



United States  
Department  
of Agriculture

LDP-M-206-01

August 2011



A Report from the Economic Research Service

[www.ers.usda.gov](http://www.ers.usda.gov)

# Trade, the Expanding Mexican Beef Industry, and Feedlot and Stocker Cattle Production in Mexico

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## Abstract

Cattle raised for export in Mexico represent, on average, over half of total U.S. cattle imports, as the United States has the comparative advantage in feeding cattle. In turn, Mexico imports the largest quantities of U.S. beef and beef products of all U.S. beef trading partners to satisfy the increasing demand for beef, including higher quality feedlot-finished beef. The authors describe the production systems and stocker and feedlot production practices commonly employed in Mexico, including regional factors like production parameters, cattle marketing, and sourcing practices. Changes in consumer demand and continued population and economic growth support the potential for increased fed beef demand in Mexico. As a result of increased fed beef production, feed demand from other livestock industries, competition from crop production for land and water to produce feed and forage, and international competition for inputs, the Mexican beef industry will face tremendous challenges in the coming decades.

**Keywords:** Cattle, Mexico, beef production, feedlot, stocker

Approved by USDA's  
World Agricultural  
Outlook Board

## **Acknowledgments**

We owe much to the reviewers who took their time to provide us with helpful comments and insights. Thanks to Economic Research Service reviewers Don Blayney and Keithly Jones, Foreign Agricultural Service reviewers Claire Mezoughem and Zaida San Juan, and New Mexico State University reviewer Rhonda Skaggs. The report was cleared by Shayle Shagam at USDA's World Agricultural Outlook Board. Special thanks also to our editor, Angela Anderson, and layout specialist, Vic Phillips, Jr.

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## Mexican Cattle Production Is Important to the United States

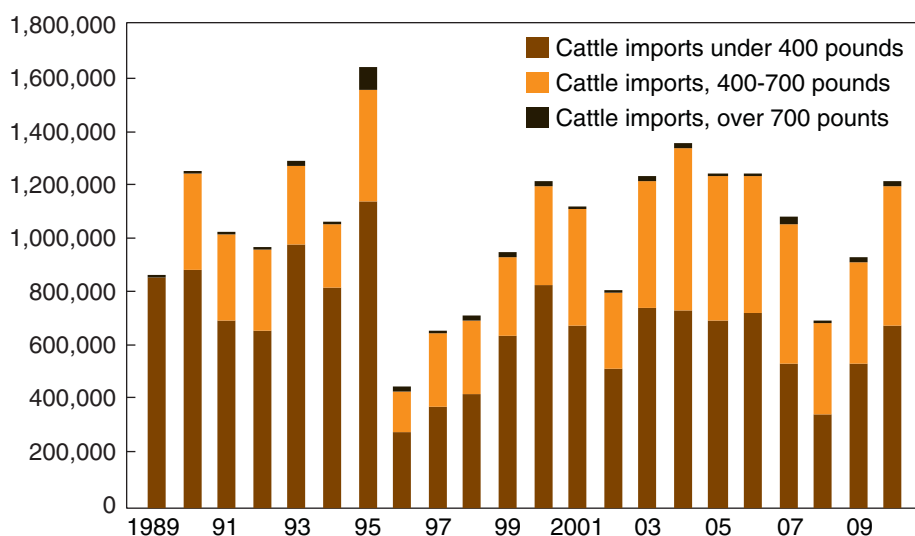
Mexico offers extensive forage resources, and over half of the 196 million hectares in Mexico are used for livestock production. With a total cattle inventory of over 23 million head in 2007, cattle are the biggest users of forage, but 7 million head of sheep, 4 million head of goats, and 2 million head of equines (including horses, mules, and donkeys) also compete for forage resources. Mexico's cow-calf industry encompasses a wide array of production activities that vary according to a diverse set of economic motivations, political and legal environments, and cultural adaptations (Peel, Johnson, and Mathews, 2010). Cattle production enterprises produce meat, milk, breeding stock, animals for export, animals for work, and animals for recreation, including fighting bulls and rodeo cattle, largely from dual-purpose cows. This diversity of enterprises occurs in climatic conditions ranging from tropical to desert.

