A long-term view:

Comparing the results of Mexico's 1991 and 2007 Agricultural Censuses

Héctor Robles Berlanga[1]
Universidad Autónoma Metropolitana–Xochimilco

1 Translated by Jonathan Fox

SUMMARY

A comparison of the results of the 1991 and 2007 Agriculture Censuses allows one to see the most significant changes in the Mexican countryside over a 16 year period that included several structural changes, including the 1992 reforms of Article 27 of the Constitution, the free trade agreement with the US and Canada, the restructuring of the Mexican state, which withdrew from many rural activities, the intensification of the migration process and the 2001 Sustainable Rural Development Law, among others.

Many of the changes in Mexico, and especially in the countryside, took place without up-to-date information on the situation in the agricultural and forestry sector at national, state or municipal levels, because the VIII Agricultural and Livestock Census was not carried out as scheduled in 2001.

This comparative exercise allows one to see changes in: land use patterns, production activity, the numbers of production units, availability of irrigation and agricultural machinery, types of traction used for crop production, head of livestock, as well as whether or not the yields of principal crops increased.

This data permits an assessment of the effects of the structural reforms in the Mexican countryside, as well as the structural problems of the rural sector in 2007.

1. OVERVIEW

The Mexican countryside has gone through a series of transformations in recent decades that are part of the globalization process. These changes are expressed through changing land use, as well as changing economic relationships resulting from the trade opening, and through different forms of power and authority that are expressed in diverse structures and institutions, as well as in the increasing presence of a wide range of rural actors.

It is difficult to assess the scope of these changes without up-to-date statistical information. The lack of data at national and state levels was overcome by the decisions of the LX Legislature's congressional representatives linked to the rural sector, from different political parties, with support from the rest of the Congress, to allocate resources in the 2007 budget so that the National Institute of Statistics, Geography and Information (INEGI) could carry out the VIII Agricultural and Livestock Census from October to December of that year.

In the second half of 2009, INEGI presented the national and state level results of the VIII Agricultural and Livestock Census, which made possible a comparison with the previous 1991 VII Census. It is important to note that the census results that have been released so far only permit comparison of Production Unit (UP) data at very high levels of aggregation, without distinguishing by crop, size of UP, access to water, etc. – in spite of the fact that two years had passed since the data was collected. The advantage of the data is that it comes from INEGI, the agency responsible for generating statistical information in Mexico, which applied a consistent methodology to survey all the farms in the country.

This study compares changes between 1991 and 2007 in the following variables: production units, land use, land tenure, availability of irrigation water, plot size, the number of tractors and trucks, the type of traction used, the number of head of livestock, access to credit, as well as the area sown and harvested of the principal crops. As will be seen, however, very few of these indicators can be cross-referenced because the definitive census results have not yet been published.

Although the most general census results are now available, INEGI should publish all of the data disaggregated to the municipal level; it is difficult to believe that 2009 ended without public access to this information.[2] This concern is based on the proposition that the publication of census data is a core principle of transparency.

The lack of disaggregated results prevents the analysis of regional patterns, as well as analysis by type of UP or crop. One cannot analyze changes in cropping patterns over the past 16 years, nor can one determine which regions or productive activities gained or lost ground in the process of the last two decades of structural change.

The concern over the lack of results is underscored by the prior experience with the decision not to carry out the VIII Agricultural and Livestock when it should have been, in 2001. Recall

2 Editor's note: This study was completed at the end of 2009.

that the IX Census is due to be carried out in 2011, and the preparations need to begin one year beforehand, so if we do not have the results in the short term and they are delayed until late in 2010, one could argue that it will not be necessary to carry out a new census.

2. COMPARING THE MAIN VARIABLES

1. Between 1991 and 2007, the number of production units increased by 25.9%. Yet it was not the agricultural and livestock UP, which grew 6.5%, that grew the most, but rather those involved in other economic activities. Notably, the land area dedicated to agriculture and livestock fell by 24.7%, which had the effect of reducing the average UP size by 7 hectares. That is, Mexico has less primary sector activity on smaller plots, at a time of world food crisis. This scenario raises the question of what is happening in the 43 million hectares that were reported as having no agricultural activity, a category that grew 159.3% in area between 1991 and 2007.

