

## Introduction

The focus of this analysis is on agricultural policies and on the agricultural sector. An assessment of the distribution of benefits to rural areas is also undertaken. At the request of the Mexican government, the OECD is conducting other studies that address education, rural development and other types of policies. Fisheries policies are addressed in Part III of this report. The results of this study have been widely shared within the OECD to ensure consistency, but interested readers are encouraged to turn directly to those publications for further information about the relevant topics.

The benchmark for the assessment presented here was defined by the OECD Council meeting at Ministerial level when, in 1998, shared goals and policy principles for the agricultural sector were defined (see box on following page). These goals and principles of policy design serve as the benchmark against which the direction of Mexico's agricultural policy reforms has been evaluated.

### OECD Ministers' shared goals and policy principles

#### *Shared goals*

Ministers outlined a set of shared goals, stressing that these should be viewed as an integrated and complementary whole. There was broad consensus that OECD governments should provide the appropriate framework to ensure that the agro-food sector:

- is responsive to market signals;
- is efficient, sustainable, viable and innovative, so as to provide opportunities to improve standards of living for producers;
- is further integrated into the multilateral trading system;
- provides consumers with access to adequate and reliable supplies of food, which meets their concerns, in particular with regard to safety and quality;
- contributes to the sustainable management of natural resources and the quality of the environment;
- contributes to the socio-economic development of rural areas including the generation of employment opportunities through its multifunctional characteristics, the policies for which must be transparent; and
- contributes to food security at the national and global levels.

Ministers stressed that agro-food policies should seek to strengthen the intrinsic complementarities between the shared goals, thereby allowing agriculture to manifest its multifunctional character in a transparent, targeted and efficient manner. The challenge in pursuing the shared goals is to use a range of well-targeted policy measures and approaches which can ensure that the growing concerns regarding food safety, food security, environmental protection and the viability of rural areas are met in ways that maximise benefits, are most cost-efficient, and avoid distortion of production and trade.

#### *Policy principles*

Ministers agreed to seek innovative ways and appropriate institutional frameworks to integrate public, private and co-operative initiatives, which take into account local and regional conditions. They agreed that in designing and implementing cost-effective policy measures, these should be regularly monitored and evaluated with respect to their stated objectives. Ministers also agreed that policy measures should seek to meet a number of operational criteria, which would apply in both the domestic and the international context, and should be:

- *transparent*: having easily identifiable policy objectives, costs, benefits and beneficiaries;
- *targeted*: to specific outcomes and as far as possible decoupled;
- *tailored*: providing transfers no greater than necessary to achieve clearly identified outcomes;
- *flexible*: reflecting the diversity of agricultural situations, be able to respond to changing objectives and priorities, and applicable to the time period needed for the specific outcome to be achieved; and
- *equitable*: taking into account the effects of the distribution of support between sectors, farmers and regions.

Source: OECD Council at Ministerial Level, April 1998.

## Chapter 2.

### Background on agriculture and the rural economy

#### Introduction

Mexico's agricultural sector is characterised by positive economic growth that is slower than the growth of the wider economy, great disparities in farm types from subsistence to highly commercialised, and inefficient use of some natural resources such as land and water. Economic development in rural areas of Mexico is a critical priority, but also an enduring challenge that has thwarted decades of efforts. Extreme poverty is mainly found in rural areas — a reflection that such areas are disconnected from commodity, financial and labour markets, as well as of low productivity and a lack of public services such as education.

The land tenure system of Mexico is a fundamental characteristic of the country's agricultural sector and rural areas. Called the first agrarian reform, the process of redistributing land and the system of communal land were initiated at the start of the 20<sup>th</sup> century as part of the 1917 Constitution. The consequences set the initial context of this study: a large part of the rural population was tied to a great many small-scale farms with tenuous claims to specific plots of land, and efforts of commercial farmers to expand were bound by limits placed on their access to land.

Mexico's agricultural policies evolved in parallel to wider policy trends.<sup>1 2</sup> Until the middle 1960s, economic policies were characterised by import substitution and trade protection, and primary agricultural policy objectives were to improve productive capacity, offer employment and generate export earnings. Domestic food consumption began to exceed domestic production from the middle 1960s, and agricultural policy sought to provide cheap food to poor consumers while also supporting urbanisation and industrialisation. An even greater effort to re-attain self-sufficiency of certain staples through an array of producer and consumer subsidies was initiated in 1980 as part of the Mexican Food System. The debt crisis in the early 1980s that followed the collapse of oil prices in 1982 undermined this plan by rendering unsustainable the high costs of subsidising policies, leading Mexico to re-orient fundamentally its agricultural policies.

This history sets the stage for the agricultural policy reforms put in place — whose effects are analysed in this study. Since the crisis of the middle 1980s, Mexico embarked on a gradual but dramatic reform of agricultural policy mechanisms, from a regime of state intervention with tariffs and government agents active at all stages of commodity distribution to a more targeted set of programmes. A part of the reform process in the last 15 years has been intended to remove some of the rigidities of the land tenure system. In the context of the mixed performance of the country's agricultural sector and its rural development needs, however, agricultural policies target objectives that have remained

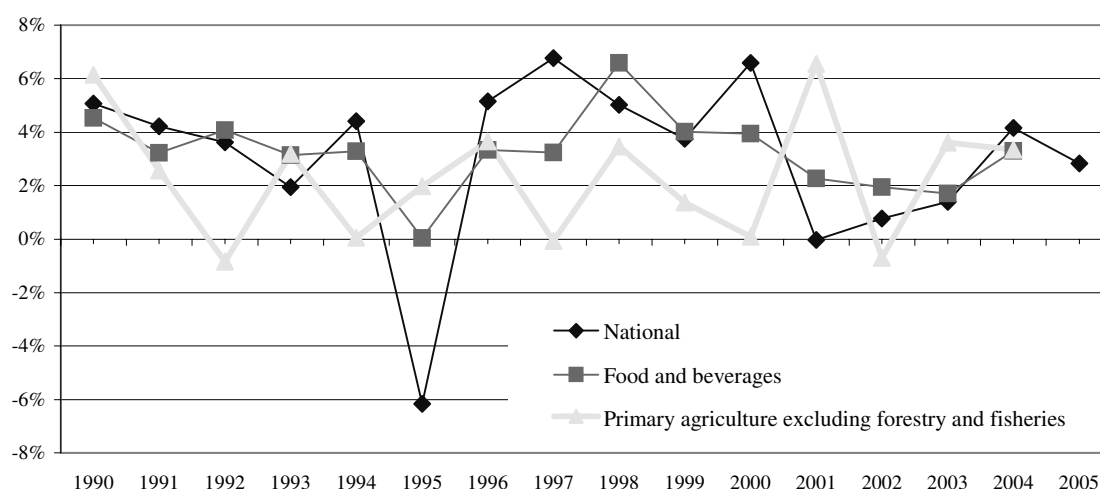
largely unchanged: helping commercial and non-commercial farmers improve technical performance, increasing access of subsistence farmers to markets for goods and inputs such as credit, and raising incomes of the poorer people. A subtext to this last objective is to discourage migration from rural areas.

The combination of reorienting agriculture towards liberalised markets and easing restrictions on land are principal components of what has been called Mexico's second agrarian reform.<sup>3</sup> These reforms, most of which were put in place in the period from 1990 to 2006, are the subject of the analysis described in later chapters. Before looking forward at the next phase of reform, it is important to understand the past and the present.

## Overall sector performance

Since 1990, growth in the Mexican agricultural sector has been slower, but less variable, than in the economy overall (Figure 2.1). Throughout the years preceding the currency crisis of the middle 1990s, primary agricultural (excluding forestry and fisheries) GDP grew at 1.2% per year and food and beverages GDP at 2.3%. During the crisis, primary agriculture did not contract, and even grew by 2.0% in 1996. In contrast, the general economy contracted by 6.2% in 1995. In subsequent years, agricultural GDP growth was 2.4% per year and growth of food and beverages GDP was 2.7%. At times, these sectors grew at a faster rate than the rest of the economy. The trend growth rate of the agricultural sector was 1.9% from the start of the 1990s to 2004 and the trend rate was 2.6% for food and beverages GDP over the same period, as compared to an overall economic trend growth rate of 3.0% per year. The averages hide a great deal of volatility, with peaks in 2001 and 2003, and slightly negative growth in 2002. The contribution of primary agriculture to overall GDP has decreased steadily from 6.3% in 1990 to 5.4% in 2004. The share of food and beverages increased from 4.9% to 5.2%. Total primary agricultural GDP for 2004 was valued at nearly MXN 246 billion, and food and beverage GDP was MXN 368 billion in that year.

**Figure 2.1. Rates of overall and agricultural real GDP growth in Mexico**

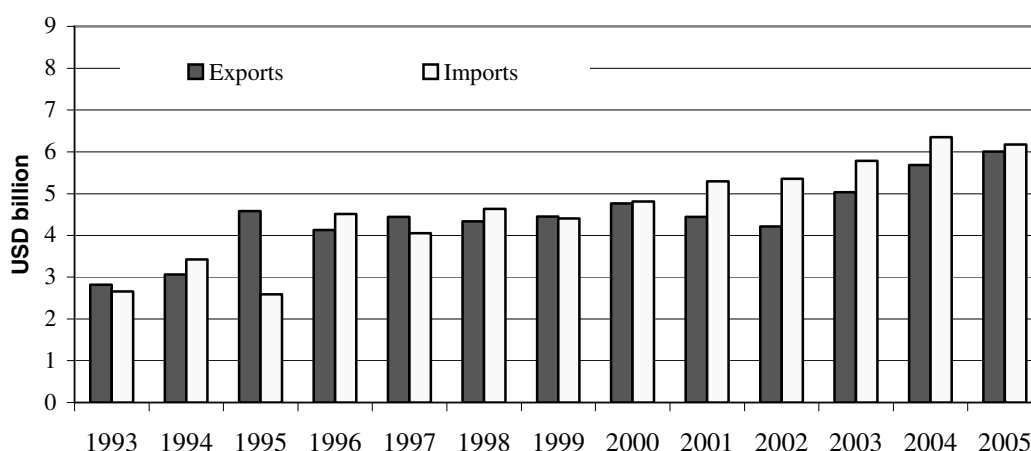


Source: INEGI, Sistema de Cuentas Nacionales de México.

