

Rural Poverty and Agriculture in Mexico: Monitoring the Conditions of Mexico's Poorer Farmers, 1991-94

I. Introduction

The conditions and policies that shape the Mexican agricultural sector have changed greatly in the late 1980s and early 1990s. Beginning around 1987, the Mexican government embarked on a far-reaching program of general trade liberalization and reforms of agricultural policy that has been accelerated by agreements reached under the NAFTA. Many of the policy changes have been supported by the World Bank through its policy-based lending and are similar to those also recommended in other countries. It is, therefore, of great interest to see what effects these reforms have had in Mexico. This study makes a step in that direction by using survey data to examine the conditions, characteristics, and production behavior of a sample of farmers in 1991 and 1994.

The empirical work in the paper is based on the results of two surveys. One covers the 1990-91 crop year; the other the 1993-94 crop year. The surveys were conducted in four states --Sonora, Puebla, Tlaxcala, and Guanajuato. The 1991 data were collected for 881 *ejidatarios* and private farmers, as well as an additional 109 *mixtos*, or farmers who have both private and *ejido* land. During the 1994 field work, a random sub-sample of 600 farmers were sought, with the end result of 567 completed questionnaires.

The data from this project will eventually be used to investigate the effect that farmers' wealth has on their production behavior, and specifically on their ability to adjust to changes. In the current paper, we report descriptive statistics that suggest how the sector has changed between the two survey dates.

II. Policy changes

The Mexican economy has become increasingly open over the last ten years. Since mid-1985, when almost all imports were subject to controls intended to shield domestic industries from international competition, protection to most import substitution sectors has declined dramatically.

Almost all imports are now free from controls, and the maximum tariff now is only 20 percent. Mexico acceded to the GATT in 1986. Until recently, however, the agricultural sector has been a prominent exception to the trade liberalization. Protection for agricultural staples remained quite high, with a large degree of government involvement in price setting mechanisms and quantitative import controls. Twelve crops had guarantee prices, which were implemented through large scale purchases of the crops by the parastatal marketing agent CONASUPO and by import controls. As of 1992, imports of maize, beans, wheat, and barley still required licenses and their levels of protection remained high, ranging from 16% (wheat) to 72% (maize), averaged over 1989 to 1992 (World Bank, 1994).

The main obstacle to liberalizing the grain markets has been the fact that many of Mexico's poorest commercial farmers rely on these commodities as cash crops. Thus, it has been feared that a reduction in protection could significantly increase the incidence and severity of rural poverty. These fears notwithstanding, direct interventions by support prices and monopoly marketing by CONASUPO were eliminated in 1990 for all crops except maize and beans, which continued to have guarantee prices. However, since these are the two most important crops, this is not an insignificant exception. Guarantee prices for other major crops-- sorghum, soybeans, wheat, and rice-- were replaced with a system under which prices were agreed in negotiations among government, industries, and producers, with a subsidy being paid to private traders to make them indifferent between domestically produced crops and imports. Guarantee prices for minor crops were eliminated.

The controls on the Mexican side have been gradually lifted, so that by early 1990s, exports were virtually free of government intervention. Regarding exports, controls and tariffs imposed by the US on Mexican exports are scheduled to be gradually removed under the NAFTA. For some products, this was done immediately, but for sensitive products (rice, wheat, dairy products, and some horticultural products), a tariff-quota is being used. A tariff-free import quota for these products will be expanded each year, and eliminated after 15 years. Meanwhile, the tariff charged on above-quota imports will be reduced, beginning at levels set to match pre-NAFTA protection, but reaching zero by the 15th year. Some horticultural products are subject to a 10-15 year phase-out of import controls and tariffs, but with "snap-back" provisions designed to prevent import surges.

Under these provisions, tariff quotas are applied, with the tariff-free quotas expanded at 3% per year. Tariffs may be applied to over-quota imports, but the tariffs are limited (to the lower of the MFN rates in July 1991 or the time when the tariffs are imposed) and will be eliminated within 10 years.

Under the NAFTA, the Mexican government is committed to phase out all quantitative import controls and tariffs on all products using the mechanisms described above. For maize, beans, and barley, the commitment is to do this by a tariff-quota. The licensing requirement for wheat imports was eliminated immediately. All tariffs for products other than maize, beans, and barley are supposed to be phased out over 10 years, but with “snap-back” provisions for swine, pork, apples, potatoes, and coffee products.

