed model includes 72 rows and 104 columns. Of these 104 columns, 28 represented agricultural activities, 2 are used for activity constraints, 13 represent off-farm labor allocation activities, and 5 represent various production method activities. The rest provide for all commodity purchase and sales activities and labor transfer activities allowing for a monthly distribution of labor by age and gender. The rows provide resources available to typical households of these regions. The primary data on the costs and returns associated with activities available to farmers, were used in the analysis. These data were based on the surveys of producers, family members, government staff, and industrial managers in the five rural communities in this region.

The uniqueness of this model is in its inclusion of the unpaid female labor activities, such as household management, child-raising, food-preparation and collection. This avoided the devaluation of unpaid labor which typically occurs in this type of model, and provided an important first step to accurately evaluating the policy impacts of NAFTA upon the entire household and community, not just those whose labor is compensated

monetarily. By including the often overlooked unpaid labor sector (which is normally performed by women, elderly, children, and absolute poor), this population sector received equal weight in the evaluation.

Summary and Conclusions

This study indicates that NAFTA is congruent with the economic sustainability of the specific rural communities evaluated, where increases in income from rising industrial demand for labor have offset losses from declining agricultural prices. More specifically, the results of this study indicate that while falling commodity prices have harmed most families (except for those on irrigated lands), increased industrialization has for this most part negated this impact and resulted in an overall increase in family income. This has occurred in large part in direct association with an augmentation in female workload, and has been associated with changing gender roles and community structures. Despite these changes, this process is seen as not only congruent with the sustainability of the rural community, but as beneficial through its reduction of many risks associated with agricultural processes.

These results are expected to vary by location, for as the study shows, differences in land and resource endowments have the ability to greatly affect the outcome. While results are not uniform across genders and households of varying resource bases, they consistently indicate that NAFTA is associated with both increased income and reduced exposure of the rural household to many of the traditional climactic and economic risks associated with agricultural production.

In summary, while the development of industrial corridors was associated with many concerns, it did appear to have increased the overall economic viability of the rural

household while reducing agricultural risk. These benefits have occurred only as a result of the rural location of this industrial corridor. When industrial growth occurs in purely urban settings or conglomerates in specific areas of a nation, the ability of rural communities to utilize this resource without migration is restricted. The absence of local off-farm allocation alternatives, coupled with the agricultural price declines commonly associated with the economic restructuring process, is shown in this study to place significant economic pressures upon the rural household.

The results of this study may be used by policy makers in encouraging the placement of more industrial zones in rurally accessible areas. While the environmental and health concerns associated with the questionable practices of some maquila industries are extensive, the potential of a properly regulated industrial sector to help ease Mexico's long going agricultural crisis can not be ignored. It is possible that a more even distribution of industrial development could reduce environmental pressures as well as provide a more even distribution of the much-needed industrial incomes.

References

- Barajas, Rafeal (El Fisgón). *¡Me lleva el TLC! El Tratado retratado*. Editorial Grijalbo: Mexico, DF, MX. 1993.
- Food and Agricultural Organization of the U.N. (FAO). *Production and Trade Year Books*. Various Issues. 1993.
- González Jácome, Alba. “Evolución de la industria textil en Tlaxcala. Siglos XIX y primera mitad del XX.” *La economía desgastada: Historia de la producción textil en Tlaxcala*. Ed. Alba González Jácome. Universidad Autónoma de Tlaxcala: Tlaxcala, Tlax., MX. 1991.
- Hufbauer, Gary Clyde, and Jeffery J. Schott. *NAFTA: An Assessment*. Institute for International Economics. Washington, DC. 1993.
- Luna Morales, Cesar del C. *Cambios en el Aprovechamiento de los Recursos Naturales del Suroeste de Tlaxcala, Mexico*. Masters Thesis: Colegio de Postgraduados, Montecillo, MX. 1990.
- Organization for Economic Cooperation and Development. *Review of Agricultural Policies in Mexico*, Paris: OECD Publications. 1997.
- Secretaria de Desarrollo Industrial (SEDI). *Informal Reports*. 1997.
- USDA, http://www.fas.usda.gov/itp/policy/nafta/nafta_background.htm, (July 2001)
- USDA, <http://ffas.usda.gov/info/factsheets/nafta.html>, (2000)

Table I: Comparative Analysis of National and International Agricultural Prices (1992 dollars)

Product	Domestic Price	International Price	% Difference
Corn	236.6	137.6	72.0%
Beans	656.9	439.7	33.0%
Barley	257.9	202.7	27.2%
Tomato	1200	1687.99	-28.9%
Oranges	244.39	1610.32	-84.8%
Avocado	2251	6086.28	-63.0%

Sources: *Perspectivas de Comercializacion de los Productos Basicos*, Mexico, Secofi, 1993.