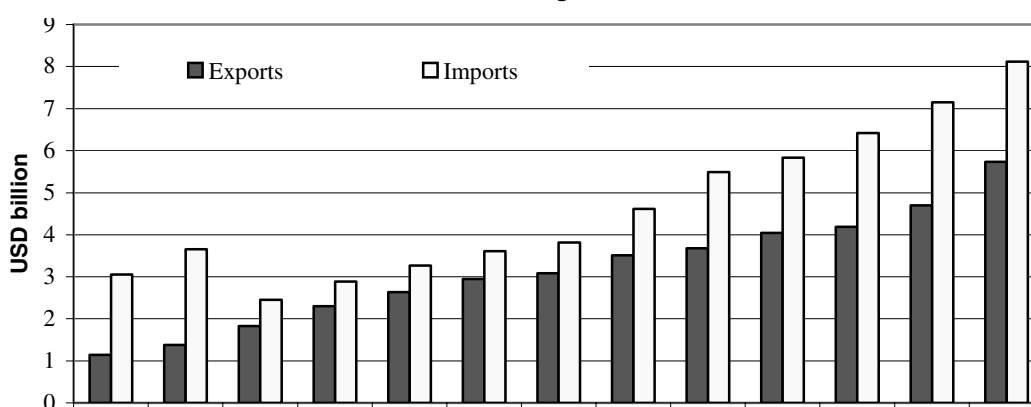
Primary agricultural and fisheries goods trade has expanded since policy changes lowered barriers to trade starting in 1994, measured in nominal USD, and trade in food, beverages and tobacco has increased more rapidly (Figure 2.2). Primary agricultural and fishery exports have grown 4.6% per year. Agricultural imports also increased since the early 1990s, at a trend rate of 7.1% per year. The trend growth in Mexico's trade of food, beverages and tobacco over the period was 9.5% for imports and 12.6% for exports. The corresponding growth rates of exports and imports of primary and processed agricultural goods in real terms over the period exceed the rate of growth of real agricultural GDP, implying growing integration with foreign markets. The relative growth rates have led to a widening of the gap between the values of imports and exports of the aggregate of primary and processed agricultural over the period. Notwithstanding the increase in this gap over the period in absolute (USD) terms, the size of the gap relative to the level of exports decreased by half, or more, from 45% in 1993 and 59% in 1994 to 22% in 2005.

**Figure 2.2. Agricultural trade balance, in USD billions**

**Panel A: Primary agriculture and fisheries**



**Panel B: Food, beverages and tobacco**

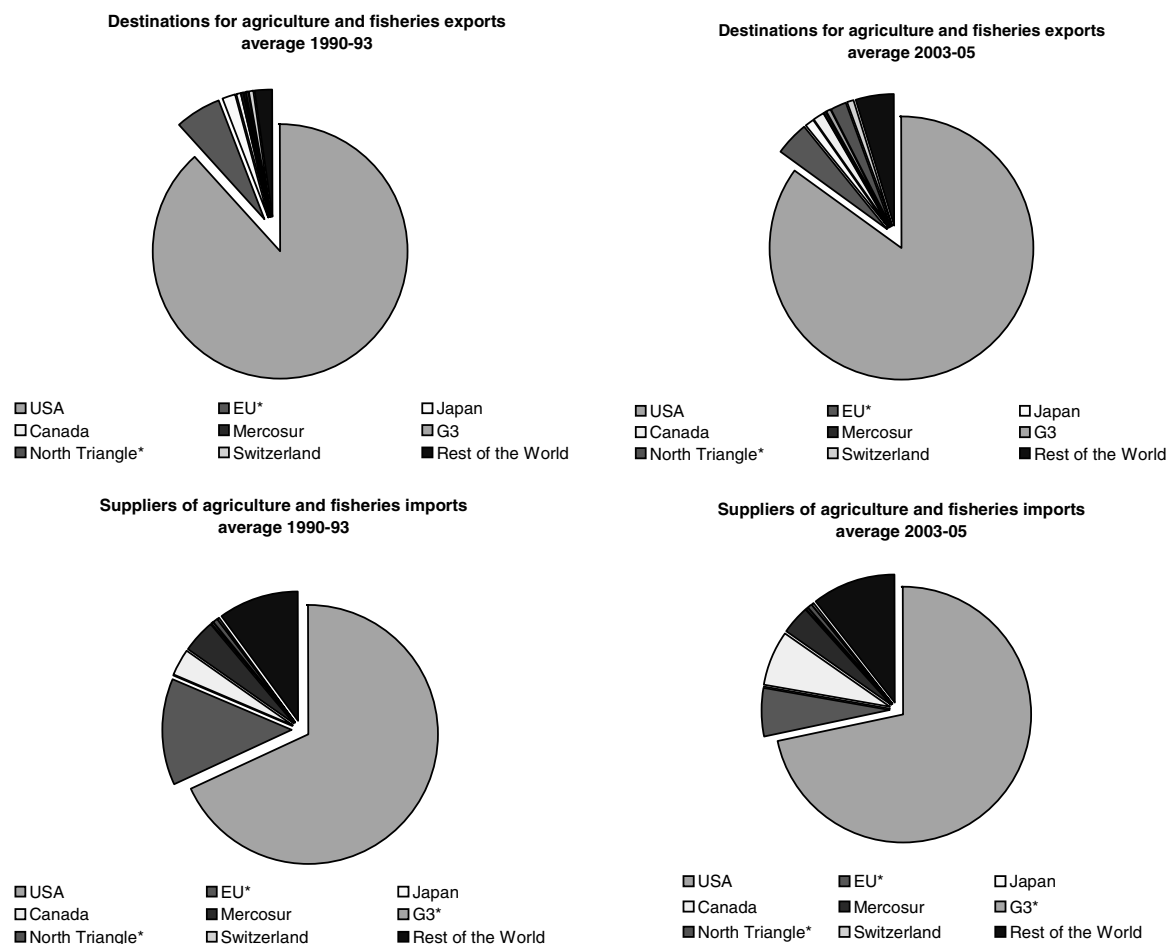


Source: Bank of Mexico.

The direction of trade flows in primary agricultural and fisheries products has changed only little since the early 1990s, implying that the increase in trade has been distributed fairly evenly among trading partners (Figure 2.3). The exceptions are the European Union, whose countries now provide a much lower share of Mexico's total

imports, and Canada whose share has doubled. The United States has been Mexico's main trading partner throughout this period, providing more than two-thirds of Mexico's imports and buying the vast majority of Mexico's exports.

**Figure 2.3. Main agricultural and fisheries trading partners  
(based on trade valued in US dollars)**



Exports	1990-1993	2003-2005	Imports	1990-1993	2003-2005
	(per cent)			(per cent)	
World	100.0	100.0	World	100.0	100.0
United States	88.2	85.0	United States	68.0	71.7
European Union*	5.9	4.1	EU*	13.3	6.0
Japan	1.6	1.3	Japan	0.1	0.0
Canada	0.7	1.3	Canada	3.3	7.0
Mercosur	0.3	0.3	Mercosur	4.2	3.5
G3	0.2	0.7	G3*	0.1	0.5
North Triangle*	0.4	1.8	North Triangle*	0.6	0.6
Switzerland	0.4	0.9	Switzerland	0.4	0.1
Rest of the World	2.2	4.7	Rest of the World	10.0	10.6

European Union data are for all 25 current members; G3 countries are Colombia, Honduras and Venezuela; North Triangle countries are Guatemala, El Salvador and Honduras.

Source: SAGARPA and Secretaría de Economía.

The top ten exports by value account for about half of the total exports of agricultural products, but there have been some changes in the composition of this list (Table 2.1). While several goods appear on the list in 1993-95 and in 2003-05, such as beer, tomatoes, live cattle, and frozen prawns, their order has shifted and new goods, such as tequila, have been added. At the same time, while fruits and vegetables remain important, the composition within this broad aggregate has changed. The share of coffee in the total is lower in 2003-05 than in 1993-95. In recent data, beer exports have amounted to nearly 13% of the total and tomatoes account for just under 10%, but most shares are well below these levels implying a wide array of exported products. Overall, the evolution of the composition of exports has been a shift towards higher value products, such as processed products and fruits and vegetables. This, together with the rising exports overall, gives evidence of the dynamism of market-oriented agriculture in Mexico.

**Table 2.1. Main exports of agriculture and fisheries goods from Mexico**

1993-1995	million USD	Share (%)	2003-2005	million USD	Share (%)
Tomato	458	9.3	Beer	1 342	12.8
Coffee	439	8.9	Tomato	1 002	9.6
Live cattle	376	7.6	Live cattle	527	5.0
Frozen prawns	364	7.4	Tequila	524	5.0
Beer	246	5.0	Frozen prawns	337	3.2
"Bell" chile	152	3.1	Fresh or frozen vegetables	301	2.9
Onion	135	2.7	Cucumber and gherkin	298	2.9
Cucumber and gherkin	124	2.5	Candy products	283	2.7
Corn cob	117	2.4	Avocado	277	2.6
Mango and guava	106	2.2	Pepper	257	2.5
Alcoholic beverages	97	2.0	"Bell" chile	253	2.4
Frozen broccoli and cauliflower	91	1.8	Onions	239	2.3
Banana	86	1.7	Food preparation	194	1.9
Milk cows	72	1.5	Coffee	184	1.8
Watermelon	50	1.0	Broccoli and cauliflower	160	1.5
Chickpea	48	1.0	Frozen broccoli and cauliflower	160	1.5
Asparagus	46	0.9	Pork meat	151	1.4
Fresh grapes	46	0.9	Seedless lemon	139	1.3
Candy products	45	0.9	Watermelon	138	1.3
Melons	39	0.8	Fresh grapes	136	1.3
Fish preparations	39	0.8	Watermelon	122	1.2
Seedless lemon	39	0.8	Bakery products	121	1.2
Bakery products	38	0.8	Mango and guava	110	1.1
Strawberry	32	0.7	Cookies	94	0.9
Cigarettes	32	0.7	Sauce preparations	93	0.9
Honey	31	0.6	Asparagus	85	0.8
Fresh or frozen vegetables	30	0.6	Strawberry	84	0.8
Avocado	28	0.6	Wheat	73	0.7
Others	1 527	30.9	Others	2 765	26.5
Total	4 935	100.0	Total	10 452	100.0

Source: SAGARPA with data from the Secretaría de Economía and BANXICO.

The top ten imported agricultural and fisheries goods by value account for 41% of the total in 1993-95 and in 2003-05 (Table 2.2). As in the case of exports, many goods have consistently played an important part in Mexico's imports, such as soybeans, beef, coarse grains (maize, sorghum), wheat, cotton and powdered milk. However, imports tend to be diversified in composition: no single category of goods accounts for even 10% of the total; and the share of "others" is about 40% of agricultural imports, which is equivalent to the share of the top ten goods.