Substantial numbers of cattle are imported into the United States from Mexico, as the United States has the comparative advantage in feeding cattle. Mexican cattle raised for export represent, on average, over half of total U.S. cattle imports. From 1989 to 2010, these imports averaged over 1 million head annually (fig. 1). Imported cattle from Mexico are steers and heifers intended for stockering and/or feeding in U.S. feedlots. They primarily originate from the northern Mexican States (fig. 2) where cattle are predominantly

Figure 1

### Total imports of Mexican cattle into the United States, 1989-2010

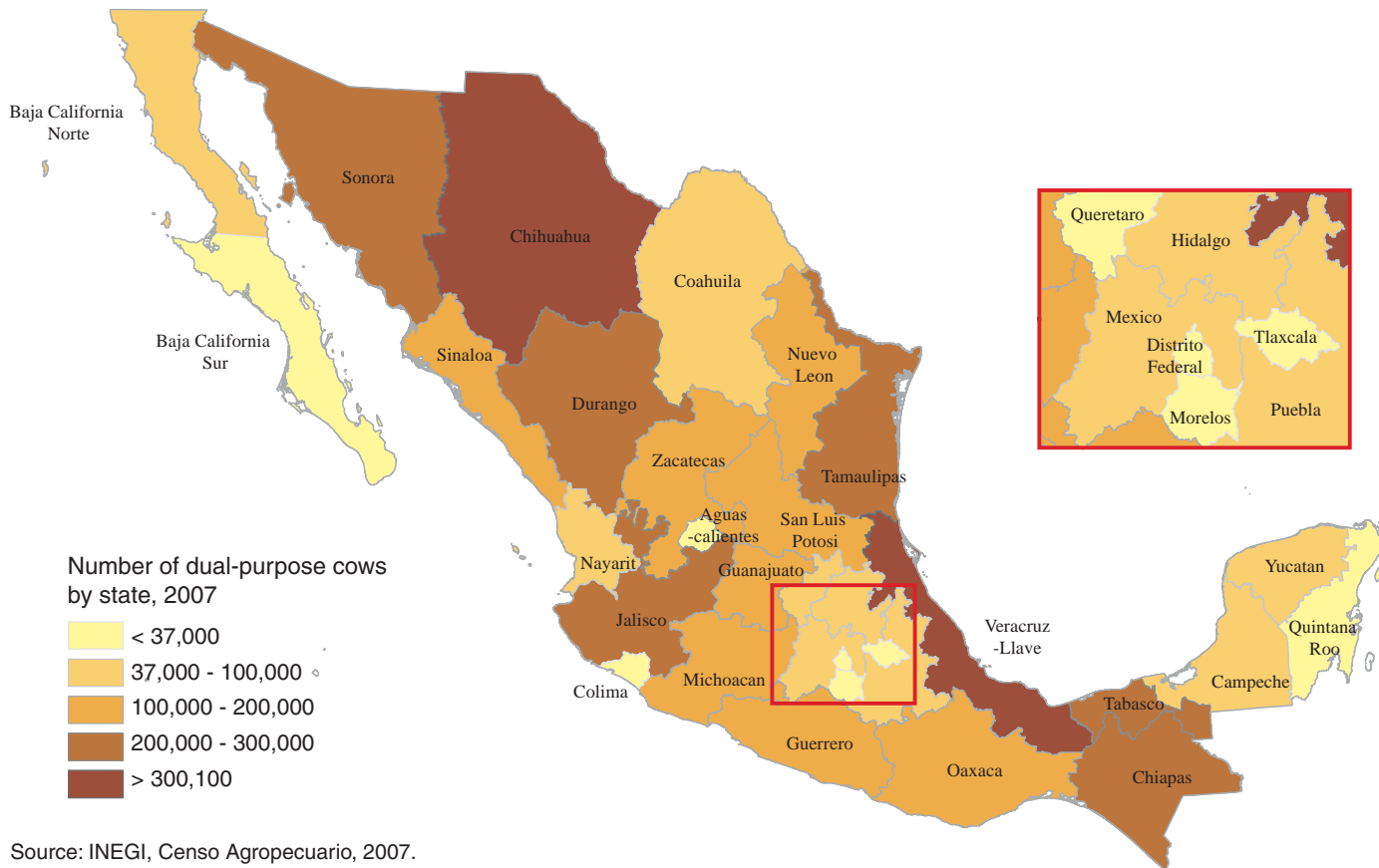
Total imports



Source: USDA, Economic Research Service.

Figure 2

**Cattle are not uniformly distributed among Mexican States**



Continental or British<sup>1</sup> breeds and where there is a greater emphasis placed on breeding and genetic improvement to raise cattle suitable for export.

Most of the Mexican cattle imported into the United States are lightweight, weighing less than 400 pounds. Although the lightweight share of cattle imported from Mexico has decreased since 1989, nearly 60 percent of all cattle imports fell into this weight group over the last decade. These cattle are ideal for pasture or stocker (backgrounding) programs, where an emphasis is placed on animal growth and, through the use of harvested or grazed forages, producers can realize relatively low-cost weight gains. Cattle weighing between 400 and 700 pounds may also be stockered or immediately placed in feedlots. Only a small number of cattle imported from Mexico weigh over 700 pounds (see fig. 1), and an insignificant portion of these cattle are for immediate slaughter. Unspayed dairy cattle, especially Holstein and Holstein-crossed females, are prohibited from being imported into the United States from Mexico because of concerns about bovine tuberculosis (TB).

<sup>1</sup>Continental and British breeds are two categories of *Bos taurus* breeds of cattle. While both categories originated in Europe, the British breeds, specifically originating from the British Isles, are smaller in size, mature early, and have increased fleshing and marbling ability. The larger Continental breeds are leaner, more muscular, and, as with the British breeds, vary in adaptability to hot climates.

