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STOCK FARMING IN MEXICO: ITS STATUS AND PROSPECTS

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## INTRODUCTION AND SUMMARY

The livestock industry in Mexico plays a major role in the country's economy. The area normally devoted to stock raising amounts to nearly 70 million hectares and about 500,000 persons are engaged in this occupation. The importance of the livestock sector in Mexico's economy is further shown by the high level of investment, which is estimated at some 80,000 million pesos (6,400 million dollars) and by the revenue in foreign currency produced by exports of cattle on the hoof and carcasses, which in the three-year period 1955-57 amounted to an annual average of about 17 million dollars. Lastly, although the contribution of the livestock sector to the gross national product amounts to only a third of the contribution of the agricultural sector as a whole, and represents little more than 4 per cent of the total, it is very substantial in absolute terms.<sup>1/</sup>

Broadly speaking the conditions and characteristic features of Mexico's livestock industry may be described as follows. If the livestock population is expressed in terms of a uniform unit (heavy cattle),<sup>\*</sup> Mexico now has some 23 million head at pasture, or in other words the density of cattle to suitable land is approximately one animal to every four hectares.

Cattle raising is the main activity in the livestock industry and has made the greatest contribution to its development in recent years, by reason of the high rate of numerical increase, estimated at 4 per cent annually throughout the period 1950-58. The production of meat and milk has risen as a result of this rapid natural increase in the cattle population. This has had a favourable effect on the consumption of red meat, which remained stable at an average level of 17 kilogrammes per capita annually between 1952 and 1956, and rose by 17 per cent in 1957 and 1958. Much the same was true of the consumption of milk and

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<sup>1/</sup> 4,274.5 million pesos (342 million dollars) in 1957.

<sup>\*</sup> Translator's note: "Ganado mayor", translated throughout this document as "heavy cattle", comprises beef and dairy cattle, horses and mules.

dairy products. The situation in Mexico stands in contrast to that in some other Latin American countries, where there was a reduction in the level of consumption of these basic protective foods.

Stock farming in Mexico is decidedly of the extensive type. The breeding and rearing of cattle clearly predominate and the cattle fattening industry is relatively undeveloped. This situation is attributable to the limitations and difficulties in the supply of forage and other feed, especially in the semi-arid areas, and to the predominance of natural grasslands of low yield and small grazing capacity. Because of the nutritional deficiencies caused by the scarcity of forage and also because of the slow development of the animals, they are slaughtered at an advanced age, often when not fully fattened. The intensive type of cattle raising is only found on dairy farms near the large consumption centres, which usually have breeds especially adapted for production and maintain higher standards of animal care and management. However, it should be added that, even on the most modern dairy farms, feeding systems are often patently backward so far as a balanced and proper diet for the animals is concerned, and there are glaring defects in breeding and production records - mainly owing to the lack of any official regulation and control.

Although in the last few years production has increased more rapidly in the livestock industry in Mexico than in other Latin American countries, the productivity indexes, which are low in themselves, show no significant increase. A few examples will illustrate this statement. The birth rate for cattle is only 55-60 per cent, and the slaughter rate only about 13 or 14 per cent. Meat yields are low for all species of livestock. The average carcass weight for cattle is 150 to 160 kilogrammes, the heaviest being carcasses of young mestizo bulls fattened in Las Huastecas, whose carcass weight may easily be as much as 200 kilogrammes or more. Average annual milk production per cow is only some 1,000 litres.

In addition to production difficulties and low productivity there are very great shortcomings in the marketing of livestock and livestock products, and these shortcomings seem to be particularly serious with respect to

/meat. There

meat. There is a decentralized slaughtering system, which means that slaughtering is carried out in a large number of inadequately equipped municipal centres where the number of animals killed is very low; this results in failure to make full use of the by-products, deterioration in the quality of meat and very unsatisfactory hygienic conditions. Further difficulties are created by the lack of any official technical standards for classifying livestock and meat, and by the existence of a large network of middlemen and dealers, who add to the cost of marketing and sometimes control and manipulate the supply and distribution of meat to suit their own ends. There is little regulation of marketing operations for livestock and livestock products to the detriment of the consumer, who at present is paying relatively very high prices, and also of the producers, whose share of the final price of meat is only 25 per cent.

Although the annual per capita consumption of meat and milk has risen appreciably in the last two years it is still undeniably low, amounting to only 20 kilogrammes of red meat and the equivalent of 81 litres of milk in all forms, figures which compare unfavourably with the much higher levels of consumption in many other Latin American countries. Although it was not possible, on the basis of the information available, to make a quantitative assessment of the income-elasticity of demand for these products, it is clear that, as in many other countries in the process of development, effective demand is heavier at the high income levels. In brief, the main reasons for the low levels of consumption are supply problems, high relative prices and extremely limited purchasing power.

The Government has announced a six-year national livestock development campaign, with the aim not only of increasing stocks for domestic consumption but also of expanding exports in view of the favourable situation with respect to world meat prices and the promising outlook in this market. Such a programme could be highly beneficial, since up to now, apart from the valuable services and campaigns of the Ministry of Agriculture and Livestock (Secretaría de Agricultura y Ganadería), the

/development of

development of livestock activities has been left almost entirely in the hands of private enterprise. This is partly attributable to the small number of specialists in animal husbandry and the economy of the livestock industry; furthermore, the present number of veterinarians and specialists in breeding techniques is entirely inadequate, which is the main reason for the low technical level of animal husbandry in Mexico. Moreover, no studies have been made of the economy of the livestock sector, which suffers from considerable shortcomings and which is at present a virtually unexplored field.

#### I. LIVESTOCK POPULATION

As may be seen from table 1, the cattle population increased by 14.5 per cent between 1930 and 1940 and by 35.6 per cent between 1940 and 1950 (an annual average of 3.5 per cent). According to information from the Livestock Division (Subsecretaría de Ganadería), the increase in 1958 compared with 1950 will be 39.5 per cent (an annual rate of 4.2 per cent). This is a high rate indeed and would normally imply optimum breeding conditions, which cannot be said to apply to Mexican livestock. It would therefore seem that recent figures for the cattle population have been optimistic, a view shared by many breeders, particularly those in the north of the country.

Table I  
MEXICO: LIVESTOCK POPULATION  
(Thousands of head)

	1930	1940	1950	1955	1957	1958
Cattle	10,083	11,591	15,713	20,171	21,028	21,921
Sheep	3,674	4,452	5,086	6,766	7,091	7,441
Pigs	3,698	5,106	6,896	8,626	8,954	9,294
Goats	6,544	6,844	8,522	9,009	9,092	9,177

Source: The figures for 1930, 1940 and 1950 were obtained from the corresponding livestock censuses; those for 1955, 1956 and 1957 are estimates by the Department of Agriculture and Livestock.

/Uncertainty regarding

Uncertainty regarding the accuracy of the figures for the animal population, a feature common to virtually every country in the area, makes the rate of slaughter and extraction difficult to calculate. Accordingly, these data must be considered provisional until the figures from the next crop and stock census are available.

## II. PRODUCTION

### 1. Slaughtering and meat production

Before commenting on the figures in table 2, it should be pointed out that the data on slaughtering of heavy and light cattle vary according to the source of information. This is essentially due to discrepancies in estimates of in situ slaughtering.<sup>2/</sup> However, a steady increase in slaughtering in recent years is reported from all sources, which would seem to be in accordance with the rate of natural growth noted in the last few years.

The appreciable decline in the slaughtering of cattle and pigs in 1950 and 1951 is very probably a result of the "stamping out" campaigns instituted by the Government between 1947 and 1950 to eradicate foot-and-mouth disease, which entailed the destruction of over half a million head of cattle and nearly 480,000 pigs. This undoubtedly affected meat production.

In 1957, the cattle slaughtered in the Federal District amounted to some 17 per cent of the total for the country, the chief source of supply being the Gulf of Mexico area, particularly from September to February.

According to the cattle population figures in table 1, the rate of slaughter was apparently 12.1 per cent in 1956, 14.6 per cent in 1957 and 15 per cent in 1958, which indicates more intensive extraction from herds. However, there seems to have been no obvious improvement in the

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<sup>2/</sup> For 1957, the Livestock Division estimated that a total of 3.9 million head of cattle were slaughtered, whereas ECLA places this figure at 2.1 million. The figures in table 2 are a compromise, more closely reflecting actual conditions in the Mexican livestock industry.