Table 2.2. Main imports of agriculture and fisheries goods to Mexico

1993-1995	million USD	Share (%)	2003-2005	million USD	Share (%)
Soybeans	566	9.5	Soybeans	1 041	7.8
Sorghum	343	5.8	Beef	816	6.1
Powder milk	313	5.3	Maize	686	5.1
Maize	236	4.0	Wheat	599	4.5
Beef	225	3.8	Unprocessed cotton	518	3.9
Unprocessed cotton	220	3.7	Pork	471	3.5
Wheat	213	3.6	Sorghum	388	2.9
Sunflower or other oil	139	2.3	Powder milk	344	2.6
Turnip or rape seeds	128	2.2	Cracked maize	326	2.4
Animal fat	100	1.7	Food preparations	301	2.3
Turkey	92	1.5	Turnip or rape seeds	290	2.2
Food preparation	87	1.5	Soup preparations	243	1.8
Chicken	84	1.4	Milk preparations	219	1.6
Cattle leather and fur	81	1.4	Turkey	213	1.6
Pork	74	1.2	Soybean meal	212	1.6
Apple	71	1.2	Chicken	200	1.5
Soybean meal	58	1.0	Animal fat	168	1.3
Dehydrated butyric fat	57	1.0	Apple	149	1.1
Water	54	0.9	Paddy rice	141	1.1
Preparations for animal feeding	46	0.8	Dehydrated butyric fat	129	1.0
Bakery products	42	0.7	Palm oil	117	0.9
Chicken sausages	40	0.7	Hard or semi hard cheese	113	0.8
Hard or semi hard cheese	39	0.7	Cattle leather and fur	108	0.8
Animal guts, bladders and stomachs	39	0.7	Preparations for animal feeding	107	0.8
Other edible parts from cattle	38	0.6	Fresh grapes	95	0.7
Filled chocolates	38	0.6	Dog and cat food	94	0.7
Turnip, rape-seed or mustard oil	36	0.6	Sauce preparation	91	0.7
Pork skin	35	0.6	Animal guts, bladders and stomachs	89	0.7
Others	2 446	41.2	Others	5 158	38.7
Total	5 940	100.0	Total	13 334	100.0

Source: SAGARPA with data from the Secretaría de Economía and BANXICO.

## Land tenure

A key characteristic of the Mexican agricultural sector is the existence of two basic forms of land ownership as a result of the agrarian reform of the 20<sup>th</sup> century. One form is private property, where owners make productive decisions on an individual basis. The other form is social property (*ejidos* and *comunidades agrarias*), that accounts for over half of the Mexican territory, or 105 million hectares out of 197 million hectares in total.<sup>4</sup> Agrarian communities include both parcels granted to individuals (34 million hectares), commonly owned property (69 million hectares) and a smaller part used for living areas (2 million hectares).<sup>5</sup> The communal land is mostly open land, with or without vegetation, although a quarter of it is forest land, but is in any case of much lower quality: 52% of communal land is arid or semi-arid, whereas only 7% of individually held parcels are arid or semi-arid.<sup>6</sup> All categories of social property are nevertheless controlled in some sense by an *asamblea ejidal*, whose traditional powers related to the allocation of parcels and other resources within the community. Now, property rights of individual members are more clearly defined as land within agrarian communities is legally permitted to be rented or sold within the community. Also, this land can be rented or sold to non-members – privatised fully — according to either of two procedures: a particular plot can be transferred with the approval of a two-thirds vote of the *asamblea ejidal* in which all *ejidatarios* in the given agrarian community have the right to vote; or the *ejido* may vote to privatise entirely.



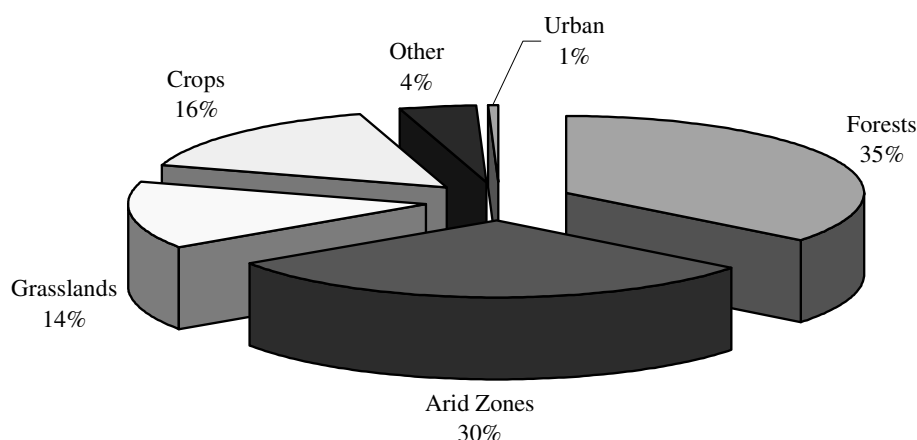
Currently, the agrarian sector includes approximately 30 000 communities, of which over 96% are labelled as agricultural, and around 3 million *ejidatarios*.<sup>7</sup> That population is aging: while 70% of the rural population is under 40 years, the average age of *ejido* members is 55 years and over a third of the *ejidatarios* are older than 65 years.

The Constitutional provisions governing land also impose limits on commercial operators' access to land. They are not permitted to control more than the equivalent of 100 hectares of irrigated maize area. This limit corresponds to 100 hectares of irrigated land for most crops, but 150 hectares of irrigated land used for cotton. The limit of rain-fed land used for staples is 200 hectares. The limit rises to 300 hectares if producing banana, sugar cane, coffee, henequen, rubber, palm, grape, olive, cinchona, vanilla, cocoa, agaves, nopal or fruit. A commercial operator's access to good quality grassland is restricted to 400 hectares, and for livestock more generally the limit is the amount of land needed to raise 500 head of cattle, or the equivalent. Finally, if the land is characterised by forests or woodlands, or else is grasslands in an arid area, then the limit for a commercial operator is 800 hectares.

## Agricultural activities

The 30 million hectares of crop land represent around 16% of Mexico's total territory (Figure 2.4). Of the area devoted to crop production in 2002, about 71% was rain-fed and the other 29%, or as much as 9 million hectares, was irrigated.<sup>8</sup> Although the amount of irrigated land is relatively small, over the past 20 years productivity of this land has increased to the point that irrigated area accounts for 55% of the total agricultural production — and 70% of agricultural exports are produced on irrigated land.<sup>9</sup> Most of the cultivated land is devoted to annual crops, with four main crops, maize, beans, wheat and sorghum, accounting for most of the total land used for crop production.<sup>10</sup>

The amount of land allocated to raising livestock is large, but may be underestimated.<sup>11</sup> There are only 28 million hectares of grasslands, but it has been estimated that 55% of the country's total area — around 107 million hectares — is actually dedicated to livestock.<sup>12</sup> Of the 28 million hectares of grasslands, 18 million hectares, or about two-thirds, is cultivated or improved in some way, whereas the remaining 10 million hectares are not improved in any significant way. A considerable amount of arid land is used for livestock and subsistence agricultural activities, but is mostly covered by desert vegetation. The lands covered by forests are also significant, and they account for 69 million hectares (Figure 2.4). However, more than 40% of forest areas have been degraded as the vegetation has been reduced or altered.

**Figure 2.4. Land use, 2002**

Source: SEMARNAT. Compendio de Estadísticas Ambientales, 2002.

The area used to produce crops and the real value of crop production for the period 1990-2005 differs in levels and in trends (Table 2.3). While cereals remain the largest crop in terms of area, the share peaked in the last 15 years at just under 50% in 1994 before falling to just over 40% in recent data. Maize continues to dominate among cereals in terms of area planted – and its share has risen to well over 90% in recent years – although the share of maize in total crop area is declining. The number of hectares devoted to maize exhibits no tendency to increase or decrease over time, whereas total area devoted to crops has grown. The trend rate of growth of 0.9% per year in total area planted to crops in Mexico is driven by greater planting of forage crops, although not the traditional sorghum, and increases in the numbers of hectares planted to fruits, vegetables, industrial crops and medicinal crops. In contrast, producers have switched away from certain other crops, such as dry legumes (including dry edible beans) and oilseeds over the last 15 years.

Cereals have historically accounted for the highest share of real crop production value but, even though the area devoted to cereals has changed little, the real value of cereal production has fallen (Table 2.3). While in 1990 the real value of cereal production was over a quarter of the total value of crop production, in 2005 they generated less than a fifth of the total. The real value of crop production fell over these 15 years by about MXN 5 billion (adjusted to 2005 prices), corresponding to a -0.7% trend rate of change. The value of fruit and vegetable production has increased over this period to surpass cereals. Although growth in these categories stalled during the currency crisis, it recovered thereafter and, over the total period, real production value of fruits increased by 3.4% per year and real production value of vegetables by 5.2% — corresponding to an increase of about two-thirds in the real value of fruit production and more than double the real value of vegetable production over the 15 years. The real value of production of ornamental crops, tubers medicinal crops, forage crops and industrial crops also grew at trend rates of 3% to 7% per year. Sugar real value production trend growth was nearly 5%, for example, doubling during the last 15 years. Finally, the real value of oilseeds production decreased by MXN 2 billion. Dry legume real production value is extremely volatile, so comparing the first and last year of any time period may be misleading, but the overall

pattern exhibited no strong trend over the 15-year period. The total value of crop production rose in real terms between 1990 and 2005 at a trend rate of 2.5% per year.