## Rising Beef Consumption in Mexico Drives Shifts in Market Structure and Trade Growth

Despite the effects of the global recession that began in 2008, Mexico's rapidly changing domestic consumer preferences and increasing population have fueled dynamic changes in its beef industry. Increasingly, access to international markets and a growing global beef trade provided some impetus for change, however, population and general economic growth in Mexico prompted the most significant changes in the quantity and quality of meat demanded. Food demand continues to grow rapidly, and meat is gaining an increasing share of the demand for dietary protein.

In 2009, per capita consumption of meats and poultry in Mexico consisted of 39 pounds of beef, 35 pounds of pork, and 65 pounds of broiler meat (USDA, FAS, 2009). Although small compared with U.S. consumption (89 pounds of beef, 64 pounds of pork, and 94 pounds of broiler meat), in the last decade (2000-09), Mexico's per capita consumption grew by more than 10 percent in all major meat categories.

Consumer tastes and preferences for different types of meat are also changing, with demand for fed beef in Mexico growing relative to traditionally produced grass-fed beef.<sup>2</sup> These changes have significant implications for producer selection of feeder cattle production systems and, subsequently, total beef production in Mexico. As more cattle are raised using semi-intensive and intensive feeder cattle production systems,<sup>3</sup> not only will the number of cattle suitable for export into the U.S. stocker and feeder cattle market increase, but more cattle will likely be slaughtered in Mexico to meet growing consumer demand. Mexico's need for improved market infrastructure and marketing practices, however, is also evident in the expanding Mexican beef sector as beef production competes with grains and alternative meat production systems for resources.