Table 2

MEXICO: SLAUGHTER OF MAIN SPECIES OF LIVESTOCK

(Thousands of head) a/

Year	Cattle	Pigs	Sheep	Goats
1948	2 289	1 907	739	1 223
1949	2 286	1 965	1 018	1 038
1950	1 666	1 231	1 252	1 549
1951	2 148	1 019	838	876
1952	2 400	2 069	887	994
1953	2 188	2 195	938	1 428
1954	2 309	2 332	989	1 464
1955	2 255	2 383	1 040	1 501
1956	2 523	2 508	1 000	1 538
1957	3 077	2 630	1 048	1 577
1958 b/	3 390	2 967	1 069	1 582

Source: Alfonso Reina C., La Industria de la Carne en México.

a/ Including slaughter recorded by the Directorate-General of Statistics, slaughter for export and an estimate of slaughter in situ.

b/ Provisional estimate.

/yield of

yield of carcass meat per animal slaughtered, usually about 150 kg except for animals from the Huastecas region which are heavier because of better pastures and improved cross-breeding.<sup>3/</sup> On the basis of the data available, a weighted average of 158 kg of carcass meat and a yield of 19 kg per head of cattle were estimated for 1957-58. These yields are considerably lower than in many other Latin American countries owing to major shortenings in the supply of fodder and the backwardness of cattle-fattening activities in Mexico.

Meat yields for pigs, sheep and goats are also relatively low, the averages being 50 kg, 14 kg and 13 kg of dressed meat respectively.

The meat production figures in table 3 were calculated on the basis of the estimated slaughter and average yield per animal. Analysis of the changes in total meat production during the past ten years shows that production in 1957-58 was 45 per cent higher than in 1948-49, the main increase being registered in the last two years, chiefly in the figures for beef. Beef accounted for three quarters of total production, pork for one fifth and goat-meat and mutton for 3 and 2 per cent respectively. This break-down was maintained virtually unchanged, except in 1950 and 1951 when the production of pork slumped, and it does not vary much from the distribution for Latin America as a whole (see also figure I).

## 2. Production of milk and milk products

In the recent ECLA/FAO study on the role of agricultural commodities in a Latin American regional market,<sup>4/</sup> Mexico's total milk production was calculated at about 2 million tons for 1954-56. According to a FAO expert,<sup>5/</sup> the milk produced was used for the purposes described in table 4.

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<sup>3/</sup> Adequately fattened young steers, crossed with zebu and Brown Swiss, generally yield up to 230 kg of carcass meat.

<sup>4/</sup> E/CN.12/499 (April 1959), p. 86

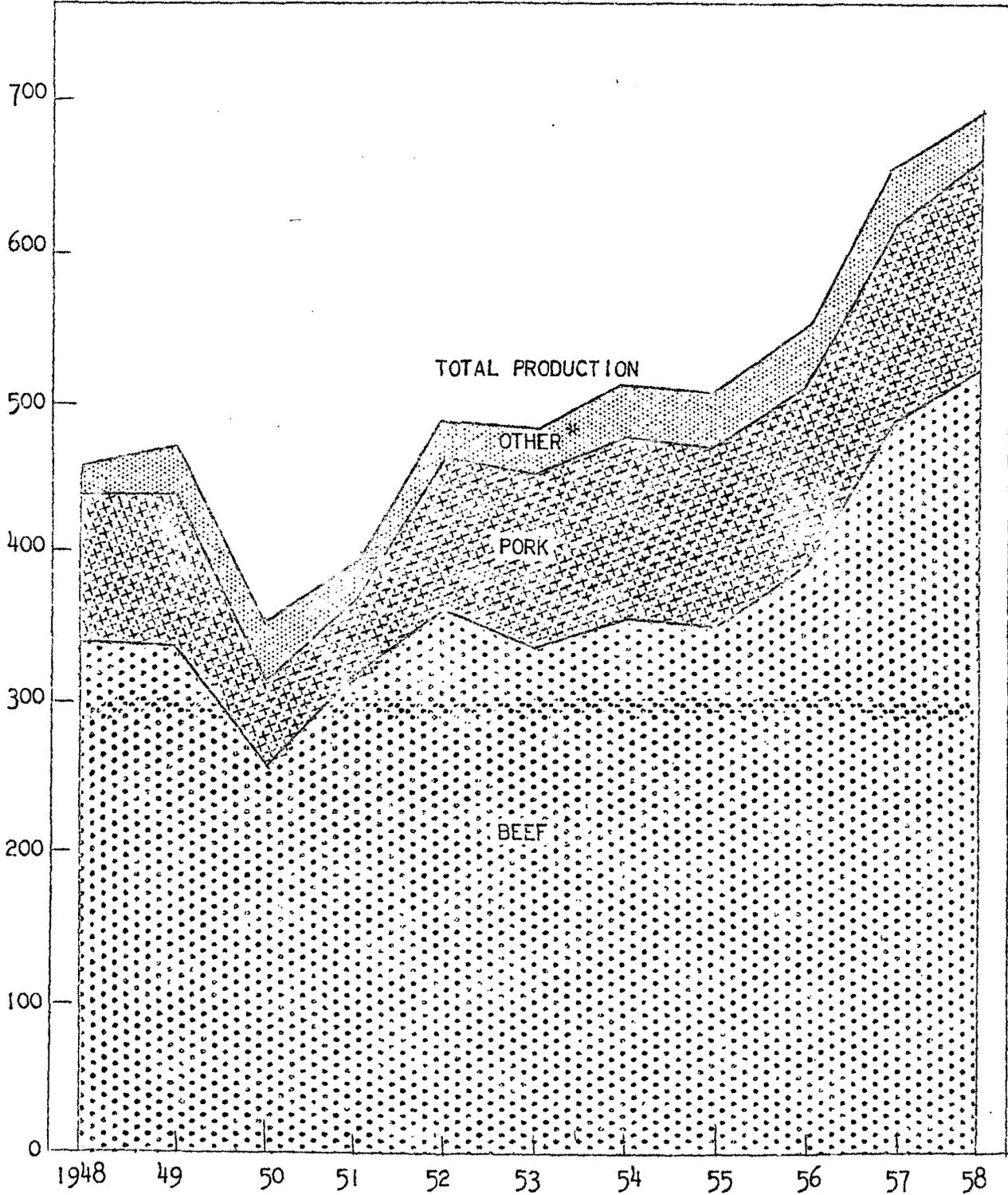
<sup>5/</sup> F. Vieira de Sá, August 1959.

FIGURE 1

MEXICO : PRODUCTION OF RED MEAT, 1948 - 58

NATURAL SCALE

THOUSANDS OF TONS



SOURCE : TABLE 3.

\* MUTTON AND GOAT-MEAT.

Table 3

MEXICO: ESTIMATED PRODUCTION OF CARCASS MEAT, 1948-1958 <sup>a/</sup>  
(Tons)

Year	Cattle	Pigs	Sheep	Goats	Total
1948	343 350	95 350	10 346	15 889	464 935
1949	342 900	98 250	14 252	13 494	468 896
1950	249 900	61 550	17 528	21 686	350 664
1951	322 200	50 950	11 732	11 388	396 270
1952	360 000	103 450	12 418	13 916	489 784
1953	339 140	109 750	13 132	18 564	480 586
1954	357 895	116 600	13 846	19 032	507 373
1955	349 525	119 150	14 560	19 513	502 748
1956	391 065	125 400	14 000	19 994	550 459
1957	486 166	131 500	14 672	20 501	652 839
1958	525 450	138 350	14 966	20 566	699 332

Source: Basic data in table 2.

a/ Including an estimate of slaughter in situ and cold-storage plant slaughter for export but not the meat equivalent of cattle exported on the hoof.

/Table 4

Table 4

MEXICO: MILK PRODUCTION AND USE

(Millions of litres)

	Cow's milk		Goat's milk
	1957	1958	1957-58
Fluid milk	1 785	1 844	130
For cheese	150	165	40
For butter	64	68	30
For evaporated milk	53	56	-
For powdered milk	42	47	-
For ice cream	25	20	-
For fresh cream	4	5	-
<u>Total</u>	2 123	2 205	200

Source: Research carried out by F. Vieira de Sá, FAO expert.