Manrubbio y Santoyo, *¿Es negocio el Campo?*
Revista Agronegocios, 1992.

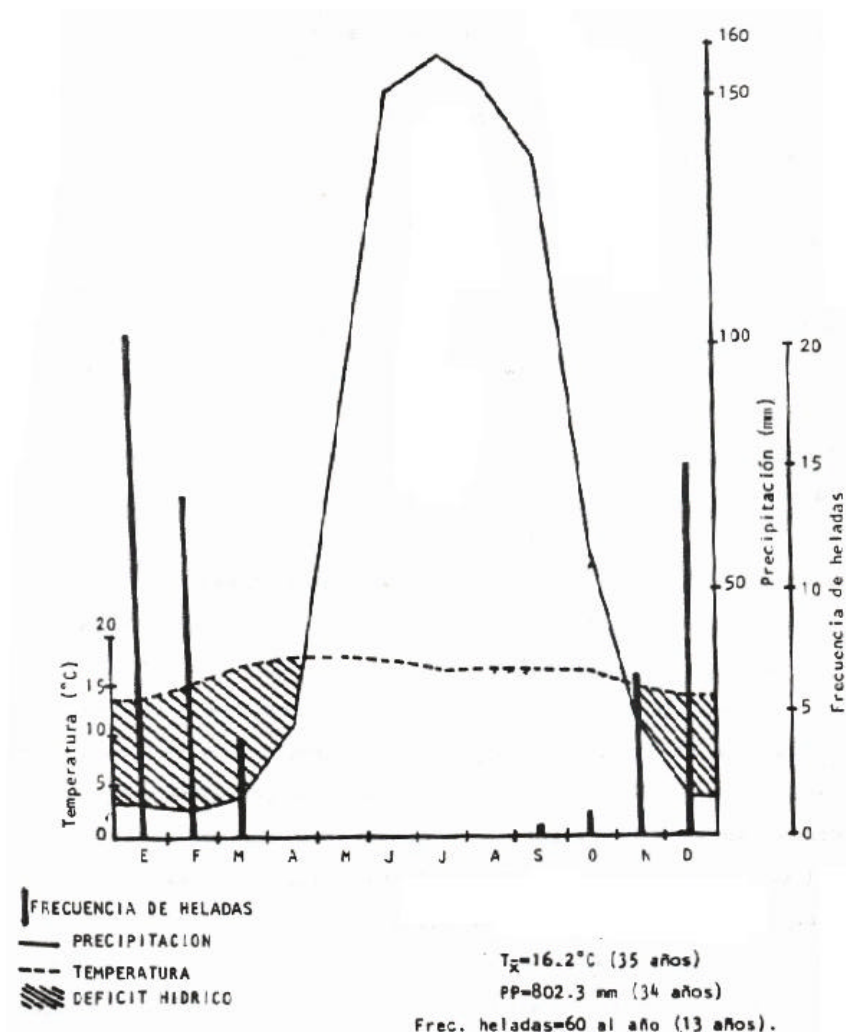
Table II: Summary characteristics of rural communities surrounding the industrial corridor of Xicohténcatl.

Pueblo	Population	Principal Crops	Irrigated Area	Agri. Structure	Labor Migration
Emiliano Zapata	6500	corn, potato, haba	10%	Ejido	Minimal
Lázaro Cárdenas	2700	lettuce, carrots, corn	74%	Ejido	Average
Zotoluca	300	small grains corn, haba	0%	Private	Extensive
Capula	1500	small grains corn, haba	0%	Ejido	Average
Santa Fé la Troje	400	small grains corn, haba	0%	Ejido	Extensive