It appears, however, that the Mexican government intends to move even faster than required by NAFTA in liberalizing the agricultural trade regime. It has announced that under the Programa Nacional de Modernization del Campo (PROCAMPO), all restrictions on agricultural trade will be eliminated, as will guarantee prices and agreement prices. Safety net payments to farmers would be made based on historical (not current) planting patterns. The payments would be a fixed amount per hectare planted in a base period in beans, maize, soybeans, sorghum, wheat, rice, cotton, barley, and safflower. These payments would be phased out over a 10-year period. Thus, when the program is fully implemented (originally scheduled for 1995-96), farmgate prices and incomes will in principle be de-linked and farmers' production decisions will be made based on world prices. Implementation of the plan has run into difficulty, however, and as of 1994, payments were reportedly still being made based on current plantings (World Bank, 1995 and observations from survey work). If so, the program is effectively just another form of price support.

In addition to these significant changes in output markets that have occurred or are imminent, Mexican farmers also are being faced with monumental changes in input markets. Historically, use of certain inputs-- fertilizer, electricity, irrigation water-- has been heavily subsidized by the pricing policies of the government. The government owned fertilizer company, FERTIMEX, had a monopoly on manufacture, import, and sale of fertilizer in the country. Its pricing was set to administer subsidies, which eventually reached macroeconomically significant proportions. Reform began in 1989-1990, when domestic prices were raised to more or less parity with world levels, and

FERTIMEX withdrew from domestic distribution. Further reforms are planned.

Reforms have also been dramatic with respect to water pricing. Historically, most increased productivity in Mexican agriculture has come from developing new sources of irrigation. This is not an option in the future since almost all economically efficient sources have been exploited, and in any case there will be increasing demand for water for urban uses (World Bank, 1995). However, a great deal of water was wasted through inefficient irrigation practices and poor maintenance of canals (with overall conveyance efficiency of about 30 percent, compared to 50-60 percent in the U.S.), which also had adverse environmental effects. Much of the water has been used on relatively low-value crops. Consequently, much can be gained from better use of existing irrigation projects with the right incentives. Recognizing this, the government has been focusing on increased cost recovery since the mid-1980s and in 1992 passed a far-reaching national water law. This transfers management of irrigation districts to water users organizations, making them responsible for operations and maintenance and for setting users fees. As of December 1994, this transfer had been fully or partially completed for 84 percent of the large surface irrigation schemes. Almost all of the irrigated area in the North has been transferred, but only about 12 percent in the Southeast. The law also allows the federal government to authorize concessions for transferrable water rights to legally defined groups (such as the users organizations), who may then grant subsidiary rights to their members.

Overexploitation of groundwater has been encouraged in the past by heavily subsidized rates for electricity used to pump the water. However, starting in 1990, rates have been raised, with a stated target of covering 100 percent of long-run marginal cost by 1997. By January 1993, the rates had reached 54 percent of the target, though increases were temporarily suspended after that.

Imports of agricultural machinery were for many years restricted in order to protect domestic manufacturers. This resulted in poor quality and high prices for machinery available to farmers. Since September 1989, however, imports have been free of quantitative control when imported by domestic manufacturers and subject to duties of only 10 -15 percent. In 1991, this regime was extended to all traders. Both the import and domestic production of pesticides, as well as their prices, also have in the past been strictly controlled. While some controls may be justified on grounds of environmental externalities, the controls actually functioned to impede entry and competition, lower

quality and raise the cost of the products. Since 1989, however, the government has desisted from controlling prices and has taken steps to ensure that the controls do not unnecessarily obstruct imports (World Bank, 1991).

The structure of extension services began to change in 1990. Before that, almost all extension was done by the central government through a large nation-wide program. This employed 20,000 extension workers in the 1980s. After 1990, the government began to privatize this work, and has now (1995) reduced its own extension staff to 370. Some other public sector organizations, including FIRA and BANRURAL (large lenders) and state governments, provide extension services, but it is estimated that about half of all extension work is now done by the private sector. The main sources of private extension services are commercial banks, non-governmental organizations, producers' groups, input suppliers, and companies in joint ventures with farmers. According to the latest agricultural census (1991), about 5 percent of all producers use public extension, and 4 percent used private extension services. Most of the use is by medium and large farmers, with about 6 to 10 percent using some type of extension, compared to 2-4 percent of small and subsistence farmers (World Bank, 1995).