**Table 2.3. Area planted by crop and value of production by commodity**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>Area planted</b>	(million hectares)															
Cereals	9.08	8.91	9.10	9.28	10.36	10.17	9.65	10.15	9.49	9.38	9.34	9.23	9.04	8.89	9.10	8.78
of which maize	7.92	7.73	8.00	8.25	9.20	9.08	8.64	9.13	8.52	8.50	8.44	8.40	8.27	8.13	8.40	7.98
Medicinal crops	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.03
Forage crops	3.50	3.16	3.76	3.26	3.76	3.68	4.58	4.76	5.11	5.20	5.41	5.45	5.58	5.84	5.77	6.00
of which sorghum	1.92	1.51	1.46	0.97	1.43	1.58	2.34	2.12	2.20	2.14	2.18	2.21	2.03	2.10	1.95	1.90
Fruits	1.02	1.10	1.13	1.11	1.14	1.16	1.19	1.19	1.23	1.24	1.26	1.28	1.28	1.31	1.36	1.35
Vegetables	0.46	0.46	0.53	0.51	0.45	0.45	0.47	0.53	0.57	0.60	0.57	0.58	0.57	0.58	0.62	0.62
Industrials	2.35	2.51	2.35	2.24	2.24	2.51	2.60	2.47	2.57	2.42	2.41	2.39	2.38	2.45	2.50	2.50
of which sugar	0.68	0.64	0.64	0.62	0.63	0.63	0.68	0.67	0.69	0.69	0.67	0.65	0.66	0.68	0.70	0.71
Dry legumes	2.43	2.33	2.00	2.26	2.47	2.47	2.36	2.46	2.48	2.58	2.30	2.19	2.42	2.20	1.93	1.89
of which dry beans	2.27	2.20	1.86	2.15	2.39	2.35	2.20	2.32	2.38	2.41	2.12	1.95	2.23	2.04	1.82	1.75
Oilseeds	0.71	0.63	0.58	0.43	0.48	0.37	0.37	0.44	0.39	0.44	0.36	0.37	0.26	0.34	0.45	0.36
of which soybeans	0.30	0.35	0.33	0.24	0.30	0.15	0.06	0.17	0.10	0.09	0.08	0.08	0.06	0.07	0.10	0.11
Ornamentals	0.010	0.015	0.009	0.010	0.011	0.012	0.016	0.015	0.014	0.015	0.015	0.014	0.014	0.014	0.014	0.015
Other crops	0.06	0.06	0.01	0.02	0.01	0.01	0.02	0.01	0.05	0.02	0.02	0.01	0.02	0.03	0.03	0.03
Seeds for sowing	0.010	0.008	0.006	0.004	0.002	0.013	0.001	0.001	0.002	0.003	0.001	0.002	0.008	0.001	0.003	0.003
Tubers	0.09	0.08	0.08	0.07	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Total area	19.73	19.26	19.56	19.21	21.00	20.94	21.34	22.11	21.98	21.98	21.78	21.61	21.66	21.75	21.87	21.64
<b>Value of production</b>	(billion 2005 MXN)															
<b>Crops</b>																
Cereals	41.3	39.5	44.0	45.3	40.6	56.5	53.5	44.1	41.6	38.3	40.0	41.6	39.1	43.1	43.0	36.3
of which maize	33.0	31.3	36.9	38.6	32.8	47.9	42.3	35.6	34.7	32.1	32.9	36.1	33.9	38.0	38.1	30.5
Medicinal crops	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.1	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.2
Forage crops	21.4	19.0	24.4	20.7	25.2	30.2	35.6	32.2	38.4	36.0	37.8	39.7	36.4	39.6	39.5	33.2
of which sorghum	7.5	5.7	6.7	3.1	4.1	9.4	12.7	8.4	8.6	7.0	7.6	8.0	7.3	9.9	9.8	6.6
Fruits	26.0	29.4	27.3	28.6	28.4	32.6	29.3	30.5	32.9	43.4	37.5	38.7	38.1	41.3	41.5	41.8
Vegetables	18.7	20.9	24.1	24.7	21.3	23.4	24.2	33.6	36.6	35.4	33.7	34.4	31.8	37.7	45.0	38.1
Industrials	23.0	22.7	18.4	19.2	23.6	34.9	34.8	34.8	32.0	30.4	30.6	32.1	29.1	32.9	30.3	30.8
of which sugar	8.9	8.5	9.9	10.3	11.9	13.1	12.9	14.1	13.6	13.8	13.4	16.2	16.0	16.9	16.8	18.8
Dry legumes	10.3	9.6	5.0	8.4	7.5	7.7	11.1	9.1	10.4	7.9	7.3	10.2	11.6	9.0	7.9	6.8
of which dry beans	9.5	8.8	4.7	7.7	7.1	6.6	9.4	7.9	9.9	6.9	5.8	8.2	10.4	8.1	7.0	5.7
Oilseeds	3.3	4.0	2.6	2.1	1.9	2.0	1.8	1.9	1.9	2.0	1.6	1.5	0.8	1.7	1.8	1.2
of which soybeans	1.7	2.9	1.7	1.4	1.2	0.7	0.2	0.6	0.4	0.4	0.2	0.3	0.2	0.4	0.4	0.4
Ornamentals	1.1	1.1	1.2	1.3	2.3	2.3	1.2	2.4	2.3	2.7	2.6	5.2	2.9	3.5	3.8	3.6
Other crops	3.3	3.6	0.2	3.3	4.2	3.4	0.5	0.5	0.4	0.5	0.4	0.4	0.4	0.5	0.6	0.5
Seeds for sowing	0.12	0.11	0.10	0.10	0.06	0.02	0.04	0.11	0.29	0.29	0.12	0.08	0.07	0.06	0.06	0.12
Tubers	2.9	3.9	3.4	3.3	5.6	5.5	5.2	4.4	5.4	6.8	6.9	6.8	7.8	8.5	7.1	7.8
Total crops	152	154	151	157	161	199	198	194	202	204	199	211	198	218	221	200
<b>Livestock products</b>																
<b>Meat</b>																
Beef	31.6	31.3	29.2	29.1	30.4	35.8	29.0	35.1	34.0	36.8	38.2	40.3	38.1	40.3	42.9	46.9
Pork	18.4	19.1	16.8	16.6	16.0	21.3	20.3	25.4	19.8	21.6	25.8	28.8	25.4	25.1	27.6	29.4
Sheep	1.0	1.0	0.8	0.9	0.9	1.1	1.0	1.1	1.1	1.1	1.3	1.5	1.6	1.8	1.8	1.9
Goat	1.4	1.6	1.3	1.3	1.2	1.1	1.1	1.2	1.3	1.3	1.5	1.5	1.6	1.6	1.5	1.5
Poultry	17.4	17.3	13.4	17.2	18.6	22.0	19.9	24.4	27.5	26.5	33.4	35.9	36.9	37.1	41.0	43.7
Turkey	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.6	0.7	0.8	0.9	0.9	0.8	0.8	0.7
<b>Milk</b>																
Cow	25.4	22.8	19.7	21.3	21.6	26.1	29.1	30.4	30.9	32.9	36.9	37.5	35.6	35.7	36.2	37.1
Goat	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.8
<b>Other</b>																
Egg	9.7	9.3	8.6	10.2	10.9	13.9	15.3	15.7	13.6	13.5	16.2	18.4	16.7	18.7	20.8	17.0
Wool	0.10	0.10	0.06	0.04	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02
Honey	1.4	1.3	0.6	0.7	0.9	0.9	1.1	1.4	1.1	1.1	1.2	1.2	1.2	1.4	1.4	1.3
Wax	0.08	0.07	0.03	0.06	0.06	0.05	0.06	0.06	0.08	0.07	0.10	0.11	0.14	0.13	0.12	0.11
Total livestock	107	104	91	98	101	123	117	135	131	136	156	167	159	163	175	181
Total value	259	258	242	255	262	321	315	329	333	340	355	377	357	382	396	381

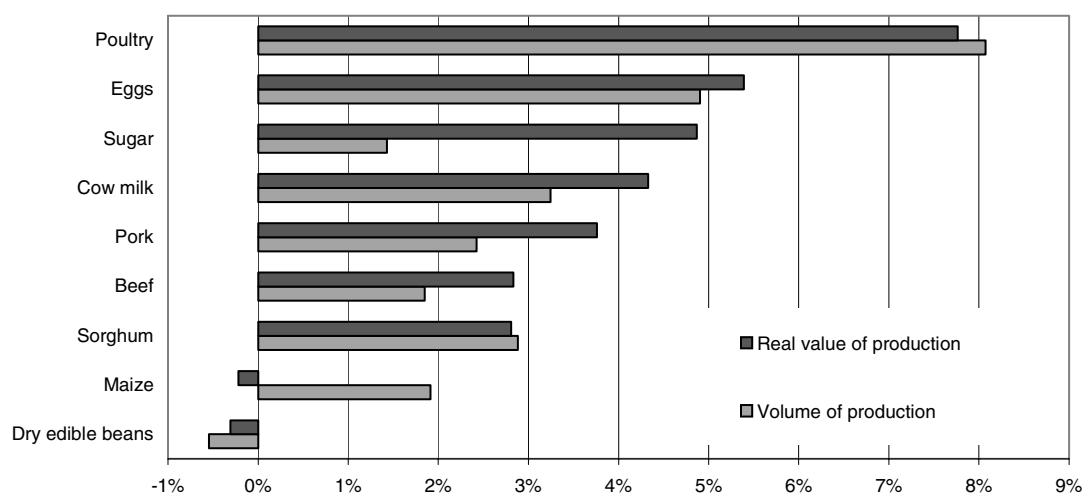
n.a. indicates that no data are available. Nominal values of production are deflated by agricultural GDP deflator, the 2005 value of which is calculated using the per cent change in the national GDP deflator in the absence of final official data.

Sources: crop data are from Servicio de Información y Estadística Agroalimentaria y Pesquera; livestock data are from the Servicio de Información y Estadística Agroalimentaria y Pesquera.

Trends in the real value of livestock products are mostly unpronounced, and levels vary considerably (Table 2.3). The most important product by a narrow margin is beef, which accounted for 9% to 12% of the value of production between 1990 and 2005. In fact, the value of beef production has grown by 2.8% per year, but this rate has been exceeded by most other livestock products. At 7.8% per year, the real value of poultry production has increased most quickly over the past 15 years, but sheep meat value of production has increased at 5.4% per year and pork at 3.8% per year. The real value of milk production has also climbed steadily, rising by 4.3% per year in the case of the cow milk. The egg industry has also expanded rapidly, at 5.4% per year, and wax and honey production values have also increased, albeit from lower starting levels. In contrast, the real value of goat meat production, although positive, has been lower, and wool has dwindled.