Table III: Survey results

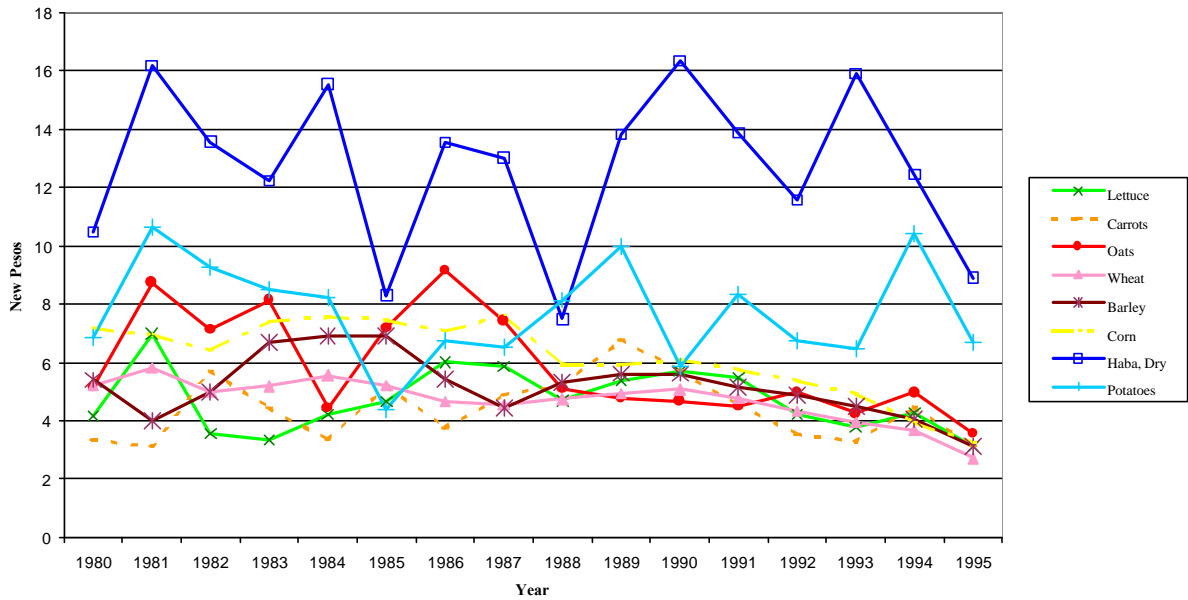
Survey Questions:	Aggregate Results
Household size	7.5
Gender composition	
male	46%
female	54%
Age composition	
0-9	26%
10-18	12%
18-28	32%
29-up	33%
Employment	
campo	44%
household	41%
industry	7%
other	7%
Land Ownership	
Yes	100%
No	0%
Plot size (hectares)	4.24
Crop areas	
corn	63%
beans	16%
lettuce	44%
Other Vegetables	53%
grains	18%
Water availability	
irrigation	0%
temporal	100%
% for household use	
corn	80%
beans	100%
potato	100%

Figure I: Climactic characteristics of western Tlaxcala.



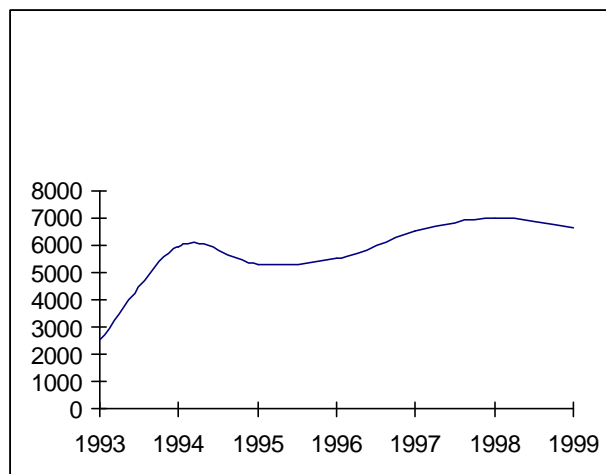
Source: Luna Morales, Cesar del C. *Cambios en el Aprovechamiento de los Recursos Naturales del Suroeste de Tlaxcala, Mexico*. Masters Thesis: Colegio de Postgraduados, Montecillo, MX. 1990.

Figure II: Mexican producer prices for commodities produced in the Xicohtencatl agricultural areas, 1980-1995.



Source: Food and Agricultural Organization of the U.N., 1999.

Figure III: Total Employment in the Industrial Corridor of Xicohtencatl, 1993-1999.



Source: Survey Data 1999.