/According to

According to previous figures, Mexico's total milk production is now apparently about 2.5 million tons,<sup>6/</sup> which represents a 25-per-cent increase over 1954-56. It will be seen from table 4 that 84 per cent of cow's milk is used for direct consumption and only 16 per cent for the manufacture of milk products. A total of 65 per cent of goat's milk is consumed directly and the remaining 35 per cent is used for manufacturing cheese and butter. It is estimated that 42 per cent of the butter and 60 per cent of the cheese are manufactured in the same plants in which the milk is produced.

Considering that 1,100,000 milk cows are responsible for total estimated production, the annual yield per animal amounts to some 2,218 litres. This is a relatively high figure and is explained by the fact that it relates to plants engaged essentially in the production of milk. Since the total cow population is estimated at 6.9 million, annual output per cow apparently amounts to only 350 litres. The total goat population is estimated at 4.5 million, of which about half are milked.<sup>7/</sup> Annual production per milk goat is therefore some 90 to 100 litres.

The increase in milk production in 1958 should be attributed partly to good weather and the relative abundance of fodder in some areas, which is itself due to favourable rainfall during the year. It should be borne in mind, however, that the development of milk production in Mexico in recent years is partly due to the Government's milk promotion campaigns. Particular mention should be made of the artificial insemination service available in 36 official centres, from which it is hoped to obtain 40,000 head of high-grade cattle for communal (ejidal) and small farms.

Generally speaking, the Mexican dairy industry is still defective in many respects in spite of the interest shown by stock farmers and the action taken by the Government. Extensive husbandry is the rule - except in farms near the capital - and management is poor. Barns are

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<sup>6/</sup> The Livestock Division has estimated that production in 1958 will amount to 2.66 million tons.

<sup>7/</sup> Goats of various breeds over 2 years old.

rarely provided for cattle and little attention is given to feeding and sanitary conditions. Moreover, there is a complete lack of integrated crop and stock farming on combined farms, much needed on milk-producing ranches and ranges. Substantial imports of dairy cattle have been made under the dairy promotion programme but with disappointing results because of the poor handling and management already mentioned.

### III. UTILIZATION OF RESOURCES FOR STOCK FARMING

#### 1. Area used for stock farming

One of the chief causes of the low productivity of the Mexican livestock industry is the smallness of the area devoted to the cultivation of artificial pastures and the prevalence of natural pastures of low carrying capacity. The Livestock Division estimates artificial pastures at slightly over 1 million hectares, situated particularly in the States of Veracruz, San Luis Potosí, Hidalgo, Tamaulipas and Tabasco. The main types are: Panicum barminode (Pará), Panicum maximum (Guinea), Panicetum Merkeron (Merkeron) and Panicetum purpureum (Elephant). Most of the remaining pasture-land is covered with natural plants - both perennial and seasonal - of little nutritional value and of low carrying capacity.

According to table 5, the total pasture area amounts to slightly over 67 million hectares. It is estimated that 96 million hectares of land, including woodland and fallow land suitable for grazing, are used for livestock. This amounts to 4.2 hectares per unit of heavy cattle, since Mexico has approximately 23 million head of heavy cattle permanently at pasture.<sup>8/</sup> However, in the opinion of many experts and breeders, the carrying capacity of the pastures is much lower than the average stated. According to data provided by livestock unions and other sources, actual carrying capacity varies within the limits stated in table 5. For obvious reasons it would be difficult to estimate reliable figures for carrying capacity, but the main trend of opinion seems to be that the real average

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<sup>8/</sup> The ratio of sheep and goats, expressed in units of heavy cattle, is 5 to 1.

Table 5

MEXICO: PASTURE AREA AND CARRYING CAPACITY, BY STATES

State	Thousands of hectares	Carrying capacity <sup>a/</sup>
<u>North</u>		
Cochuila	8 282	18-50
Chihuahua	14 555	5-50
Durango	5 729	8-50
Nueva Le6n	2 586	6-15
S. L. Potosi	2 698	1-15
Tamaulipas	1 670	1-15
Zacatecas	3 899	6-10
<u>Gulf of M6xico</u>		
Campeche	692	1-5
Quintana Roo	119	8-15
Tabasco	727	1-5
Veracruz	1 856	1-5
Yucat6n	347	8-15
<u>North Pacific</u>		
Baja California	1 752	8-50
Nayarit	926	5-10
Sinaloa	1 443	5-10
Sonora	7 189	15-25
<u>South Pacific</u>		
Colima	208	4-10
Chiapas	1 404	1-5
Gerrero	2 205	5-10
Oaxaca	1 420	3-10
<u>Central</u>		
Agascalientes	268	5-10
Distrito Federal	13	5-15
Guanajuato	892	5-15
Hidalgo	474	1-15
Jalisco	2 470	4-10
Mexico	446	5-15
Michoac6n	1 621	2-10
Morelos	187	6-15
Puebla	802	6-15
Quer6taro	418	6-15
Tlaxcala	78	1-15
<u>Total</u>	67 376	...

Source: 1950 crop and stock census for area figures; and Alfonso Reina C., La Industria de la Carne en M6xico, 1958, op. cit.

<sup>a/</sup> Hectares required per head of heavy cattle.

/for the

for the country is slightly more than twice that suggested by the livestock density index computed on the basis of the census. There would thus seem to be either over grazing or an excess of cattle population of varying intensity depending upon the State concerned. This is a most unfortunate situation since it leads to soil impoverishment, reduces the supply of fodder per animal - thus hampering the process of growth and fattening -, and increases the risk of animal diseases. A comparison of the data on area and number of animals shows that most of the over-grazing takes place in the central part of the country - particularly the States of Mexico, Puebla, Michoacán and Jalisco - and in the north. It should be borne in mind that the dairy farms where all or part of the animals are kept in byres, necessitating supplementary feed rations and thus less pasture for grazing, are concentrated in the State of Mexico and the Federal District.

## 2. Livestock areas and their ecology

### (a) Northern zone <sup>9/</sup>

This zone extends over 39.4 million hectares used for livestock. The carrying capacity of the pastures varies between 6 and 50 hectares per head of full-grown cattle, with the exception of Las Huastecas, Tamaulipas and San Luis Potosí where, because of good weather and soil conditions, each hectare of natural pasture can carry two head of cattle and each hectare of artificial pasture can fatten three young steers in six months.

This vast zone is generally semi-arid, with very sparse vegetation and very poor natural pasture, which very often can be used only during and immediately after the rainy season. Except for the humid tropical region of Las Huastecas, the average temperature in most of the northern zone is 18° C<sup>10/</sup> with annual precipitation ranging between 800 and 1,200 mm; cattle is raised here and then sent on to other regions for fattening. Cattle is sold in Nuevo León, Zacatecas, northern Tamaulipas

<sup>9/</sup> Coahuila, Chihuahua, Durango, Nuevo León, San Luis Potosí, Tamaulipas and Zacatecas.

<sup>10/</sup> The temperate climate far north, where the temperature drops to 0° C in winter, constitutes an exception.

and San Luis Potosí for fattening in the Las Huastecas region.

The northern zone is the most important area for raising beef cattle, having nearly 30 per cent of the country's cattle population. Chihuahua is the major livestock State since it has 37 per cent of the zone's pasture area and 7.4 per cent of Mexico's cattle population. Half the country's goat population is also concentrated in the northern zone, which also has the second largest pig population (one-fifth of the total for the country as a whole).

(b) Gulf of Mexico zone<sup>11/</sup>

While the smallest in pasture area (3.7 million hectares), the Gulf of Mexico zone is the most important for the fattening of cattle. Because of the fertility of the soil, the abundant rainfall and the quality of the artificial pastures, each unit of area can carry up to three head of cattle in parts of Veracruz, Tabasco and Campeche. Veracruz, with half the pasture area in the zone and the second largest cattle and pig population in the country, is the most important livestock State in the Gulf of Mexico.

The climate is mainly dry in some areas of the Yucatán peninsula and thus the pasture-to-cattle ratio is much lower (from 8 to 15 hectares per head of full-grown cattle).