The increasing volume of production explains more than half the change in real production value since 1990 for most products (Figure 2.5). The level of beef produced was 1.11 million tonnes in 1990 and, in 2005, 1.56 million tonnes. The trend growth rate of 1.8% per year in volume explains much of the change in the total value. Regarding poultry meat, there has been strong growth in the quantity of production, apart from a pause in 1996: starting from a production volume 750 thousand tonnes in 1990, by 2005 poultry production surpassed 2.4 million tonnes, easily exceeding the volume of beef production; poultry meat production more than tripled over the past 15 years. The volume of pork and sheep meat production also increased more quickly than beef production over the 1990 to 2005 period, but at less than half the rate at which poultry production climbed. Milk is also an important livestock product that has grown over the period, particularly cow milk which grew at 3.2% per year. During the period from 1990 to 2005, the quantity of milk production grew nearly two-thirds, going from 6.3 billion litres in 1990 to almost 10.1 billion litres in 2005. Egg production trend growth was almost 5% per year during the last 15 years, resulting in a doubling of the volume of eggs. Of all livestock products, only honey, wool and wax production volumes declined since 1990. Comparing growth in production volume and real value, on the order of two-thirds of the greater real value of beef and pork, three-quarters for milk, and most of the change in poultry and egg real value of production comes about due to higher volume rather than rising average real values per unit.

**Figure 2.5. Trend growth rates of production, selected commodities, 1990-2005**



Source: Servicio de Información y Estadística Agroalimentaria y Pesquera and the Servicio de Información y Estadística Agroalimentaria y Pesquera.

## Rural population

### *Characteristics of rural households*

In 1990 the population in rural areas was 23 million, or 29% of the total population.<sup>13</sup> Although the population in these areas has been increasing, it has done so at a lower pace than the urban population. According to recently published estimates, there were 24 million people living in rural areas, accounting for 24% of the total population, in 2005.<sup>14</sup> By one estimate, the proportion of the population living in rural areas will continue to decrease, but the actual number of people will continue to increase such that, by 2030, the rural population will be 27 million, but the share of total population living in rural areas will have fallen to 21%.<sup>15</sup>

In 2005, there were 5.5 million rural households with, on average, 4.4 family members each.<sup>16</sup> Almost 60% of these households had four or more members. The total rural population is comprised of 49% men and 51% women. The average monthly income per capita is MXN 1 447.<sup>17</sup> In general, the rural population is young: the median age is 20 years and 70% of the rural population is younger than 40 years. Not all rural households derive income from agricultural activities, nor are all members of all farm households engaged solely in agricultural activities.

### *Education*

Rural education is generally considered to be deficient. Overall educational achievement is still low as compared to other OECD members (Part 1), but also education in rural areas is inferior compared to urban areas of Mexico (Table 2.4). Illiteracy in rural areas, at 21%, is more than twice the national average, and seven times higher than in Mexico City. The obvious immediate causes are the lower average amount of time spent in school and the lower share of children in school: average schooling is less than five years in rural areas, half the average for Mexico City; and almost three-quarters of the population in Mexico City and over half of the national population have completed post-primary education, but not even a quarter of the population in rural areas has attained this level. Education lags most in smaller rural communities.<sup>18</sup>

**Table 2.4. Education gap of rural areas**

	Rural	National	Mexico City
Population 15 years and older			
Illiteracy rate (%)	21.0	9.6	3.0
Average schooling (years)	4.8	7.6	9.7
Share with post-primary education (%)	24.2	51.6	71.6
Population 15-19 years			
Share in School (%)	28.9	46.7	64.8

Source: Population Census 2000.

### *Income source*

Rural household income is not solely, or even mostly, dependent on agriculture.<sup>19</sup> Data from a survey of rural households (which uses a narrow definition of rural) show that the most important sources of rural household income are non-agricultural salaries and wages, accounting for 41%, followed by farm production activities, with 18% (Table 2.5). Migrant remittances also represent a substantial share, 12%, of income.

Income generated by agricultural activities, including agricultural salaries and wages, is 31% of total rural household income. With respect to agricultural income, these survey definitions and data show that the most important source is agricultural salaries and wages, accounting for 13%, followed by commercial crops and plantations, at 10%. In contrast, income from livestock and staple crop production account for only a very small share of income.

**Table 2.5. Composition of rural household net income, average shares, 2002**

Source of Income	Share
Farm production activities	<b>18.2%</b>
Livestock	3.7%
Staples	2.4%
Commercial Crops and plantations	10.0%
Other agricultural activities	2.1%
Local non-farm activities	<b>8.3%</b>
Commerce	6.0%
Services	2.2%
Handicrafts	0.1%
Renewable resource extraction	<b>2.3%</b>
Public transfers	<b>4.4%</b>
Migrant remittances	<b>12.7%</b>
Internal	1.7%
Mexico to U.S.	11.0%
Salaries and wages	<b>54.2%</b>
Agriculture	13.0%
Non-Agriculture	41.2%

Source: Ceron Monroy, 2004, with data from ENHRUM.

According to a survey that employs a much broader definition of rural, the role of agriculture in rural household income has declined between 1992 and 2004 (Figure 2.6).<sup>20</sup> Official data reveal that the share in income of independent farming fell from nearly 30% in 1992 to less than 10% in 2004, and the share of agricultural wage labour fell slightly as well, so income from agriculture fell from 38% of all income in 1992 to 17% in 2004. The sum of public and private transfers to rural households has grown significantly and now accounts for 17% of rural income, a similar share as agriculture. The share of public transfers in rural incomes increased from 1.7% to 7.9% in the last decade, though there may be some crowding out of private domestic transfers, whose share has fallen by almost half.<sup>21</sup> While international transfers have grown, they still represent only about 4% of household incomes in the rural sector.

The composition of rural income varies between the poorer and richer people, as well as over time (Table 2.6). The share of non-monetary income of the poorest decile of the rural population was 40% in 2004, which was twice the national average. Moreover, whereas the share of non-monetary income of the poorest decile has changed little over the previous ten years, the share of non-monetary income fell by more for other groups, and particularly for those in the centre of the income distribution. The part played by business income, which is particularly large for those with higher income, has also been falling for all groups, but is still important. Rising shares are associated with wage and

salary income for all but the poorest, and transfers, whether payments from government or remittances from migrants.

**Figure 2.6. Principal sources of rural monetary income, 1992 and 2004**



“Rural” refers in this Figure to localities with less than 15 000 people, as opposed to the common definition of localities with less than 2 500 people. “International transfers” refers to remittances. “Independent farming” refers to non-wage farm income.

Source: Ruiz Castillo (2005).

**Table 2.6. Rural income composition, by decile, 1994, 2000 and 2004**

	Income Deciles						Average of All Rural Households		
	I		V		X				
	1994	2004	1994	2004	1994	2004	1994	2000	2004
	(per cent)								
<b>I. Current Monetary Income</b>	55	60	66	80	79	86	72	77	81
I.1. Work remunerations	22	20	34	46	33	41	34	37	43
I.1.1. Wages and salaries	22	18	33	44	30	38	32	34	40
I.1.2. Others	0	2	1	2	3	3	2	3	2
I.2. Business income	18	15	19	14	34	24	24	25	19
I.2.1. Agriculture business	13	9	13	5	22	7	16	12	6
I.2.2. Other business	5	6	6	10	12	18	8	13	13
I.3. Property income	1	0	0	1	1	3	1	1	1
I.4. Transfers	15	26	13	19	10	18	12	14	18
I.4.1. Retirement and pensions	0	0	1	1	1	7	1	2	4
I.4.2. Other transfers	14	26	12	18	9	11	11	13	14
I.5. Other incomes	0	0	0	0	1	0	1	0	0
<b>II. Non-monetary income</b>	45	40	34	20	21	14	28	23	19
II.1. Self-consumption	13	7	9	2	5	3	7	4	3
II.2. Others	32	33	26	18	17	12	22	19	16

Source: Encuesta Nacional Ingreso-Gasto de los Hogares, INEGI.

The number of people employed in agriculture has been declining unsteadily and the nature of their employment has also changed since 1990 (Table 2.7). The total number, nearly 8 million in 2003, has decreased by about 2% per year. The number of producers has declined more quickly and the number of people working in agriculture in communities such as *ejidos* has fallen by more than half a million. Since the mid-1990s, at least, a greater number of people active in this sector are paid labourers, and this category has grown at about 1% per year. Unpaid workers, although fewer, continue to account for well over a quarter of all people active in agriculture.

**Table 2.7. Activities of individuals engaged in agriculture**

	1991	1993	1995	1996	1997	1998	1999	2000	2002	2003
	(millions of people)									
<b>Total</b>	9.8	10.5	9.7	9.2	10.4	9.8	9.5	8.7	8.2	7.7
<b>Producers</b>	4.3	4.8	4.1	3.7	4.0	3.9	3.8	3.4	3.5	3.3
Owners	1.2	1.2	1.1	1.1	1.5	1.2	1.2	1.0	1.1	1.0
Ejidatarios and joint owners	2.1	2.5	2.1	1.8	1.6	1.8	1.8	1.6	1.6	1.6
Occupants	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2
Tenants and sharecroppers	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3
Livestock producers (not owners)	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2
<b>Workers</b>	5.5	5.7	5.6	5.4	6.4	6.0	5.7	5.3	4.8	4.4
Laborers and unskilled workers	2.2	1.9	2.2	2.1	2.8	2.3	2.5	2.3	2.4	2.2
Employees and operators	0.1	0.2	0.2	0.2	0.3	0.1	0.2	0.1	0.1	0.2
Unpaid workers	3.2	3.6	3.3	3.2	3.4	3.5	3.0	2.8	2.2	2.0

Source: Encuesta Nacional de Empleo, various years, INEGI - STPS.

## Migration

Migration from rural areas is mostly directed towards cities within Mexico as people seek opportunities in urban areas, but there is an international component, as well. INEGI estimated that about 1 million people from rural areas immigrated to the United States from 1990 to 1995 of whom two-thirds were men and one-third were women.<sup>22</sup> This figure declined by 10% to 0.9 million immigrants for the period from 1995 to 2000 of whom 70% were men and 30% were women. On average, according to these data, during the 1990s, about 4% of the rural population left the country every five years.

The outflow of workers from rural areas to urban areas in Mexico or to other countries gives rise to transfers back into these rural areas from those workers in the form of remittances. In 2004, Mexico received MXN 166 billion in remittances of which 34% was received by rural households.<sup>23</sup> These MXN 56 billion are equivalent to over one fifth of the value of total agricultural production. These data do not measure the number of migrants from rural to urban areas within Mexico.