In the land market, recent reforms have been truly revolutionary. Much of Mexican agriculture has been organized since the revolution as "*ejidos*", organizations of farmers, each of whom may have usufruct rights to parcels of land, but not other ownership rights. Thus, they have been unable to pledge land as collateral, making them poor risks for lending. (This was one major *raison d'etre* for the state-owned agricultural credit system.) This system also limited the incentives for investment in land improvements and impeded the consolidation of inefficiently small plots. In early 1992, the Constitution and applicable laws were amended to give *ejidatarios* much greater flexibility. They can now rent land, enter into joint ventures with outsiders, sell it to members of the *ejido*, or sell it to non-members with the approval of a majority of *ejido* members. Land can now be pledged as collateral. All of these changes are intended to encourage the development of dynamic rural land and financial markets. Implementation requires that individual titles be given out for 4.6 million agricultural parcels and 4.3 million house plots, a huge task. The process was begun in January 1993, but is reportedly proceeding slowly, at least partially because of the very precise, but time-consuming, survey method being used. As of April 1995, some 20 percent of the *ejidos* had

received certificates of *ejido* rights, with another 50 percent of the *ejidos* at some point in this process (de Janvry, et al, 1995). This had resulted in few complete individual titles for individual *ejidatarios*, however.

III. Issues and research findings

The vision of the Mexican agricultural sector of the future, when the unilateral reforms and the actions under the NAFTA take full effect, is one of efficient allocation of scarce resources, with a significant and growing export sector, and with government resources directed to those most in need by means of a safety net. To realize this vision will require careful monitoring to ensure that the reforms have their intended effects and that farmers are able to respond. One of the purposes of this research is to compare relevant characteristics of farm households in 1991 and 1994, and in some cases where data were not collected in 1991 to provide a baseline in 1994 for future monitoring. While changes cannot be formally causally linked to the policy changes based on this survey data, it is possible to see whether the expected changes are taking place. Table 1 reports some of the results so far for the group of 567 farmers in both samples.

In addition, the farmers were divided into five groups according to the total values of their assets, including land, machinery, vehicles, buildings and large animals, at the end of 1994. Group I averages 6240 new pesos (N\$) of assets per household member, while group IV averages over N\$50,000 and group V surpasses all with N\$244,660 per household member. We will use these groupings to compare poor versus wealth farmers.

A. Demographics

A range of household indicators is available using these data sets; we highlight a few here. More heads of household were active in off-farm work activities in 1994, compared to 1991, increasing from 16.4 to 33.7%. The increase is apparent in all groups, but especially pronounced in groups I and II. Since off-farm income offers an additional manner to diversify risk in household consumption, it would appear that farmers, especially the less wealthy, are relying more heavily on this option. This pattern is also evident in the numbers for percentages of families with anyone

working off-farm. Looking at the households where someone looked for work during 1994, we also see that the concentration of job-hunting is in the lower asset groups. Each of these patterns indicates that the poorer households were not only more active in off-farm work activities in 1994 compared to 1991, but that their participation is at greater levels.

Between 1991 and 1994, we also see an increase in average family sizes, from 5.1 to 6 persons, as well as an increase in the dependency ratio (of persons less than 16 years of age). These patterns are not even across the asset groups. In fact, group IV exhibits no change in the number of children over the three-year period, but family size increases, and the dependency ratio drops. Households in group IV are slightly smaller in 1994, with no additional children, and a steady dependency ratio.

B. Input and extension use

The reforms in the input markets were generally intended to reduce costs of these inputs to farmers and improve their quality by privatizing marketing channels and by reducing import tariffs and barriers. The exception is fertilizer, the price of which generally should have risen due to the removal of subsidies. The availability should have improved, however, because of the demonopolization of marketing channels.

Consistent with expectations, a higher percentage of the sample used most of the purchased inputs in 1994 than in 1991, though most of the changes were small. More farmers hired labor; purchased seeds, fertilizer, and pesticides; and used a tractor to prepare the soil. These results were true more or less in all asset groups, except that fewer farmers in groups II and V purchased seeds. Given the phaseout of fertilizer subsidies, it is particularly interesting that fertilizer use was already high in 1991 and increased nearly across the board (in the number of farmers who use it).

Not only did more farmers use purchased seeds and fertilizer in 1994 compared to 1991, but they had less distance to travel to obtain it. Survey results show an average of 17 kilometers between farmer and seed supplier in 1991, dropping to 13.3 in 1994. This pattern is similar across asset groups, and for fertilizer as well.

There was a reduction on average in the number of farmers who irrigated their crops, though the top two asset groups increased their use of irrigation. Reforms in the water market should have resulted in water use becoming more expensive, but also in farmers having more control over its delivery. The higher price may have been a deterrent to the less wealthy farmers, but apparently not to the wealthier ones. This supports the finding in other studies that farmers are willing to pay for water use when users have control (Knudsen and Nash; Postel). Since the need for irrigation is highly weather-dependent, however, firm conclusions would have to take account of climatic conditions of the individual farmers in the two survey years.