The region of Las Huastecas covers part of the States of Veracruz, Hidalgo, San Luis Potosí and Tamaulipas. The quality of its natural and artificial pasture is excellent, as is the quality of its livestock, considering the tropical conditions that prevail there. The average permanent carrying capacity is one head per hectare. This area produces some 200,000 fattened cattle per year, with a carcass meat yield of 240 to 250 kg per head; two-thirds of the output is consumed in the Federal District. Fodder in Las Huastecas is always in relatively abundant supply because the higher-altitude pastures of the "Guinea" (Panicum maximum) type are used during the rainy season and the lower pastures of the "Pará" (Panicum barminode) type can be used during the dry season, after the floods.

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<sup>11/</sup> Campeche, Quintana Roo, Tabasco, Veracruz and Yucatán.

(c) Central zone<sup>12/</sup>

This zone has a pasture area of 7.6 million hectares, with a carrying capacity of 5 to 10 hectares per head of cattle. The climate is very variable, ranging from dry with moderate precipitation to tropical with virtually constant rainfall. It is the most densely populated area in the country, with the highest consumption of meat and milk. It also has the largest proportion of beef cattle - one third of the total for the country.

Various strains of cattle are bred in this zone and most of the intensive dairy farming is carried out on its higher plateaux. Jalisco and Michoacán are the most important livestock States, with a cattle population estimated at more than 17 per cent of the total for the country. It also has the largest pig population - 44 per cent of the total - raised and fattened on farms which, in the States of Guanajuato and Michoacán, sometimes have over 10,000 animals each. Half of the sheep population is in the Central zone, particularly in the States of Mexico, Puebla and Hidalgo. The goat population amounts to nearly 3 million head, or about one third of the 1957 total estimated for the country as a whole by the Livestock Division.

(d) North Pacific zone<sup>13/</sup>

This zone is the second largest in pasture area (11.3 million hectares) but only third in cattle population because of the low pasture-to-cattle ratio which varies between 5 and 50 hectares per head of full-grown cattle. However, conditions are improving noticeably in the northern areas of Baja California, Sonora and Sinaloa where irrigation schemes will facilitate the intensive development cattle fattening and milk production. Pig, sheep and goat breeding is only carried out on a relatively small scale in this zone.

(e) South Pacific zone<sup>14/</sup>

The pasture area here is estimated at 5.2 million hectares with a cattle population of 2.3 million head. The pasture-to-cattle ratio

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<sup>12/</sup> Aguascalientes, Federal District, Guanajuato, Hidalgo, Jalisco, Mexico, Michoacán, Morelos, Puebla, Querétaro and Tlaxcala.

<sup>13/</sup> Baja California, Nayarit, Sinaloa and Sonora.

<sup>14/</sup> Colima, Chiapas, Guerrero and Oaxaca.

varies considerably (ranging from 1.5 to 10 hectares per head of heavy cattle). From 5 to 10 hectares per head are required in Guerrero, Oaxaca and Colima and even more in the semi-arid areas where the climate is dry. From 1 to 3 head of cattle per hectare, depending upon the condition and type of pasture, can be carried in northern Chiapas where the climate is tropical, with considerable rainfall, and the quality of the pasture is good. It ranks third after the central and northern zones in the size of the pig, sheep and goat populations, with 1.3 million, 455,000 and 883,000 head respectively.<sup>15/</sup>

### 3. Breeds of cattle

According to the 1950 census, and assuming that conditions have remained more or less unchanged since, 92 per cent of Mexican cattle was of the criollo or ordinary type. These animals have been raised from the Iberian strains introduced by the Spaniards, but they almost always show marked traits of the specialized breeds. On the other hand, since they are subjected to extensive cattle-raising practices, they display varying degrees of degeneration, and their adjustment to their environment is still at a stage which is not propitious to early maturing or high yields. By far the greater part of the cattle population consists of about 20 million head of native and mestizo cattle and 1.9 million head of improved foreign strains. Of the latter, the Holstein breed is prevalent on dairy farms, the Brown Swiss and the zebu in Gulf of Mexico cattle farms and the Hereford in northern ranches.

Most of the cattle of specialized breeds are in the northern zone, followed by the Central, North Pacific, Gulf of Mexico and South Pacific zones. The largest number of selected cattle of foreign breeds is to be found in the States of Chihuahua, Coahuila, Mexico, Durango, Veracruz and Sonora, in ascending order. Chihuahua, Jalisco, Veracruz, Sonora and Michoacán have the largest population of pure-bred bulls. In general, the ratio of pure-bred to ordinary cattle is 1 to 6 for bulls and 1 to 12 for cows; pure-bred animals constitute about 41 per cent of the total cattle population.

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<sup>15/</sup> Estimates for 1957 by the Department of Agriculture and Livestock.

Most of the cattle are thus of native breeds, generally low in meat and milk output, but with the advantage of complete adaptation to local conditions. Accordingly they require less care and are more resistant to diseases and attacks by external parasites.

It should be noted that the Mexican Government has encouraged the importing of breeding stock to improve both beef and dairy cattle. Thus, for instance, in the two-year period 1956-57, cattle imports sponsored by the Government amounted to 19,711 head for a total value of 5 million dollars. More than four fifths were beef cattle breeds (Hereford, Santa Gertrudis, Brahman and Aberdeen Angus) and the remainder dairy stock (Holstein and Brown Swiss). These were all imported from the United States in accordance with the conditions applying to the Export-Import Bank loan to the Mexican Government for cattle imports.

The Government is also promoting genetic improvement by the practice of artificial insemination on experimental stock farms. Private enterprise is playing a leading role as regards breeding techniques and associations of cattle raisers and breeders of specialized strains are showing increasing interest in introducing new blood into their herds. It should be borne in mind, however, that all these efforts to improve breeds ought to be supplemented by the establishment of breeders' associations for the more important species and the keeping of milk production records under the supervision or control of the competent section of the Department of Agriculture and Livestock. An official register for pure-bred cattle and production records would constitute a strong incentive to breeders and instil greater confidence in buyers.

#### 4. Use of feed for livestock

##### (a) Fodder

Generally speaking, open-range pasture predominates in Mexico and is practically the only way in which green fodder is supplied to livestock. The cultivation of fodder crops for cutting is not practiced very widely except in intensive dairy farming, either for the purpose of obtaining additional green fodder for milk cows or for stocking as hay or silage.

/In the

In the northern zone, green fodder is available for livestock only when grass growth is promoted by rainfall and therefore only dry fodder is given to the animals during the dry season. Conversely, in the coastal areas of the Gulf of Mexico, where rainfall is plentiful, there is a permanent supply of green fodder.

Seasonal variations in the supply of fodder naturally produce very sharp fluctuations in output volume. During the dry season, the yield of milk cows drops appreciably and the supply of fat young steers is considerably reduced. Fat cattle is in short supply between March and August, particularly in May and June. The supply becomes much more plentiful again towards the end and beginning of the year. In this connexion, technical assistance programmes and financing would be most useful as an incentive to stock farmers to follow fodder conservation practices as a general rule. Fluctuations in the number of cattle slaughtered in the Federal District coincide with seasonal variations in the fodder supply. However, they are not as severe as in some provinces because cattle-fattening is carried on permanently in the main supply centre - the Las Huastecas area.

The seasonal fodder shortage not only has an unfavourable effect on output but also causes severe organic ailments as a result of protein and vitamin deficiencies, encourages animal diseases and increases mortality.

(b) Food concentrates

The fodder shortage during the dry season would not be such a serious problem if food concentrates, now used only on a few farms where intensive methods are practiced, were available on a much larger scale. Wider use should be made of agricultural by-products such as oil-seed, wheat-flour and cocoa shell cake, bran, molasses, etc., which are very often wasted, and also of some grains and minerals in the feeding of milk cows and young bulls in the process of being fattened. While the boom in the poultry and dairy industries has resulted in the establishment of plants manufacturing food concentrates and a sharp increase in the importing of animal feed preparations, the loss of foreign exchange<sup>16/</sup> this represents could be partly reduced if supplementary feeds were to be grown on the farms themselves. One method of achieving this is to combine crop and stock farming by means of mixed farms.

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<sup>16/</sup> Amounting to approximately 10 million dollars in 1957.

#### IV. LIVESTOCK DISEASES

##### 1. Infectious and contagious diseases

The most common infectious and contagious diseases affecting livestock are anthrax, clostridium chauvoei, septicemia haemorrhagica, brucellosis in cattle, goats and pigs, tuberculosis, paralytic rabies, infectious enteritis, hog cholera, mastitis, granular vaginitis and trichinosis.