It is extremely important for policy-makers to know the reasons for the reduction in agricultural and livestock land area. The responses would vary depending on whether the shrinkage is due to out-migration, versus whether the producers shifted into more profitable activities. To shed a bit of light on the issue of why 971,000 production units did not plant crops in 2007, according to Table 14 of the VIII Census, 33.2% of the UP did not plant because of lack of funds or support, 25.9% because the lands were lying fallow, and 10.1% because of bad weather or drought.

Table 1
PRODUCTION UNITS WITH AND WITHOUT AGRICULTURAL AND LIVESTOCK ACTIVITY

Year	Production units		With agriculture/ livestock activity		Average plot size	Without agricultural/ livestock activity	
	Number	Area	Number	Area	Area	Number	Area
1990	4,407,880	108,346,084	3,823,063	91,413,395	23.9	584,817	16,932,688
2007	5,548,845	112,743,247	4,069,957	68,829,752	16.9	1,478,888	43,913,494
Increase (%)	25.9	4.1	6.5	-24.7		152.9	159.3

2. In the last 16 years the area surveyed remained almost constant, including potential cropland. In contrast, forested lands shrunk by 55.4%, possibly deforested to expand pastures, which increased by 8 million hectares. However, the 900,000 hectare increase in unproductive land does not account for the exponential increase in lands without agricultural or livestock activity, as shown in Table 1.

3. It is important to note that in the last 50 years, potential cropland grew by 7 million hectares and the amount registered in 2007 is the highest so far. That is, the 31 million hectares reported in Table 2 represent the country's maximum, the agricultural frontier. In addition, one can conclude that only 18% of Mexico's rural lands are apt for agriculture, which suggests that we are not a nation that should limit its rural economic development policies to the promotion of agriculture.

Table 2
LAND USE PATTERNS

Year	Total area surveyed	Cropland	Pasture	Forest	Unproductive
1990	108,346,084	31,104,451	67,232,593	8,793,066	1,215,973
2007	112,743,247	31,512,323	75,187,612	3,919,415	2,123,896
Increase (%)	4.1	1.3	11.8	- 55.4	74.7

4. In Mexico, some actors opposed the 1992 reforms of Art. 27 of the Constitution because of their concerns that social sector lands would be privatized, expecting that *ejidos* and agrarian communities would lose their lands to the private sector.[3] The 2007 Census results show that this did not happen. While agrarian community land area was reduced, they converted to *eji-*

3 Editor's note: Mexico's social sector landholdings take two main forms, *ejidos* and agrarian communities. The latter are somewhat different forms of governance of land tenure that are based on restitution of indigenous community lands.

dos, while private property remained constant. The increase in *ejido* lands could have two explanations: first, the agrarian courts' resolution of the agrarian reform adjudication backlog, and second, the possibility allowed by the Agrarian Law to change how social sector property is categorized, by decision of the assembly of members.[4]

Table 3
LAND USE ACCORDING TO PROPERTY CATEGORY

Year	Total area surveyed	Ejido	Agrarian Community	Private	Agricultural colony	Public lands
1990	108,346,082	30,032,643	4,338,099	70,493,493	2,166,650	1,315,197
2007	112,743,247	37,057,776	3,783,888	70,014,723	1,393,803	493,054
Increase (%)	4.1	23.4	-12.8	-0.7	-35.7	- 62.5

5. The 1991-2007 census data show that the amount of land considered to be irrigated or well-watered remained constant. The only change is that in 1991 1.7 million hectares of non-irrigated land that was classified as well-watered (*de humedad*) were no longer reported as such, and appear to have been categorized as irrigated, since the amount of rainfed land did not decrease. In synthesis, in the last 16 years, no rainfed lands gained access to irrigation – a worrisome situation because reliable access to water allows for increased productivity and the planning of agricultural activity.

Table 4
LAND AND ACCESS TO WATER

Year	Irrigated	%	Well-watered	%	Rainfed	%	Other
1990	3,824,366	13.6	1,792,390	4.0	23,170,409	82.4	28,113,852
2007	5,563,492	18.4		-	24,657,753	81.6	30,221,245
Increase (%)	45.5		-100.0		6.4		7.5

6. The production units with less than 5 hectares, representing 71.6% of the total, have increased in number. Over 80 years they grew by 708%, from 332,000 in 1930 to 2.6 units in 2007, which makes the *minifundio* the predominant form of landholding in our country.