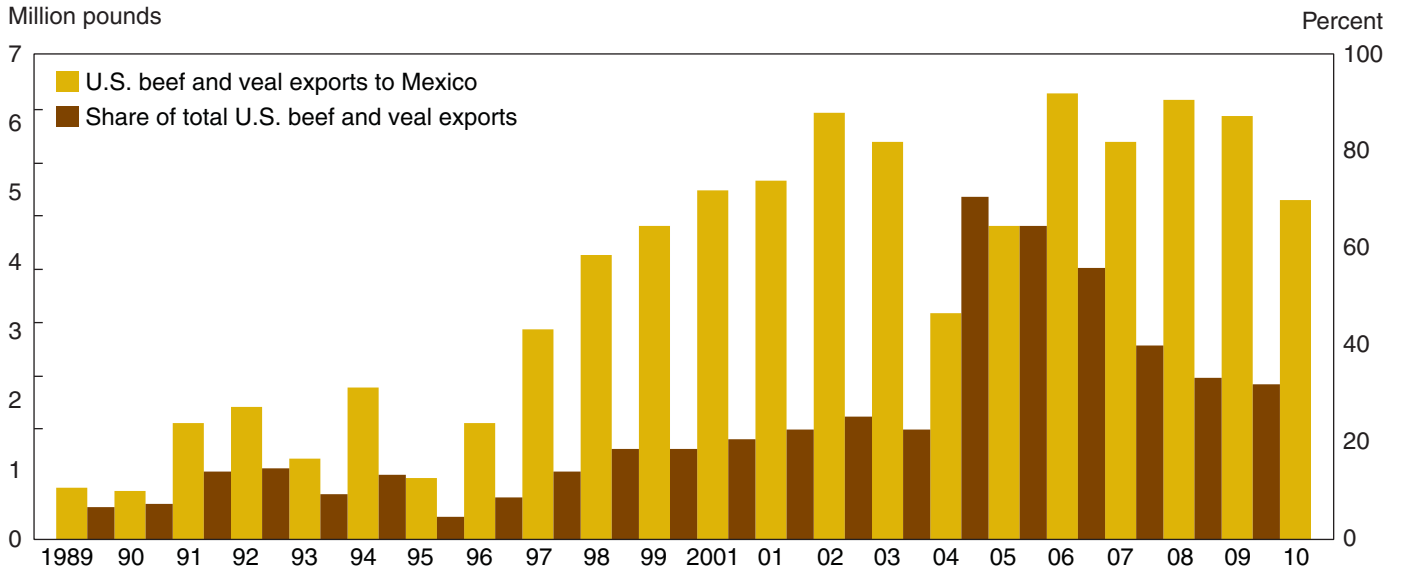
While Mexican consumers currently prefer a leaner product than U.S. consumers, rapidly growing demand and increased preferences for higher quality meat in Mexico are being met with a larger share of meat exported to Mexico. Mexico is the largest export market for U.S. beef and beef products (fig. 3). Imported meat fills supply gaps not met by domestic production and also provides an improved product mix relative to consumer demands. In addition to the higher prices Mexican producers can obtain for their cattle in the United States, the increasing demand for higher quality meat may partially explain why Mexican cattle are exported to the United States for finishing. Since the United States has the comparative advantage in feeding cattle, due primarily to lower grain costs, Mexico can more effectively export stocker and feeder cattle to the United States and, in turn, import higher quality beef for domestic use.

<sup>2</sup>For the purposes of this report, "fed cattle" refers to cattle finished on grain rations and is equivalent with the term "grain-fed." Fed cattle in Mexico are generally fed a smaller amount of grain in the ration compared with cattle fed in the United States.

<sup>3</sup>"Semi-intensive" production systems are those in which cattle are not generally confined during the growing or finishing periods. "Intensive" production is used in an environment of close confinement, like backgrounding lots or feedlots.