Outbreaks of diseases of the anthrax type and septicemia haemorrhagica are generally sporadic because of the increasingly widespread practice of preventive vaccination, which affords a high degree of protection when applied periodically and systematically. Brucellosis (B. abortus), tuberculosis, mastitis and infectious pneumoenteritis occur frequently in young dairy cattle. While the first three do not cause appreciable mortality, they substantially reduce milk output and calving. What is worse, they may constitute a serious threat to human health. Pneumoenteritis occurs frequently in very young calves and, together with coccidiosis and gastrointestinal and pulmonary parasites, produces a high rate of mortality.

The incidence of the above-mentioned diseases varies within a very wide range, depending upon sanitary conditions and controls. The mortality rate for which they are responsible, however, varies between 5 and 15 per cent in young animals and between 2 and 5 per cent in animals kept in byres and barns.

Foot-and-mouth disease, it should be noted, has been completely eradicated from Mexico, a process which involved heavy losses and a series of financial, economic and social problems. It broke out in 1946 in the State of Veracruz and spread rapidly to sixteen other States. The Government of the United States hastily sealed its borders to Mexican exports, which until then had amounted to 500,000 head of cattle. Thanks to the efforts of the joint Mexican-United States commission for the eradication of foot-and-mouth disease and after having applied the "stamping-out" policy to 519,000 head of cattle and 472,000 pigs between

/March 1947

March 1947 and June 1950 - nearly one million animals valued at 140 million Mexican pesos;<sup>17/</sup> the United States Government reopened its borders to Mexican livestock and meat on 1 September 1952. The disease unfortunately reappeared in Veracruz and the border was closed again on 23 May 1953. Traffic in livestock and meat between the two countries was not renewed until the end of 1954, after the United States was satisfied that foot-and-mouth disease had been eradicated from Mexico, which is now considered completely free from the disease.

## 2. Parasitic diseases

Parasitic diseases attack all species of animals at a very early age, their incidence and ravages being greater among young animals. Because of variations in climate and defective health control these diseases are prevalent in all stock farming areas. According to the Health Section (Sección de Sanidad Pecuaria) of the Livestock Division, the main internal parasitic diseases are: piroplasmosis, anaplasmosis, coccidiosis, fasciolosis, ascariasis, strongylosis, taeniosis, filariasis, trichomoniasis and leptospirosis. The most common ectoparasites are ticks, hipoderma bovis, dermatobia hominis, mycosis and mange.

To these must be added protein, vitamin and mineral deficiencies - particularly of iodine, calcium, phosphorus, cobalt and magnesium - which retard the growth and fattening of cattle and sometimes are of a clinical nature difficult to identify etiologically and thus to combat.

## 3. Border health control

Harbour and border health regulations prohibit the entry of cattle, pigs, sheep, goats and horses from countries where foot-and-mouth disease is considered to exist. These animals can only be imported from countries free of foot-and-mouth disease subject to presentation of the relevant certificates testifying to their origin from a disease-free zone and to Bang agglutination, tuberculin, mallein, dourine, etc., tests. Direct inspection and veterinary examination at quarantine stations are also compulsory.

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<sup>17/</sup> Amount of compensation to which the stock farmers were entitled.

Most of the cattle imported into Mexico come from the United States and Canada, while sheep are also imported from Australia and New Zealand.

#### V. MANAGEMENT OF LIVESTOCK FARMS

The handling, organization and management of livestock and livestock enterprises are defective in many respects in the extensive farms which constitute the majority of the ranches in Mexico engaged in the breeding and fattening of cattle. The animals are kept out in the open, generally on unduly large ranges. Bulls are allowed to mingle permanently with calves, heifers and cows on farms for the breeding of non-dairy cattle, thus hampering controlled breeding. Under these conditions, sires are to a large extent wasted and cows and heifers are in calf before they are fully developed. The ratio of sires to females on this type of farm is estimated at one bull to 35 or more cows, whereas the best ratio under Mexican extensive farming conditions should be not more than 25 cows per bull.

Conditions for the care and handling of livestock are even worse in the semi-arid areas, where animals often have to walk long distances in search of watering-places. Cattle are not separated by type in these areas, nor is pasture rotation or supervision and inspection of cattle practised to any extent. The handling and care of cattle is limited to gelding, branding and vaccinating, operations which are carried out only a few times a year. Obviously, the productivity of these farms is extremely low, although profitable because of the small input required.

Stock farming on common land (terrenos ejidales) is also primitive because various types of livestock graze promiscuously on the same pastures and receive no other care. In view of the importance of stock farming on common land <sup>18/</sup> and of the innumerable problems it presents, the Mexican Government recently included common land stock farming as a new part of the agrarian reform programme aimed at the more rational development and handling of livestock and better use of pastures through rotation.

The levels of technology and management are much higher on dairy farms

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<sup>18/</sup> In 1951, the number of livestock on common land was 528,000 cattle, 337,000 sheep, 622,000 goats and 417,000 pigs. (FAO, Background Country Studies, No.8).

/and cattle-fattening

and cattle-fattening ranches. Because of the high price of land, particularly in areas near the large consumer centres, such as the Federal District, more intensive methods have to be applied, including the placing of cows in byres, at least during milking, when they receive extra feed in the form of forage, hay, silage or protein-rich concentrates essential to milk production. These farms also undertake the artificial feeding of calves, controlled breeding - at times resorting to artificial insemination - and more efficient health control. They are, in fact, better organized farms and many of them own selected strains of cattle and very valuable pedigree animals. Nevertheless, according to the authoritative sources who were consulted in the course of the research on which this report is based, productivity could be doubled within a few years with the adoption of improved feeding, reproduction and disease control systems. This would in turn result in a higher yield of milk per cow, a higher calving rate and reduced mortality, which is high on farms where nursing cows are milked. In advocating improved techniques, emphasis should be placed primarily on pasture renewal and rotation because the practice has been to use pastures uninterruptedly year after year. The cultivation of pastures combining grass and legumes on small areas suitable for rotation and deferred grazing, depending on the season and type of farm concerned, should be recommended. In Mexico, as in many other countries in the area, the time-honoured practice is to overgraze in order to keep the grass short and avoid lignification. While this practice may be recommended in some cases, it may impede the normal growth of forage plants because lack of adequate rest retards the sprouting of stems and foliage and weakens them because the chlorophyll content is exhausted by overgrazing. One of the major disadvantages of permanent grazing is that the grass is not allowed to grow and therefore its carrying capacity is only one third of what it would normally be per unit of area and time. It is thus advisable to manage pastures in such a way as to allow them to rest so that the grass can grow fully and thus be suitable for intensive grazing during short periods.

Another important problem, fairly common in Mexico, is the lack of livestock feed during the dry seasons. This shortage may be largely remedied by storing surplus fodder accumulated during the rainy seasons in the form of hay and by cultivating fodder crops for cutting to provide silage.

/Control of

Control of internal parasites may sometimes be effected by systematic livestock rotation in order to break the growth cycle of parasites. The periodical tick-destroying bath is an easy method of promoting animal health. Other simple and cheap handling and management practices are the timely use of vaccines against local diseases and the supplying of mineral mixtures as required.

## VI. MARKETING OF LIVESTOCK PRODUCTS

### 1. Livestock and meat

In Mexico there are no fairs, special markets or auctions of cattle for consumption. Livestock is sold by breeders on their farms or ranches to middlemen, merchants, butchers, packers, super-markets, etc. Livestock is sold by the head, and the price depends upon the degree of fattening, type of animal and estimated weight. Livestock is sold by the kilogramme or on the hoof on ranches and in slaughterhouses where scales are available.

Livestock is brought to abattoirs or slaughterhouses by rail, lorry or on foot. In some cases, the journey is difficult and takes several days, which causes the animals to lose weight; the loss sometimes amounts to 10 per cent and thus a further period of fattening is required.

It is estimated that nearly 75 per cent of the beef cattle is slaughtered in obsolete slaughterhouses, inadequate both economically and from the point of view of health. Failure to use by-products such as blood, bones, hooves, etc., results in an annual loss estimated at 125 million pesos (10 million dollars). Many municipal slaughterhouses have no facilities for the hygienic handling of meat, nor is there any inspection or control by veterinarians. This constitutes a serious threat to public health. These major defects can be attributed chiefly to the large-scale decentralization of slaughterhouses into a growing number of small municipal abattoirs where the small scale of operations does not justify the establishment of modern plants. Moreover, the municipalities usually manage the abattoirs strictly for the purposes of revenue, maintaining antiquated slaughtering taxes and receiving fees for the use of the abattoir.