## Incidence of poverty

In 1989, 53% of the total population, 39 million people, was in a situation of income poverty, including many in even more dire poverty conditions (Box 2.1). As of the middle 1990s the first half of the 1990s the situation had worsened and the rate of poverty increased, but the problem was likely exacerbated by the currency crisis as, in 1996, the income poverty rate reached a peak at 69% of the total population, or 66 million people.<sup>24</sup> Since the end of the currency crisis, the share of people living in poverty has declined in Mexico. This reduction has likely been caused by economic growth in the period 1995 and 2001, but has also been attributed to increased spending on poverty reduction programmes, such as PROGRESA/*Oportunidades*. Spending on these programmes went



from 0.7 to 1.2% of GDP in 2002. By at least some measures, Mexico has been more successful in reducing poverty in recent years than other Latin-American countries: the share of population living below USD 2 per day fell from over 25% in 1998 to about 15% in 2004, as compared to 18% in 1992, whereas the Latin American average remained at about 25% throughout the period.<sup>25</sup>

### Box 2.1. Definitions of poverty

SEDESOL has defined three broad levels of poverty: (1) *alimentaria*, also called food or extreme poverty, when members of a household are not able to attain an acceptable level of food intake; (2) *capacidades*, capacity or moderate poverty, when they attain an acceptable level of food intake but cannot invest in health or education; and (3) *patrimonio*, income poverty, when they can invest in health and education but cannot afford housing, clothing or transportation. These definitions are cumulative in the sense that any person in food poverty is also in capacity and income poverty, and any person in capacity poverty is also in income poverty. Various definitions of “rural poverty” are available; rural poverty may refer to poverty in municipalities with a population less than 15 000, although this includes “semi-urban” localities with a population between 2 500 and 15 000, or may be limited strictly to municipalities with less than 2 500 people. It is not always clear which definition is applied, but the meaning is noted where possible.

Despite some recent reduction in poverty, poverty remains all too common (Table 2.8). In absolute terms, national income poverty decreased by 7% during the 2000-2004 period. Other dimensions of poverty fell further; extreme poverty fell by nearly one-quarter from 2000 to 2004. Nevertheless, poverty still affects a large number of Mexicans: 20% live in extreme poverty, and just less than 50% live in capacity poverty. Moreover, although poverty in aggregate has decreased in recent years, there is some evidence that the fall in the rural poverty rate in this period reflects income gains for households close to the poverty line rather than large increases in income among those who are far below the poverty line.<sup>26</sup> Poverty is also found to be more extreme for certain types of populations, and in particular in areas with large indigenous populations that are concentrated in the South-eastern states.<sup>27</sup>

Judgments about the trends in rural poverty since 1991 are not unanimous. To some extent, differences of opinions may reflect differences in the time periods being considered: some observers point to the reduction in rural poverty by nearly one half from the middle 1990s to 2004, whereas other observers consider the 1992-2002 period to be a “lost decade” in terms of rural poverty-reduction (Table 2.9). The incidence of poverty in rural areas rose substantially in the middle 1990s during the macroeconomic crisis: approximately one-half of the rural population may have been in extreme poverty in the aftermath of that event. Poverty worsened even more quickly in urban areas at that time, however. In any case, whereas the rural poverty rate has decreased by about one-half since the middle-1990s, comparing the situation at the start of the reform period with the more recent data suggests that the reduction in extreme poverty in rural areas has been on the order of one quarter, from 36% to 28%.

**Table 2.8. Population in poverty, national, urban and rural since 1992**

		1992	1994	1996	1998	2000	2002	2004
<b>Absolute: number of people in millions</b>								
National	Extreme (food)	20	19	35	33	24	21	18
	Capacity	25	27	43	40	31	28	26
	Income	46	51	65	62	53	51	49
Urban	Extreme (food)					8	7	7
	Capacity					12	11	12
	Income					26	26	26
Rural	Extreme (food)					16	13	11
	Capacity					19	17	14
	Income					37	25	23
<b>Relative: share of relevant population, in per cent</b>								
National	Extreme (food)	23	21	37	34	24	20	17
	Capacity	28	29	45	41	32	27	25
	Income	53	56	70	64	54	51	47
Urban	Extreme (food)	14	10	27	21	13	11	11
	Capacity	18	17	35	29	20	17	18
	Income	44	44	62	56	44	42	41
Rural	Extreme (food)	36	37	52	52	42	35	28
	Capacity	42	46	60	58	50	44	36
	Income	65	72	81	75	69	65	57

*Note:* See Box 2.1 for the relevant definitions.

*Source:* Anexo Estadístico, V Informe de Gobierno, Government of Mexico.

**Table 2.9. Incidence of extreme poverty**

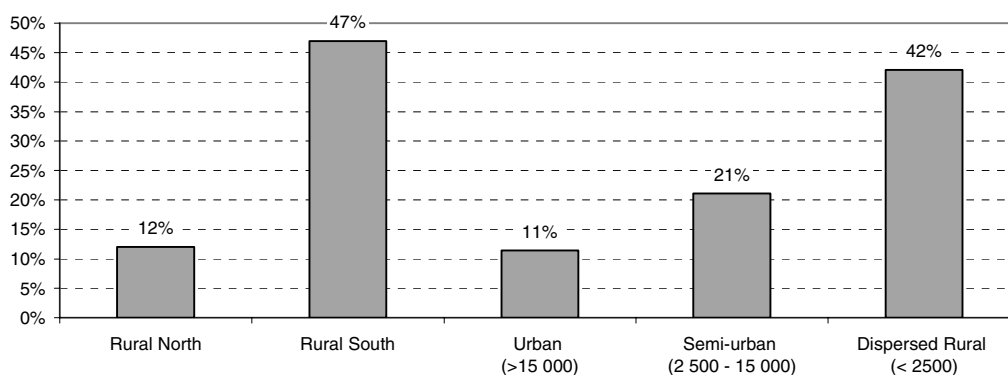
	National extreme poverty rate	Rural extreme poverty rate	Share of national extreme poverty in rural areas
1950	62%		
1956	64%		
1958	61%		
1963	46%		
1968	24%		
1977	25%		
1984	23%		
1989	23%		
1992	23%	36%	66%
1994	21%	37%	73%
1996	37%	52%	57%
1998	34%	52%	62%
2000	24%	42%	68%
2002	20%	35%	66%
2004	17%	28%	60%

*Source:* Cortés *et al.* (2002); Comité Técnico para la Medición de la Pobreza (2005).

In Mexico, poverty is a far more serious problem in rural areas. As of 2004, about 60% of the extremely poor and nearly half the population in income poverty live in rural areas (Table 2.8). As only a quarter or so of the total population lives in rural areas the incidences of all types of poverty are much higher in rural areas. The difference is greatest in the case of extreme poverty: the extreme poverty rate in rural areas is 28% according to 2004 data, as compared to 11% in urban areas. Moreover, this difference has

narrowed only gradually over time; the share of people in extreme poverty living in rural areas has remained at about two-thirds at least since 1992. Extreme poverty rates vary significantly by region as well as degree of “rurality”: 12% of the population living in the rural areas of Northern states are in extreme poverty, as compared to 47% in the rural South; and the rate doubles going from urban to semi-urban localities, and doubles again from semi-urban to small rural localities (Figure 2.7).

**Figure 2.7. Variations in extreme poverty by region and size of localities in 2002**



Source: World Bank (2005).

Poverty is associated with the low skilled labour that characterises Mexican agriculture.<sup>28</sup> Comparing wages to the legislated minimum wage, shows the share of persons engaged in agricultural activities with low earnings in 2004 (Table 2.10). In 2004, 40% of contracted workers received up to one minimum wage, 20% between one and two, 13% up to five and 2% more than five times the minimum wage. Over time, fewer in absolute and relative terms receive 1-2 times the minimum wage. While there has been some increase in the numbers receiving higher multiples of the minimum wage, there has also been a fairly constant number – and rising share – who receive less than one minimum wage. A decreasing number of people engaged in the sector receive no monetary income at all, and in any case this number may include family members whose earnings are reflected in some way in household income nevertheless. In 2002, 4.6 million agricultural labourers were classified as being in extreme poverty.<sup>29</sup>

Rural poverty is also related to the large dispersion of the rural population. The cost of providing basic public services and infrastructure tends to be higher for a scattered population. For example, 15% of the rural population does not have access to electricity, 37% does not have access to sanitation and 60% does not have access to piped water.<sup>30</sup> Education services also tend to be more expensive when populations are dispersed and, as indicated earlier, education in rural areas is deficient (Table 2.4).

In the case of health, municipal infant mortality rates (IMR) vary directly as a function of municipal marginality measured by a multi-dimensional poverty indicator (CONAPO marginality index) which is highly correlated with the degree of “rurality” (Figure 2.8). Comparing the extremes of this distribution, the IMR of highly rural – dispersed – municipalities was as high as 67 infant deaths per 1000 live births, whereas the metropolitan municipalities at the other end had an IMR as low as 17 in 2000.<sup>31</sup> The distance between the municipalities with the highest and lowest IMR in Mexico has been reported to be as high as 103 to 9 in 1999, a gap comparable to the difference between the national average IMRs of Bangladesh and the United States.<sup>32</sup>

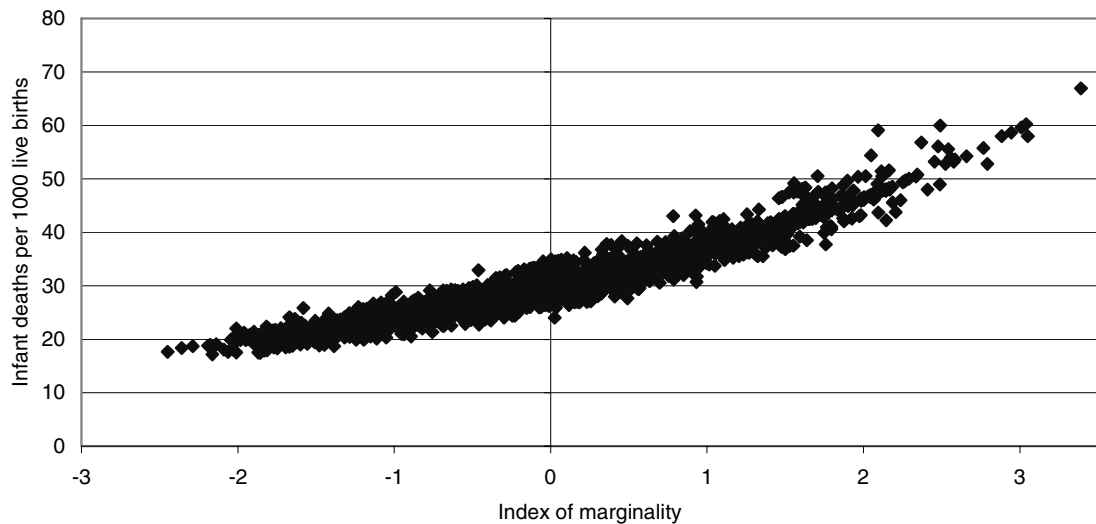
Table 2.10. Distribution by income levels of population employed in agriculture