Farmers use of insurance dropped dramatically from 1991 to 1994, both as a whole as well as across the groups. The reorganization of Banrural and FIRA into more self-sustainable organizations implied that many fewer farmers likely qualified for the same type of loan in 1994 as in 1991. Since many farmers do not acquire crop insurance unless required to by a lender, it is thus not surprising that the percentage that did obtain insurance dropped as well. Only about 12 percent on average used crop insurance during 1994.

We cannot tell how the use of extension service changed between 1991 and 1994, since the question was not included in the 1991 survey. However, we can tell something about the pattern of use in 1994 by different asset groups. In our sample, use of technical assistance is more common in the higher asset groups, though the difference is not as great as the 1991 Agricultural Census found (reported in World Bank, 1995; see discussion in section II above). The census found that the percentage of medium and large farmers who used extension was 2 1/2 to 3 times the percentage of small farmers who were users. In our sample, the ratio is on the order of 1 1/2. The split between users of free assistance (presumably mostly government-provided) and paid assistance is about 41-59, but this varies substantially across asset groups. In Groups III and IV the percentage of paid technical assistance users exceeds that of users of free services.

C. Land

Improving property rights in land should help create a more fluid land market, which should make an important contribution to increasing efficiency by encouraging the consolidation of

inefficiently small plots. It should also encourage investment in land improvements, which will be a prerequisite for a thriving export sector.

The land market appears to have become slightly more fluid between 1991 and 1994. The average size holding increased a bit, indicating some consolidation. Such consolidation appears to be concentrated in groups III and IV with no change in the wealthiest group. The rental market also grew, with more farmers renting land, and the average amount of land rented increasing. The average amount of land rented in and out rose in almost all asset groups, with the only exception being land rented in by the group IV farmers. And finally, with respect to land titling, these survey results confirm that the process is going slowly. Only about 9 percent of the *ejidatarios* had received full title for at least one parcel. This covered about 12 percent of the *ejido* land. Among the 5 asset groups, the wealthiest and the least wealthy (in that order) were the groups in which the highest percentage of farmers had received full title.

Farmers were asked about the quality of their land (very fertile, fertile, or poor). The percentage of farmers who said their land was “poor” fell between 1991 and 1994, and it fell most in the lowest asset group. Farmer-reported land values also show an interesting pattern. Figures in the table are expressed in nominal value per hectare. First, we see in each year that group IV, and not group V, exhibits the highest land values. This is likely due to a larger holdings of ranch land among the wealthiest farmers, which may be worth less per hectare than fertile crop land, but they hold more of it. Second, using the wholesale price index to convert 1991 land values to 1994 values, we see that land values increased considerably from 1991 to 1994, an average of 63 percent. This increase was most pronounced in groups II and III, each at about 80 percent, and least in group IV at 37 percent. One possible explanation for the improved quality and value of land is an increase in investment, which is what would be expected from the land reformer.

D. Other assets

Ownership of tractors and vehicles increased over the sample period. Ownership of tractors increased in all asset groups except the lowest, in which it stayed the same. By far the largest

increases, both in percentage points and as a proportion of the 1991 figures, were in groups III and IV. Vehicle ownership increased in all groups, with the lowest group showing the largest proportionate increase.

E. Output

Changes were evident in cropping patterns. Overall, the number of crops produced by the average farmer increased. The greater diversity of crops was also reflected in an increase in intercropping. Both patterns were evident in all asset groups.

Diversification can have two effects. The first is to increase average income levels, when the result is higher production of high-value crops, especially fruits or vegetables. Levy (1991) found that "(d)iversification is one of the key mechanisms to increase the returns to land," and noted that in the North and Northwest regions, there was a great deal of this kind of diversification in response to market incentives, but not much in other parts of the country.

Another effect is to reduce risk. Farmers' perceived risk may be higher now than before for several reasons. One is the removal of the parastatal CONASUPO's marketing monopoly and guaranteed support prices. Another is the closer linkage of domestic with border prices. This will have a number of salutary effects, but will also create greater variability in domestic prices. Finally, the reforms in the credit markets have eliminated the de facto requirement that all farmers participate in the crop insurance program. Increased risk from any of these sources would be expected to increase farmers' incentives to self-insure by diversifying their crop mix, as they have apparently done.

Interestingly, we see an increase from 1991 to 1994 in the portion of farmers who sold one or more crops to CONASUPO, from about 11 to 14 percent, evident as well in each asset group except IV. However, when we add all other government buying agencies, we see the proportion drop dramatically, from 29 to 15 percent. Thus it appears that while CONASUPO's role is still important on a per farmer basis, it now constitutes nearly the only government buyer to which the farmers in our sample sold any of their output.

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