The remaining 25 per cent of beef cattle is slaughtered and dressed in modern plants, either State-owned or private, with special facilities for

/the killing

the killing of animals, preservation of the meat by chilling and freezing, and the packing of meat products. The Ferrerfa slaughterhouse in Mexico City is a State-run establishment of this type which also has modern facilities for poultry-killing. Most of the meat consumed in the Federal District comes from this establishment. In order to make the fullest use of the plant's vast capacity, the Government seeks to have all slaughtering done there by levying heavy inspection taxes when meat comes from other sources. While the larger-scale operations lower costs and facilitate supplies to the Federal District, they should not be such as to force other modern plants to close down or limit their operations.<sup>19/</sup>

There are about 22 meat-packing plants subject to federal inspection in Mexico, with an annual slaughter capacity of some 660,000 head of cattle. In recent years, however, they have only operated at from 20 to 25 per cent of capacity because of current regulations on livestock exports and slaughter. Better use of these plants, which represent an investment of over 14 million dollars, would be made by increasing the export quota for packed meat under favourable conditions of external demand, by authorizing them to slaughter cattle for local consumption and by improving domestic production and supply conditions. It should be borne in mind that, while market conditions abroad at present favour the export of better-quality livestock on the hoof and the packing of inferior-quality meat, different and unexpected conditions might suddenly arise which would force a change in the composition of exports. In short, protection of the meat-packing industry is not only justified from this point of view but also because it can play a much more important role in improving the marketing of meat.

The distribution and retail sale of meat are generally satisfactory in the Federal District and the larger towns because they are well regulated and in the hands of properly organized groups of merchants and butchers prepared to comply with the official regulations governing the transport,

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<sup>19/</sup> According to information from the Mexican Stock Farmers' Federation, Empacadora de Santa Clara, S.A. had to suspend operations because the high Government inspection tax compelled livestock suppliers and middlemen to send their cattle to the Ferrerfa slaughterhouse.

health inspection and sale of food. In the smaller centres and the semi-rural areas, on the other hand, meat is handled, transported and sold under conditions dangerous to public health.

One of the major marketing defects is the lack of official technical standards for the grading of livestock and meat. Again, carcasses are not properly cut into slices and pieces of different quality to suit the taste and purse of the consumer.

The technical and economic efficiency of livestock and meat marketing is, in short, low. These two aspects are not necessarily related, so that high costs are not the result of efficient service but the consequence of a disorganized market.

As already seen, marketing practices, slaughtering and handling techniques and the scale or volume of activities in abattoirs and retail shops all contribute to high prices, independently of the quality of the services provided and of the product sold. Marketing margins and consumer prices are thus higher. There is often unnecessary duplication of functions among some middlemen who are usually favourably placed to control supplies and fix prices. The same meat marketing problem exists in other Latin American countries also affected by fluctuating supplies and costs and by considerable speculation of varying origin.

It is essential, therefore, that the various marketing functions should be so organized as to stabilize costs and adjust the profits of middlemen to the services they actually perform. An adequate marketing margin would thus be established which would enable a satisfactory relationship to exist between the prices paid by the consumer and those received by the producer. Under present conditions in the Mexican meat market, the stock farmer receives only 25 per cent of the retail price, the remainder being distributed between the middlemen's profits (28 per cent), slaughtering fees and taxes (9 per cent) and the retail butcher (38 per cent).<sup>20/</sup> This contrasts most unfavourably with conditions in countries where livestock and meat marketing is properly organized, because the stock farmer's share of the retail price in those countries is two or three times larger.

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<sup>20/</sup> Alfonso Reina C., La industria de la carne en México, 1958.

## 2. Milk products

The marketing and processing of milk and milk products also present a series of problems, of which the main aspects will be dealt with here.

Small producers usually deliver milk on the farm itself in containers of 20 to 30 litres to processing firms or to collecting suppliers, who transport the milk by tank truck, railway or lorry. In some cases the milk is taken to a neighbouring market by pack animals. Milk producers near the large consumer centres usually transport the milk to the consumer market or to the processing plant, and many provide bottled milk of the certified or pasteurized type.

During the assembling, collection and transport of milk there is wastage and loss, the latter due particularly to acid fermentation of milk and a rise in the bacteriological count.

In the Mexican markets, various types of liquid milk are distributed. Leche preferente is top grade, supplied by producers' associations in accordance with the provisions of, and subject to sanitary inspection by, the Ministry of Health, and destined mainly for the Federal District. Certified or pasteurized milk is regarded as second grade and is distributed by large enterprises and by co-operatives of small producers; in the Federal District and other large centres, most milk for direct consumption is of this type. In addition, reconstituted milk is distributed among the poorest sectors of the population. Lastly, there is a black market in milk that is neither pasteurized or otherwise processed and is more exposed than any other type of milk to adulteration by watering or the addition of other substances; the consumption of such milk in the Federal District in 1958 was estimated at 40 million litres, i.e., about 10 per cent of the total consumption in the District.

Processing plant activity has increased steadily. In 1958, the six milk powder plants stepped up production by about 12 per cent compared with the previous year, and there was a 5-per-cent increase in the plants producing tinned milk (condensed and evaporated). Butter and cheese plants also expanded output, by 6 and 10 per cent respectively. <sup>21/</sup>

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<sup>21/</sup> Data provided by the FAO technical assistance mission in Mexico.

Marketing of milk and milk products is carried on with a rather small number of middlemen. This is probably because, in many cases, producers join to form co-operative or distributing agencies. Moreover, the producers themselves often treat and process milk and milk products.

## VII. FOREIGN TRADE IN LIVESTOCK PRODUCTS

### 1. Exports

Mexico is a net exporter of meat, mainly in the form of cattle on the hoof, <sup>22/</sup> of which it is the second largest exporter in Latin America, coming next to Argentina. Table 6 shows an interruption in the exports of cattle on the hoof prior to 1951, because of the outbreak of foot-and-mouth disease at the end of 1946; the appreciable drop recorded in 1954 was also due to the same cause, since the United States, as stated above, again closed its frontiers as soon as it learned of the second outbreak. It can be seen that, as from 1957, foreign sales of cattle on the hoof have risen significantly, although without reaching the high figure of 587,000 cattle exported in 1943.

Changes in the volume of meat exports are largely dependent on trade in cattle; there was a noticeable increase in meat exports when exports of cattle on the hoof were suspended, and vice versa. However, in 1958 there was a marked expansion in exports of both products because of heavier demand and better prices in the United States market. Exports subsequently fell off in 1959 and 1960. The increase was recorded more particularly in chilled and frozen meat, for which Mexico has a good market in the United States, although it also exports on a smaller scale to Central America, Chile and Europe.

As cattle and meat exports constitute an important source of dollars <sup>23/</sup> for Mexico, the Government is sponsoring and promoting greater development

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<sup>22/</sup> Mainly cattle between 10 and 12 months old, with an average weight of 170 to 200 kilogrammes, destined for fattening in the south of the United States.

<sup>23/</sup> In the three-year period 1955-57, the value of exports of cattle, meat and hides to the United States rose to an annual average of 17.4 million dollars, (217.5 million pesos).

Table 6

MEXICO: EXPORTS OF BEEF CATTLE ON THE HOOF AND CARCASSES, 1948-59

Year	On the hoof (Thousands of head)	Carcasses <sup>a/</sup> (Thousands of tons)
1948	-	43.0
1949	-	51.0
1950	-	45.6
1951	-	4.9
1952	123 517	4.7
1953	134 595	12.6
1954	4 645	13.8
1955	243 434	8.7
1956	110 821	7.5
1957	350 540	7.6
1958	490 607	30.0
1959	374 000	21.5

Source: ECLA estimates for the figures of exports of cattle on the hoof; trade yearbooks for meat.

a/ Not including horsemeat and unspecified meats, or offal.