	Total	Less than 1 mw	1 mw to 2 mw	2 mw to 3 mw	3 mw to 5 mw	5 mw 10 mw	over 10 mw	No income	Not stated	Total with Income
	(number of people, millions)									
1991	8.11	2.59	2.35	0.43	0.16	0.05	0.02	2.20	0.30	5.91
1993	8.75	2.81	2.09	0.33	0.13	0.06	0.02	2.95	0.36	5.80
1995	8.30	2.30	1.59	0.34	0.19	0.08	0.07	3.37	0.35	4.93
1996	7.89	2.10	1.53	0.33	0.19	0.11	0.05	3.28	0.30	4.61
1997	8.93	2.55	1.80	0.38	0.23	0.14	0.06	3.54	0.23	5.39
1998	7.48	2.16	1.35	0.34	0.22	0.09	0.05	3.03	0.25	4.46
1999	7.79	2.18	1.62	0.40	0.18	0.11	0.04	3.07	0.18	4.73
2000	7.10	2.06	1.62	0.45	0.20	0.10	0.05	2.40	0.22	4.70
2001	7.04	2.98	1.50	0.45	0.20	0.09	0.03	1.61	0.18	5.44
2002	7.18	2.84	1.55	0.58	0.17	0.10	0.04	1.74	0.15	5.44
2003	6.79	2.67	1.47	0.62	0.19	0.09	0.05	1.57	0.13	5.22
2004	6.91	2.75	1.40	0.67	0.20	0.07	0.04	1.56	0.22	5.35

Data include only contracted workers, and exclude those individuals starting a new job; mw = minimum wage; data from 1998 to 2004 are preliminary estimates.

Source: Encuesta Nacional de Empleo, various years, INEGI - STPS.

**Figure 2.8. Infant mortality rate by municipality ordered by level of marginality  
2000**



Source: Calculations based on *Consejo Nacional de Poblacion* (CONAPO, National Council of Population) municipal infant mortality data.

## Infrastructure, inputs and resources

The agricultural sector's capacity to grow is strongly related to its structural characteristics. In addition to low crop and livestock productivity, there are inefficient marketing systems, problems in access to and possible overuse of resources, irrigation systems with limited coverage and an underdeveloped financial system. The incidence of these problems varies: large producers or corporations have access to financial, insurance and input markets that allow them to remain competitive, but small-scale farmers and agricultural workers face limited access to production factors. This section reviews some of the constraints to economic growth.

Access to input and output markets is not uniform, and a common distinction is drawn between commercial and subsistence farmers. For example, Deininger and Lavadenz (2001) identified two groups of agricultural producers. The first is commercial farmers and rural entrepreneurs. This group includes the 2.6% of private farmers who own 30% of total land (around 60 million hectares, not only for agricultural uses). Members of this group have access to insurance companies and other factor markets, and their production is intended for commercial markets, including exports. The second group identified by Deininger and Lavadenz is small holders of low productivity. This group includes the private farmers not in the first group and over 3 million *ejidatarios* that produce for local markets or for subsistence. Some members of this group are covered by government programmes for financing and insurance (described below). However, the poorest section of this group of producers has no access to insurance, or financing, and only limited access to output and input markets.

Most agricultural producers own small portions of land. The average land holding may be about five hectares per producer, but with a high variance.<sup>33</sup> Moreover, even the smallest holdings may be divided into plots that are even smaller.<sup>34</sup> Some households

have greater than 100 hectares, while 88% of the rural households' landholdings are smaller than ten hectares. Limited access to financial markets may explain only a small part of this structure. The social property regime, which accounts for half of Mexico's territory, is a major barrier for agricultural producers to increase their landholdings and to land consolidation and trading within *ejidos*, and restricts private ownership of land.

Regarding marketing channels, overall, transaction costs are high and distribution systems are inefficient. The physical infrastructure leads to costly losses "with evidence that up to 30% of production is lost owing to inadequate transport and storage".<sup>35</sup> In some instances, there is high concentration. For instance, six traders account for all the throughput of fruits and vegetables at one of the most important markets in the country, Mexico City's *Central de Abastos*. Non-competitive behaviour, if it occurs, and high distribution costs lead to lower producer prices for a given retail price; a substantial share of buyers' costs may be lost to the high-cost distribution network. In the market for fruits and vegetables, producers receive 35% to 45% of the retail price as compared to 50% for farmers in other Latin American countries, and 65% to 75% for some Central American producers.<sup>36</sup>

An underdeveloped financial sector limits banking services, thereby raising the cost of credit and investment funds. Low participation of private lenders in rural areas, due to a wider dispersion of potential clients and systematic risks associated with some agricultural activities, adds to the deficiencies noted in Part I. The large number of small-scale farms and the tenuous claims of individuals on land within the communal land structure such as the *ejidos* are widely perceived to be handicaps for banking in rural areas. The land reform initiated in the 1990s was intended, in part, to establish property rights so that land could be used as collateral for bank loans. Nevertheless, recent survey data indicate that 5% of rural households have never had access to credit, and only 10% have a bank account.<sup>37</sup>

## Water

Water is a critical input to many agricultural activities, but water availability in Mexico is unequal and, in many areas, current use is unsustainable. The defining characteristics are the dominant role agriculture plays in water use, and the great variation of water supply among regions. Water pollution caused by agricultural activities is mainly associated with irrigation, but livestock effluents are increasingly polluting water as well.<sup>38</sup>

The annual renewable supply of water of 450 billion m<sup>3</sup> is sufficient for an ample water supply per person of nearly 5 000 m<sup>3</sup> per year, but there is great disparity among regions — particularly between the dry Central and Northern areas and the wet Southeast.<sup>39</sup> Agriculture consumes 75% of total water consumption and, of the total water used by agriculture, 80% is used for irrigation.<sup>40</sup> (Recall the disproportionate share of output of the sector that is produced on irrigated land: the 9 million hectares of irrigated land represented 29% of total area in 2002, but accounted for over half of production.) Agriculture in many regions of Mexico is dependent on irrigated water; more than half of agriculture takes place in arid or semi-arid zones.<sup>41</sup> Although the northern and central regions of the country have only 28% of the water, they contain 92% of Mexico's irrigated area.<sup>42</sup>

Where measurements are available, water extraction often exceeds renewable supplies, leading to the steady depletion of Mexico's water resources. The number of aquifers known to be over-exploited has risen from 32 in 1975 to over 100 in 2005, endangering associated ecosystems and leading to growing soil salinity.<sup>43</sup> These data relate only to the 202 aquifers that have been measured and officially certified, but these represent a minority of the total number of aquifers as another 451 out of 653 have not yet been measured and certified.

### ***Deforestation, soil erosion, pollutants***<sup>44</sup>

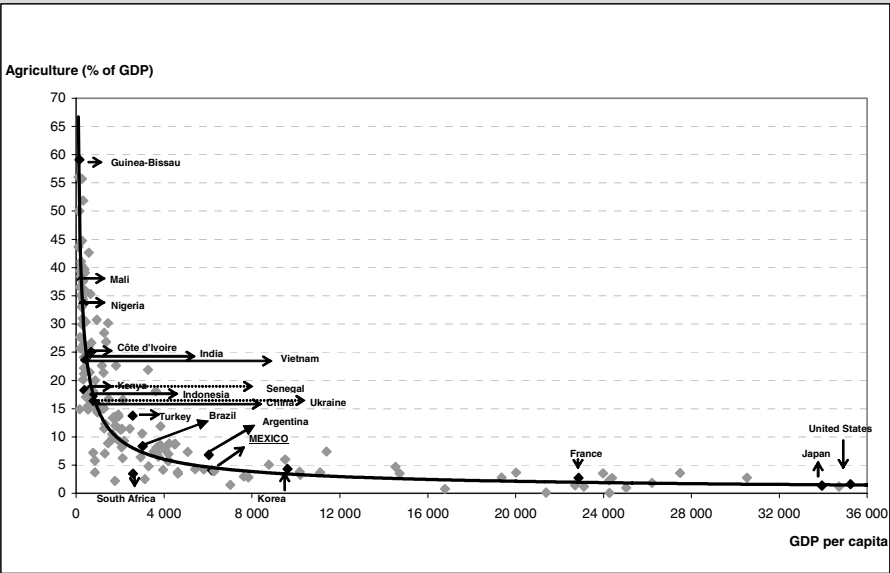
Water is not the only natural resource affected negatively by agriculture in Mexico. Severe soil erosion affects about 40% of the total area of Mexico, and 60% or more is subject to soil erosion to a lesser but still important extent. Fully 80% of the area suffering soil erosion is used in agriculture; agricultural activities, principally over-grazing, excessive irrigation and certain tillage practices, cause or exacerbate soil erosion. The use of pesticides in Mexico has grown 22% over the 1990s, but the number of poisonings caused by pesticides has decreased since bans were adopted in 1998 prohibiting chlordane and in 2002 prohibiting DDT, although these pesticides may remain in use illegally. The agricultural sector also contributes to air pollution. About a tenth of greenhouse gases emitted in Mexico are caused by agricultural activities, with livestock-generated methane the chief component. Vegetable production practices, particularly soil fumigation using methyl bromide, emit ozone-depleting chemicals. Mexico has been deforested at a rate of 1% per year during the 1990s, often as a consequence of clearing land for livestock grazing. The loss of temperate and tropical forests jeopardises further wild species.