While the 1992 reforms of Art. 27 of the Constitution attempted to roll back the presence of *minifundios*, average plot size has grown smaller over the past fifteen years Between 1991 and 2001, the average area divided up into farm plots within *ejido* land fell from 9.1 to 8.5 hectares, and by 2007 as reduced to 7.5 ha.[5] Over 16 years, *ejido* and agrarian community plots lost 21% of their average size. If the analysis focused on the cultivated area of all production units, that has fallen from 8.9 to 8.4 hectares. That indicates that the predominance of production units with less than 5 hectares applies to both the agrarian reform and the private sectors. Indeed, minifundios represent an even larger share of private landholdings, accounting for 62% of those production units, compared to 50% of *ejido* production units.[6] Small farms predominate in all types of property.

Table 5
PRODUCTION UNITS WITH FARMED AREA OF LESS THAN 5 HECTARES

Year	Land farmed	Production units	Average area farmed	Less than 5 hectares	%
1990	31,104,451	3,504,510	8.9	2,114,622	60.3
2007	31,512,323	3,755,043	8.4	2,688,611	71.6
Increase (%)	1.3	7.1	-5.4	27.1	

7. The data on area harvested shows two trends, the crops for which the land area remained constant over the past 16 years (corn and sugar cane) and the crops which reported less area

4 Editor's note: Given the drop in agrarian community land area indicated in Table 3, this suggests that some agrarian communities may have chosen to convert to *ejido* status.
5 INEGI, VIII and IX Ejido Census, Mexico
6 Given that the information released so far from the VIII Agricultural Census is only in aggregated form, one is unable to see what share of these production units' land is farmed, how much is left fallow and what crops are grown. The publication of the definitive results will permit this analysis.

harvested (beans, wheat, coffee, cotton and sorghum). It is notable that none of these crops showed significant increases in area harvested.

Corn and sugar cane show production increases, which has to do with yield increases compared to 1991, especially for corn. Coffee experienced the opposite trend, and was the only crop that showed reduced production and yields. The production of wheat, beans and cotton fell, because of the reduced area harvested, since they could not compete with the cheaper prices of these commodities in international markets. The country continues to be in deficit in corn, wheat and rice, in spite of increased corn production – in contrast to decades ago, when the country was self-sufficient.

Table 6

PRINCIPAL CROPS: AREA HARVESTED, PRODUCTION AND YIELD[7]

Crop	1990	2007	Increase (%)
Corn			
Area harvested	7,705,163	7,329,283	- 4.9
Production (KG)	10,228,262,250	20,662,158,310	102.0
Yield (KG)	1,327	2,819	112.4
Frijol			
Area harvested	2,371,836	1,522,494	- 35.8
Production (KG)	1,279,556,270	882,275,730	- 31.0
Yield (KG)	539	579	7.4
Wheat			
Area harvested	958,847	275,364	- 71.3
Production (KG)	3,475,725,829	1,258,816,300	- 63.8
Yield (KG)	3,625	4,571	26.1
Sugar cane			
Area harvested	600,538	617,855	2.9
Production (KG)	35,541,199,386	45,862,653,740	29.0
Yield (KG)	59,182	74,229	25.4
Coffee			
Area harvested	731,524	681,288	- 6.9
Production (KG)	1,947,046,832	1,154,729,660	- 40.7
Yield (KG)	2,662	1,695	- 36.3
Cotton			
Area harvested	253,097	116,828	- 53.8
Production (KG)	534,539,000	326,050,100	-39.0
Yield (KG)	2,112	2,791	32.1
Sorghum			
Area harvested	1,542,161	1,117,130	-27.6
Production (KG)	3,690,554,062	3,996,792,300	8.3
Yield (KG)	2,393	3,578	49.5

8. In terms of the type of farm equipment used to work the land, during the 1991-2007 period the number of production units that used only mechanized traction increased, while the number that used only animals or mixed traction decreased. In other words, animal traction is less widely used. Notably, the large number of UP that use only manual tools for farming remained constant during the same period.

Although the number of production units using only mechanized traction grew 45.9%, the total number of tractors and trucks dropped by 24.7% and 30.8%, respectively. This decrease may be due to the reduced number of farms that were able to access capital investment loans, while the increased costs of inputs and services may have obliged producers to change their livelihood strategies. For example, the prices for nitrogen-based fertilizers, in which Mexico is in deficit, increased by more than 50%, from M$ 2,200 per ton in 2005 to M$3,3000 in 2008, while potassium-based fertilizer prices increased 200%, from M$4,151 to $12,857 during the

7 As in the case of the size of UPs, data that would permit analysis of production units by crop remains unavailable to the public.

same period (Guzmán 2008). The cost per barrel of oil, which directly influences agrochemical prices, has risen 25% over 2005.