/of livestock

of livestock production, with the aim of doubling supplies for export within the next few years. The plan for expanding livestock production will concentrate first on Yucatan, Campeche and Quintana Roo, where there is a livestock potential that can easily be exploited. In addition, a vast livestock campaign will be waged in the State of Veracruz as part of the national programme of livestock development. The general programme envisages an extension of artificial pastures and better management of pastures; the organization and extension of cattle-fattening activities; an increase in the number of meat-packing plants - mainly in actual production centres, so as to ensure a greater share of the profits for the producers - with the aim of reducing exports of cattle on the hoof and increasing meat exports; and finally, more vigorous and effective aid to producers in the way of credit and technical assistance.

## 2. Imports

It can be seen from table 8 that Mexican imports of livestock products amounted to 115 million pesos in 1957, 70 million in 1958 and 80 million in 1959. Over half these amounts was for imports of breeding animals to improve strains, mainly cattle, in the first two years and a little less than half in the third; next in importance came foreign purchases of dairy products - principally milk powder, - and last came meat and meat products, among which the largest amount was for offals and ham (see tables 7 and 8). The higher figure for imports in 1957 was due to the increased purchases of selected cattle from the United States, which is also the main supplier of the meat products and preserved milk imported by Mexico.

The tariff structure and trade policy are clearly protectionist. Except for breeding animals, all livestock and livestock products are subject to both specific and ad valorem duties. The latter are particularly high for imports of meat products, preserved milk and cheeses. The import of livestock for food is prohibited, and in most cases prior authorization and registration by the Ministry of Economic Affairs and the Ministry of Health and Welfare are required for the importation of all other types of livestock.

Table 7  
MEXICO: IMPORTS OF LIVESTOCK PRODUCTS, 1957-59

Item	Product	1957		1958		1959		General import tariff			
		Quan- tity	Thou- sand of pesos	Quan- tity	Thou- sand of pesos	Quan- tity	Thou- sand of pesos	Unit	Duty		Official price
									Spe- cific	Ad- Valorem (percent- age)	
<u>Livestock for breeding</u>											
011-00-00	Goats	425	52	325	47	234	77	Head	Exempt	-	a/
011-01-00	Sheep	455	318	1 262	645	1 174	529	Head	Exempt	-	a/
011-02-00	Pigs	1 078	1 037	48	27	8 272	3 687	Head	Exempt	-	a/
011-03-00	Cattle	23 172	63 080	5 950	22 134	5 463	18 860	Head	Exempt	-	a/
011-03-01	Milk cows	8 833	13 213	2 764	12 850	3 259	13 213	Head	Exempt	-	a/
<u>Livestock for food b/</u>											
011-00-01	Goats	-	-	1	-	-	-	Head	+2.00	13	80.00
011-01-01	Sheep	4	1	3	-	152	2	Head	+2.00	13	80.00
011-02-01	Pigs	34	2	1	-	2	1	Head	Exempt	13	200.00
011-03-02	Cattle	13	45	2	-	-	-	Head	Exempt	13	220.00
<u>Meat and meat preparations</u>											
020-01-00	Goat-meat, fresh or chilled	1	10	-	-	-	-	G.K.	+0.10	13	a/
020-02-00	Mutton, fresh or chilled	1	8	-	-	-	-	G.K.	+0.10	13	a/
020-03-00	Pork, fresh or chilled	-	-	-	-	42	236	G.K.	+0.10	13	a/
020-04-00	Beef, fresh or chilled	1	11	1	14	15	137	G.K.	+0.10	13	a/
020-04-01	Beef, frozen	1	11	1	7	1	7	G.K.	+0.05	13	a/
020-99-02	Animal offals: entrails, organs, waste, parings, etc.	1 284	4 691	988	2 968	2 890	8 760	N.K.	0.20	-	a/
021-00-00	Ham, cooked or uncooked, not in airtight containers	5	73	10	205	1	21	N.K.	+1.00	40	17.00
021-00-01	Meat sausages, not in airtight containers	16	310	17	334	5	94	N.K.	+1.00	40	20.00
021-00-98	Foods containing meat, not in airtight containers	2	38	5	70	2	12	N.K.	+1.50	45	11.50
021-00-99	Meat smoked, cooked, salted or in brine, not in airtight containers, n.e.s.	5	44	1	6	1	5	N.K.	+0.30	35	15.50
022-00-01	Preserved beef or veal foods, whether or not including vegetables in whatever proportion, in airtight containers	37	318	32	264	72	498	N.K.	+1.50	45	11.50
022-00-02	Ham, cooked or uncooked, in airtight containers	121	2 365	96	2 209	106	2 287	N.K.	+1.00	40	22.00
022-00-03	Sausages in airtight containers	30	538	32	654	22	431	N.K.	+1.00	40	20.00
022-00-04	Bacon in airtight containers	2	41	10	188	6	73	N.K.	+0.40	25	15.00
022-00-97	Foods containing meat, in airtight containers	19	136	23	240	70	618	N.K.	+1.50	45	11.50
022-00-98	Meat smoked, cooked, salted or in brine, not in airtight containers, n.e.s.	2	18	1	12	6	61	N.K.	+1.50	45	11.50
<u>Milk products</u>											
030-00-00	Milk, fresh, not in airtight containers	98	361	51	155	69	186	G.K.	+0.05	1	3.00
030-00-01	Milk, fresh, in airtight containers	-	-	-	-	1	2	G.K.	+0.50	35	3.50
030-00-02	Condensed milk	3	14	-	-	-	-	G.K.	+0.15	35	10.50
030-00-03	Evaporated milk	40	116	51	164	58	185	G.K.	+0.50	35	3.50
030-00-04	Milk in powder or block form weighing less than 5 kg including container	537	5 113	216	1 776	732	4 523	N.K.	+0.60	30	12.00
030-00-05	Milk in powder or block form weighing more than 5 kg including container and with a fat content of up to 3 per cent	6 162	18 090	7 495	20 525	8 747	22 003	N.K.	+0.40	15	5.60
030-00-06	Milk in powder or block form weighing more than 5 kg including container and with a fat content of over 3 per cent	21	82	34	142	25	91	N.K.	+0.40	15	10.00
030-01-00	Butter	45	720	54	753	14	218	-	-	-	-
030-01-01	Butter substitutes (margarines and oleomargarines), whether or not with milk added	1	21	1	34	1	15	N.K.	+0.80	25	16.00
030-02-00	Cheese and curd of all types	410	4 432	376	4 144	294	3 760	N.K.	+2.00	50	14.00

Source: Foreign trade yearbooks.

a/ No basic official price. b/ Importation prohibited.

Table 8

## MEXICO: VALUE OF IMPORTS OF LIVESTOCK PRODUCTS, 1957-59.

	1957		1958		1959	
	Value (thousands of pesos)	Per- cent- age of total	Value (thousands of pesos)	Per- cent- age of total	Value (thousands of pesos)	Per- cent age of total
Breeding cattle	77 700	67	35 703	51	36 366	45
Dairy products	28 907	25	27 659	39	30 968	39
Meat products	8 669	8	7 171	10	13 240	16
<u>Total</u>	<u>115 276</u>	<u>100</u>	<u>70 533</u>	<u>100</u>	<u>80 574</u>	<u>100</u>

Source: Table 7

## VIII. FOOD SUPPLIES

1. Meat

As a result of the first outbreak of foot-and-mouth disease there was an appreciable drop in meat supplies in 1950 and 1951. Except for 1953, there has been a steady increase in supplies since 1952. As a result consumption has risen and the volume of exports expanded, especially in the last few years. In practice meat consumption in Mexico depends on national production, since the volume of imports is very small and consists mainly of special types of prepared meats (see table 9).

Although there has been a marked improvement in total meat supplies, table 10 shows that this has been only just sufficient to meet the greater demand caused by population increase; indeed, per capita consumption remained more or less stable between 1948 and 1956 at about 17 kilogrammes. In 1957 and 1958, there was a considerable increase (20 per cent) in the supplies available for per capita consumption because of an expansion in beef production. As a general observation, it may be said that for many years there has been little change in the per capita consumption of pork, mutton and goat-meat, except of course in 1950 and 1951.

With respect to the composition of consumption, beef and veal account for almost three quarters (73-74 per cent), pork for 21-22 per cent and mutton, lamb and goat-meat for the remaining 5 per cent.

Per capita consumption of meat is notoriously low, amounting to less than a fifth of that in Uruguay and Argentina, and is far below the recommendable nutritional level (35-40 kilogrammes a year). Clearly the average consumption of 20 kilogrammes does not reflect the actual degree of under-consumption, since the highest levels are recorded in the Federal District and in the large towns, where higher incomes and better distribution facilities encourage effective demand, although a large sector of the population in these towns does not eat meat regularly because their purchasing power is too low.