**Box 2.2. Mexico's agricultural sector in a global context**

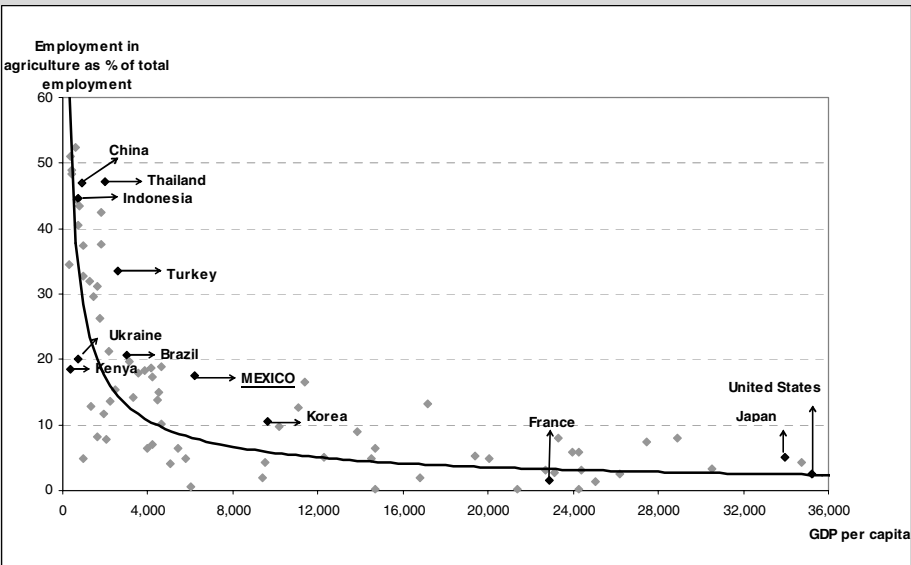
The description of Mexico's agricultural sector provided here may contradict some stereotypes about OECD agriculture. Whereas agricultural sectors of OECD members might be expected to be characterised by high levels of capital intensity and productivity – and many producers in Mexico access readily capital markets and achieve excellent productivity – some part of Mexico's agricultural sector is neither capital intensive nor highly productive.

International comparisons emphasise the standing of Mexico's agriculture sector in a broader context. The share of agriculture in total GDP in Mexico, about 4%, is well below the 17% average (Panel A), but is nevertheless higher than the shares seen in many other OECD countries. According to these data, employment in agricultural activities plays an average part in total employment in Mexico, even though Mexico has above average GDP per capita. While economic development can follow many paths, these comparisons highlight the potential to sustain the current share of agriculture in the overall economy, if not the level of employment, during the course of future evolution in Mexico's economy.

**Panel A. Agriculture's share in total GDP**



**Panel B. Agriculture's share in total employment**



Source: OECD (2005) *Review of Agricultural Policies: Brazil*, based on World Bank data and national sources.



## NOTES

1. Assessments of the state of Mexico's agricultural sector are imprecise due to the lack of a regular agricultural census. Thus, although general information about output markets and trade are available, information about the structure of Mexico's agricultural sector and input markets are drawn from the last census in 1991 and surveys in subsequent years that are either partial or not focused on agriculture. The relevance of much of these data is questionable and they are represented here only sparingly.
2. For more details about the development of agricultural policies, see OECD 1997, and the series of alternating OECD publications *Agricultural Policies in OECD Countries: Monitoring and Evaluation* and *OECD Agricultural Policies: at a Glance*.
3. Gordillo *et al.* 1999.
4. *Censo Ejidal* 2001, INEGI.
5. *Censo Ejidal* 2001, INEGI.
6. *Censo Ejidal* 2001, INEGI.
7. Deininger and Labadenz, 2001.
8. SEMARNAT (2002), *Compendio de Estadísticas Ambientales*. Another source (Programa Especial Concurrente para el Desarrollo Rural Sustentable, 2002) gives a lower estimate of 6.3 million hectares.
9. Alvarado and Kemper, 2001.
10. Deininger and Lavadenz, 2001.
11. Unless otherwise noted, data of this paragraph are drawn from SEMARNAT, *Compendio de Estadísticas Ambientales* 2002.
12. Deininger and Lavadenz, 2001.
13. Instituto Nacional de Estadística, Geografía e Informática (INEGI).
14. *II Conteo de Población y Vivienda* 2005.
15. Consejo Nacional de Población (CONAPO).
16. Unless otherwise stated, data of this paragraph are from *II Conteo de Población y Vivienda* (2005).
17. INEGI (2004) *Encuesta Nacional de Ingreso y Gasto en Hogares*.
18. OECD (2003) *Territorial Review Mexico*.
19. Data of this paragraph are drawn from the *Encuesta Nacional de Hogares Rurales de Mexico* (ENHRUM), unless otherwise noted. ENHRUM is a survey representative of Mexican households located in rural areas, except for those living in hamlets with a population under 500 inhabitants. By excluding these populations, the analysis risks

excluding households living under the extreme conditions of poverty and isolation. The data also exclude areas with more than 2 500 people, but these areas are usually not considered rural in Mexico by definition.

20. Apart from normal differences in survey data, different definitions may lead to apparent discrepancies between rural income data. In particular, ENHRUM data are based on a definition of “rural” that includes only communities with 500 to 2 500 people, whereas the definition used by Ruiz Castillo is for localities with less than 15 000 people.
21. These data must be evaluated with caution: the underlying source, the ENIGH survey, is designed to be representative for income as a whole, but not necessarily for small income sources. Ashraf, McMillan and Zwane note that some authors have estimated substantial under-reporting of income, likely by the wealthier respondents (p. 27).
22. INEGI sources: II Conteo de Población, and Vivienda 2005z II Conteo de Población y Vivienda 2005. Survey data indicate that there may have been a higher rate of international migration in more recent years (ENHRUM).
23. ENIGH 2004 and Central Bank of Mexico.
24. Szekely, 2005.
25. World Bank calculations based on household surveys.
26. Cortés *et al.*, 2005. These authors find that poverty measures sensitive to the depth of poverty and the distribution of the poor (poverty gap and squared poverty gap) show no statistically significant change.
27. OECD (2003), *Territorial Review*.
28. The OECD Territorial Review (2003) uses INEGI data to show that not only are average nominal wages lowest for employees in agriculture, forestry and fisheries during the 1990s, but also the rate of wage growth in that sector is the lowest during that period (p. 40-41).
29. Procuraduría Agraria: Procuraduría Agraria (2003), *Tendencias del Campo Mexicano en 2003*, Mexico, D.F.
30. Instituto Nacional de Población y Vivienda, *XII Censo General de Población y Vivienda 2000*.
31. Secretaría de Salud, 2001.
32. Bangladesh and USA IMRs are from World Bank, World Development Report 2000/2001.
33. Based on the PROCAMPO roster.
34. For example, Bellon and Berthaud (2006) summarise a sample from southeastern states: the number of fields per household average as high as 3.4 in one area and as low as 1.1; and hectares per field averages as low as 0.9, in the same region as reported the highest number of fields per household, and as high as 4.2 in a different region.
35. World Bank (2001a), p. 81.
36. Brizzi (2001).
37. ENHRUM.
38. OECD (*forthcoming 2007*).

39. Garduno, 2005.
40. OECD (*forthcoming 2007*).
41. OECD (*forthcoming 2007*).
42. Alvarado and Kemper (2001).
43. OECD (*forthcoming 2007*).
44. Material of this section is drawn from OECD (*forthcoming 2007*).

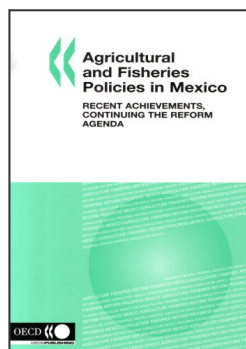


## *Table of contents*

Glossary .....	9
Executive summary .....	11
<b>PART I. OVERVIEW OF THE MEXICAN ECONOMY .....</b>	<b>17</b>
<i>Chapter 1. An overview of economic performance and the structural environment in Mexico</i> .....	19
Introduction .....	19
The economy has become more open in the 1980s and 1990s.....	20
Macroeconomic performance.....	20
Structural environment.....	28
Conclusion.....	36
Bibliography .....	37
<b>PART II. AGRICULTURE.....</b>	<b>39</b>
Introduction.....	41
<i>Chapter 2. Background on agriculture and the rural economy</i> .....	43
Introduction .....	43
Overall sector performance .....	44
Land tenure.....	48
Agricultural activities .....	49
Rural population.....	53
Infrastructure, inputs and resources.....	61
<i>Chapter 3. Main developments in agricultural policies 1990-2006</i> .....	69
Introduction — the policy framework.....	69
International trade policy .....	71
Domestic market intervention .....	73
Income support — PROCAMPO.....	76
Input support measures .....	77
Water and other natural resources .....	79
Policies to improve productivity .....	81
Other policy measures.....	85
Total expenditures on agricultural policies .....	85
<i>Chapter 4. Agricultural policy transfers and welfare effects</i> .....	87
Introduction .....	87
Monetary transfers due to agricultural policies.....	87
Welfare effects of agricultural policies .....	103
Conclusion.....	109

<b>Chapter 5. Agricultural policies and commodity markets</b>	115
Introduction	115
Brief overview of commodity production and consumption	115
Analysis	118
Conclusion	135
<b>Chapter 6. Agricultural policy and rural poverty</b>	139
Introduction	139
Land: The <i>ejido</i> reform and agrarian institutions	140
Agricultural support and rural development	144
Conclusion	157
<b>Chapter 7. Inputs, natural resources and institutions</b>	161
Introduction	161
Infrastructure	161
Finance	163
Technology	165
Natural resources	166
Institutional structures of policy design and implementation	170
Conclusion	172
<b>Chapter 8. Conclusions and recommendations</b>	175
Directions of agricultural policy	175
Achievements of the reforms	179
Priorities for the agricultural sector	181
Actions for further reform	182
Annex II.A. Exchange rate table	189
Annex II.B. Detailed programme information	191
Bibliography	199
<b>PART III. FISHERIES</b>	203
Introduction	205
<b>Chapter 9. Background on the fisheries and aquaculture sector</b>	207
Production trends	209
Markets and trade	213
Fleet structure	214
Employment	217
Regional characteristics	218
<b>Chapter 10. Fisheries management policy</b>	221
Developments in institutional arrangements	221
Current institutional framework	226
Support programmes	230
International engagement	240
Key institutional issues	243

<b>Chapter 11. Review of fisheries management performance since 1990 .....</b>	<b>255</b>
Management instruments .....	256
Status of major stocks .....	257
Profitability and rent generation.....	267
Key fisheries management issues.....	268
Conclusion.....	274
<b>Chapter 12. Aquaculture sector policy .....</b>	<b>275</b>
Institutional arrangements .....	276
Environmental aspects of aquaculture policy.....	282
Stability of the policy regime .....	283
Key policy issues.....	284
Conclusion.....	293
<b>Chapter 13. Fisheries policy and rural development.....</b>	<b>295</b>
Impact of fisheries management policies .....	297
Aquaculture policy and rural development .....	300
Impact of fisheries support programmes .....	301
Conclusion.....	306
<b>Chapter 14. Conclusions and recommendations .....</b>	<b>309</b>
Conclusions .....	309
Achievements of fisheries policy changes .....	311
Recommendations .....	316
<b>Bibliography .....</b>	<b>325</b>



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