Table 7
MECHANIZATION AND NUMBERS OF TRACTORS AND TRUCKS
(PRINCIPAL CROPS)

Year	Total UP	Only mechanized	Only animal traction	Both mechanized and animal traction	Only manual tools	Tractors	Trucks**
1990	2,564,814	843,509	1,130,095	591,210	1,236,519	317,312	198,200
2007*	3,741,438	1,111,885	631,715	374,659	1,251,204	238,830	137,238
Increase (%)	45.9	31.8	- 44.1	- 36.6	1.2	-24.7	-30.8

* The sum of UP by type of traction does not add up to the total UP
** Refers to all trucks larger than 2 tons

Increased fuel costs impacts the use of farm machinery as well, which could explain the reduced numbers of tractors in 2007. Another explanation may involve an increase in the number of larger capacity tractors, which could cover larger areas. There appear to be fewer service providers who rent land preparation machinery. According to the 2007 census, 99.5% of those farmers who used tractors reported that they rented the service.

9. One of the central problems in the Mexican countryside is the lack of financing for productive investment. This situation that worsened over the past 16 years, as the number of UP reporting that they received credit fell from 744,000 to only 172,000 – a drop of 76.8%. Currently, according to the Census, only 4% of all production units received credit. If one considers that credit is needed to leverage the capitalization of production units, this data suggests that the vast majority of Mexican farmers cannot improve the conditions under which they produce and compete in international markets.

Table 8
PRODUCTION UNITS WITH ACCESS TO CREDIT

Year	UP	With credit
1990	3,867,495	744,400
2007	4,067,633	172,585
Increase (%)	5.2	-76.8

10. The predominance of small farms, the lack of increased access to irrigation, the drop in the number of farms receiving credit and the low use of farm machinery explains much of Mexico's limited capacity to market production in international markets. According to the Census' Table 26 "UP with land, nursery or greenhouse dedicated to production," of the 3.7 million UP, only 3,213 reported international sales – only 0.08% of all farms. In addition, the Census' Table 27 "UP with land, nursery or greenhouse dedicated to production according to type of buyer" reported that 1,518,000 UP did not sell their crops. In synthesis, few UP are directly inserted into the global economy.

11. In livestock production, only poultry grew between 1991 and 2007 - by 53.4%. The number of cattle remained almost constant, while the numbers of pigs, horses, sheep, goats all fell substantially. The poultry increase is due to the increased number of technified operations for the production of foreign varieties of meat and eggs. The reduction of horses is due to their reduced use as work animals. Numbers of other livestock fell in part because the increased cost of feed, by 60% in the past two years, obliged many producers, especially small-scale, to reduce their herds or withdraw from the activity.

Table 9
NUMBER OF HEAD OF LIVESTOCK

Year	Cattle	Horses	Sheep	Goats	Pigs	Poultry
1990	23,865,899	5,180,721	4,010,610	6,882,767	10,581,242	232,560,043
2007	23,316,942	2,143,934	7,305,578	4,124,201	9,021,192	356,824,337
Increase (%)	- 2.3	- 58.6	82.2	- 40.1	- 14.7	53.4

The comparison of the Agricultural and Livestock Censuses of 1991 and 2007 shows the following negative results:

- The number of production units without agricultural or livestock activity increased significantly, which indicates an abandonment of the use of land for food production
- The land under irrigation did not increase, yet water is a key input for planning crop production, improving crop yields and increasing producer income
- The fall in farm credit limited the capitalization of production units, which is necessary for them to become more competitive
- The fragmentation and pulverization of land distribution persisted, preventing the generation of economies of scale
- Access to capital goods fell, including tractors and trucks, while most production units did not use mechanization
- The number of head of larger livestock remained constant or fell, in contrast to what happened to the national population, leading the number of head per household to fall in relation to 1991
- In the context of the trade opening, the number of farms that participate in international trade is very small.

The comparison of the Agricultural and Livestock Censuses of 1991 and 2007 also shows positive results:

- Both production and productivity of key crops increased, permitting farms to become more competitive
- The production of poultry meat and eggs increased, increasing the availability of this basic food to Mexican consumers
- In 2009, in spite of the lack of access to credit, more farms used machinery than in 1991
- The distribution of land by property regime did not change, which indicates stability in terms of land tenure.