Consumption levels in the rural areas are very low; this can be gathered from the data in table 11, which, although not very representative, give some idea of the situation. They show that these levels vary widely,

Table 9

MEXICO: ESTIMATED MEAT CONSUMPTION, IN TERMS OF  
CARCASS MEAT, 1948-58

(Thousands of tons)

Year	Production <u>a/</u>	Exports <u>b/</u>	Imports	Estimated consumption <u>c/</u>
1948	465	43.0	0.4	422.4
1949	469	51.0	0.3	418.3
1950	351	45.6	0.4	305.8
1951	396	4.9	0.7	391.8
1952	505	19.5	0.9	486.4
1953	497	28.8	1.2	469.4
1954	508	14.6	0.9	494.3
1955	532	37.9	0.8	494.9
1956	564	20.8	1.3	541.9
1957	695	49.7	1.5	646.8
1958	754	88.9	1.2	666.3

Sources: Tables 2, 6 and 7, and foreign trade yearbooks.

a/ Estimated from official slaughterhouse records and figures reported for in situ slaughtering, added to the meat equivalent of exports of livestock on the hoof.

b/ For beef cattle on the hoof the average meat yield per animal is estimated as 120 kilogrammes.

c/ Production minus exports and plus imports.

Table 10

MEXICO: PER CAPITA MEAT CONSUMPTION, 1948-58 a/  
(Kilogrammes)

Year	Beef	Pork	Goat-flesh	Mutton	Total
1948	12.3	3.9	0.6	0.4	17.2
1949	11.6	3.9	0.5	0.6	16.6
1950	7.9	2.4	0.8	0.7	11.8
1951	11.9	1.9	0.4	0.4	14.6
1952	13.0	3.8	0.5	0.4	17.7
1953	11.6	3.9	0.7	0.5	16.7
1954	11.9	4.0	0.7	0.5	17.1
1955	11.5	4.0	0.7	0.5	16.7
1956	12.6	4.1	0.6	0.5	17.8
1957	15.2	4.2	0.6	0.5	20.5
1958	15.3	4.3	0.6	0.5	20.7

Source: Table 3.

a/ Not including the small consumption of imported meats, since its inclusion would not appreciably affect the total per capita consumption figures.

Table 11

MEXICO: DAILY PER CAPITA CONSUMPTION OF MEAT AND  
DAIRY PRODUCTS IN SELECTED RURAL AREAS, 1959

(Grammes)

Area	Meat	Milk	Eggs	Economic classification <u>a/</u>
Tabasco	113.0	19.0	13.0	B
Guerrero	75.0	100.0 <u>b/</u>	2.0	B
Distrito Federal <u>c/</u>	56.0	215.0	7.0	B
Yucatán	40.0	5.0	2.0	C
San Luis Potosí	37.0	217.0 <u>b/</u>	4.0	C
Tlaxcala	26.8	10.0	6.0	B
Mexico	23.5	17.5	3.5	C
Guerrero	17.5	38.0	2.0	C

Source: Mexican Nutrition Institute.

a/ Economic classification B represents a higher income level than C.

b/ Including consumption of cheese in terms of fluid milk.

c/ Semi-urban zone.

/the highest

the highest being in the areas where cattle are fattened (Tabasco and Guerrero) and the lowest in the high plateaux and the breeding and dairy cattle areas (México, Guanajuato, etc). Average annual per capita consumption among the rural population appears to be about 15 kilogrammes.<sup>24/</sup>

## 2. Milk products

The rapid growth both in population and income, especially in the large towns, where consumption levels are low, has led to a great increase in total demand, resulting in a greater per capita supply of milk and milk products. There was in fact an appreciable expansion in the consumption of fresh milk, cheese and milk powder in 1958 compared with the previous year (see table 12). Nevertheless, although Mexico is the third largest producer in Latin America, coming immediately after Argentina and Brazil, per capita consumption is below the estimated average for the region as a whole, <sup>25/</sup> especially with respect to such products as butter and cheese. It should be noted that, as in the case of meat, the levels of per capita consumption vary widely, reflecting the enormous differences in income levels. Thus, in the poorest sectors of the population there is no effective demand because of the complete lack of purchasing power, whereas at the highest income levels the annual per capita consumption of milk is usually over 200 litres.

There are no sufficiently sound or adequate statistics to provide a basis for quantifying the combined effect of income levels and relative prices on the cost and consumption of protective foods such as meat, milk products and eggs. However, it is unquestionably true that, according to the results of the few nutrition surveys conducted in Mexico, <sup>26/</sup> per capita consumption of foods of animal origin is normally higher in families with

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<sup>24/</sup> When the deviation formula was applied to the data in table 11, it was found that, within a 5-per-cent margin of error, annual average consumption per capita could fluctuate between 8 and 20 kilogrammes for meat and between 7 and 50 litres for milk. The data are not representative and are consequently subject to revision.

<sup>25/</sup> For the period 1954-56, total per capita consumption of milk in Mexico was estimated at about 74 litres, compared with an average of 98 litres for Latin America as a whole.

<sup>26/</sup> See table 11.

Table 12

MEXICO: TOTAL AND PER CAPITA CONSUMPTION OF MILK PRODUCTS,  
1957 AND 1958 <sup>a/</sup>

Product	Total (thousands of tons)		Per capita (kilogrammes)	
	1957	1958	1957	1958
Fresh milk	1 960.0	2 109.0	62.40	65.20
Tinned milk	32.8	34.2	1.05	1.06
Milk powder	12.4	14.1	0.40	0.44
Butter	4.8	5.0	0.15	0.15
Cheese	16.7	20.3	0.53	0.63
In terms of whole milk	2 376.0	2 619.0	75.60	81.00

Source: F. Vieira de Sá, FAO technical assistance mission in Mexico.

<sup>a/</sup> Includes goat milk and the net effect of foreign trade.

/higher incomes.

higher incomes. The effect of changes in relative prices is reflected in the replacement of livestock products in the diet not only by other such products but also by products of non-animal origin. This replacement effect can to some extent be deduced from the data in table 11, which show that the level of consumption of a product is higher in areas where, owing to comparative advantages, production is cheaper and relative prices are lower.

## IX. OUTLOOK FOR LIVESTOCK DEVELOPMENT

### 1. Livestock potential

Mexico has abundant natural resources and favourable ecological conditions for diversified large-scale livestock production. Firstly, the area under pasture can be extended by incorporating new lands at present not in use, and it is estimated that the area of pasture land could be increased by at least 30 per cent, which would bring the total area directly available for animal husbandry up to about 90 million hectares. <sup>27/</sup> Secondly, the livestock potential could be markedly enhanced by technical improvement of production to raise the present low level of productivity. There are vast areas given over to grazing on natural pasture which could be transformed into artificial pasture with a higher yield and thus greater carrying capacity. In other place, production could easily be intensified by the use of specialized breeds of milk and beef cattle, and by wider use of supplementary feeding. The normal carrying capacity of pasture could be more than doubled by such means, which would mean that the present livestock acreage could support some 40 million head of cattle. In view of the increase in the livestock population that is practicable and the possibility of increasing livestock productivity per animal and per area unit, it may be concluded that Mexico is very favourably placed for a long-term increase in livestock production.

### 2. Livestock development campaigns

It is clear from the above remarks and from the observations made throughout the present study that much remains to be done in Mexico in the

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<sup>27/</sup> Estimates by the Department of Agriculture and Livestock, September 1959.

way of livestock development. Apart from the dairy industry in certain areas, the livestock sector has not yet benefited from modern production techniques, and this applies particularly to animal husbandry in the North. Although the Department of Agriculture has provided valuable assistance to producers through extension and technical assistance campaigns, it is clear that a more integrated form of guidance is needed. Often the Government and the stock farmers agree on new methods of improvement, but there is a lack of planning and co-ordination in carrying out the various stages of the programme. Mexico needs a structural programme for livestock development for the proper channelling of effort in exploiting existing resources and for the elimination of the main obstacles to development. From this standpoint, the encouragement of technical advances at the farm and marketing level should be accompanied by an adequate official policy of price control and livestock credit, which would in turn promote a steady and more rapid rate of investment.