3. RECOMMENDATIONS

The census data comparison raises major public policy issues about agriculture, livestock and forestry, especially because the results of the VIII Agricultural and Livestock Census, as well as the IX Ejido Census, indicate that key policy goals have not been reached, including: reversing the trend toward *minifundismo*, capitalizing the countryside, changing crop patterns, promoting new approaches to organization and generating certainty in land tenure. Now is the time to consider carrying out changes that point in a different direction:

1) Policy needs to take into account the predominance of *minifundios* and the fragmentation of landholdings in the Mexican countryside. The recognition of the problem of pulverization of landholdings suggests solutions that involve the promotion of forms of organization of producers that draw on community-based ties of solidarity and permit the improvement of some stages of the production process. This recognition also suggests the need to invest more resources in agricultural research that generates technologies that are appropriate to this kind of farm.

2) The census results indicate the huge potential of non-agricultural lands: 75 million hectares of natural pastures (not counting those registered as common lands in *ejidos*) and approximately 50 million hectares of land with forest and other kinds of vegetation. These lands' importance is not only in the value of their natural resources, but also in the possibility of generating new productive alternatives, such as environmental services, tourism projects, as well as both metallic and non-metallic mining, all of which can generate employment. Each project should take into account how it can directly benefit the landholders, while protecting natural resources.

3) Mexico was self-sufficient in basic foods, but this situation has changed in recent years. The lack of food self-sufficiency affects many sectors of society, especially the poorest. This situation points to the need to establish a long-term, systematic, sustainable agro-food program that would address all the issues involved in guaranteeing appropriate, timely and sufficient food supplies to the Mexican population, taking into account availability, stability in supply, access, nutrition, food safety, quality and biosecurity. Such policies should offer sufficient income to producers for them to be able to be economically profitable or to fulfill their social or cultural roles in the different productive systems.

4) The lack of investment in rural infrastructure and the reduced capitalization of production units revealed by the VIII Census suggest the need to restructure public spending for rural Mexico. Larger investments in infrastructure are needed, to reverse losses in recent years in

terms of warehouses, roads and irrigation districts. This approach would have broad regional impacts, in contrast to the concentration of resources in a handful of commercial producers that is caused by the current budget distribution (reflected in the Special Concurrent Program for Sustainable Rural Development, known as the PEC). Instead, agricultural policy should be universal, long-term, and should generate better conditions for productive activities.

5) The lack of agricultural credit, as reported in the Census, should change. It is necessary to consider credit strategies with interest rates that are competitive with our trading partners, and to create financial options for low-income producers. It is difficult for farms to compete with our trading partners if they can only rely on the subsidies delivered by the PEC.

6) No doubt, living in rural areas in our country is associated with poverty. To be a resident of these regions leave one in a condition of discrimination. To mention just a few facts: 80% of the people who live in the lowest income municipalities are considered rural, more than half of the population employed in the primary sector earns less that the minimum wage or has no cash income, the GDP per capita in the countryside is one sixth of that of urban areas, almost all of the municipalities considered at extreme nutritional risk are rural, and four of every ten migrants to the US are from rural areas.

The policies to address rural poverty should not be limited exclusively to social programs, as they are now. Oportunidades is today the program with the broadest coverage in rural areas. Agricultural programs, in contrast, do not reach low-income rural areas, including production funding, the Livestock Program, the Compensatory Funds for Rural Energy Costs, the Support Funds for Productive Competitiveness, Income Target and the different programs within the Rural Alliance, just to provide a few examples. The reorientation of rural anti-poverty policy should not be postponed any longer. Poverty will not be overcome only with social welfare payments, the promotion of productive activities should be the central axis of Mexican rural development policy.

BIBLIOGRAPHY

Guzmán, Jesús, 2008. "Orígenes de la crisis alimentaria mundial," *Rumbo Rural*, 4(9), May-August. CEDRSSA

Subsidizing Inequality:

Mexican Corn Policy since NAFTA

This edition was printed in October 2010.
The edition consists of 500 copies.
Publication coordination: Alicia Athié
Printed by DISSA Impresores
Calle 3 núm 14 andador 4-5 Colonia Agrícola Pantitlán C.P. 08100
Delegación Iztacalco, México D.F.