Figure 3

**Exports of U.S. beef and veal to Mexico, 1989-2010**



Source: USDA, Economic Research Service.

U.S. beef in Mexico is sold primarily in restaurants, hotels, supermarkets, and warehouse clubs. Since 1997, over 5 million pounds, on average, of U.S. beef is exported annually to Mexico. During 2006-10, beef and veal exports to Mexico accounted for 33 percent of total U.S. beef and veal exports, with this share increasing since the 1990s.

## Production of Stocker Cattle in Mexico

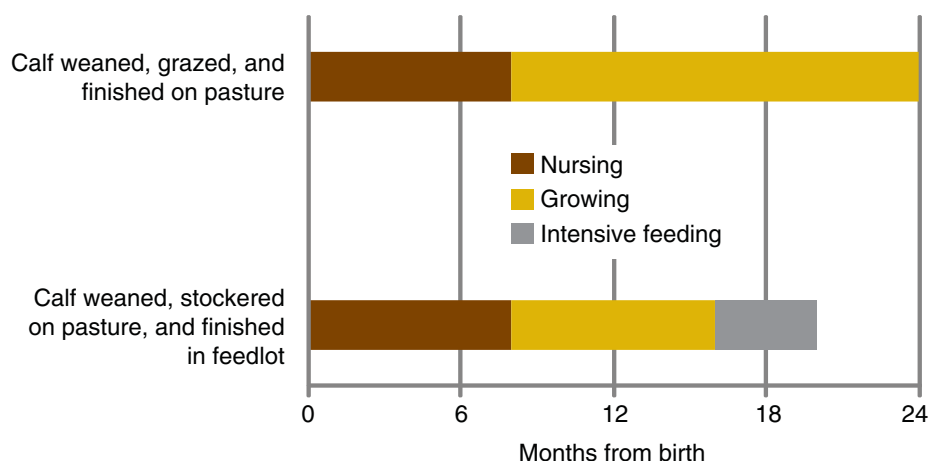
Stocker (or backgrounding) programs are defined as grazing or confined production systems that emphasize animal growth and frame development over fat deposition. Stocker cattle production may occur in a wide variety of production systems, ranging from extensive native pasture grazing to intensive confinement. In the traditional Mexican system, where animals are finished with very little fat deposition prior to slaughter, there is little distinction between backgrounding and finishing. Cattle finished in the feedlot generally experience a shorter production period (fig. 4). In Mexico, the most common extensive stocker systems are native pasture grazing, mostly in tropical and temperate areas. More intensive systems include supplementation on pasture, grazing on high-quality irrigated or improved temperate pastures, and confined backgrounding programs.

Until the last decade, stocker production was a mostly nonexistent or at least an unrecognized part of the Mexican beef cattle industry. Historically, calves in the north were exported at weaning, and those not exported joined other cattle as part of the domestic focus on grass-finished cattle. In the traditional pasture finishing system, stocker production is usually an indistinct part of the finishing program. Calves may also be kept for post-weaning development in conjunction with cow-calf operations, but stocker production has typically not been recognized as a separate production enterprise.

As the Mexican beef industry evolves, stocker production will likely become a more distinguishable segment of the industry for two reasons. First, in the north, producers of export calves are increasingly aware of the value of selling heavier cattle. Some calves previously sold at weaning in the fall are now retained on high-quality winter pasture until spring. This process allows for additional weight gain, plus the ability to sell cattle at seasonal price peaks in the spring. The increase in feedlot production also implies an increase in stocker programs. Since the average weaning weight of Mexican

Figure 4

### Production timelines for cattle finished on native pasture versus feedlot



Source: USDA, Economic Research Service.

calves is roughly 375 pounds (170 kg), it is usually necessary to add 175-265 pounds (80-120 kg) of weight (growth) before cattle are finished in feedlots.

Stocker programs are more than a production process; they also serve an important economic role. Inexpensive forage-based weight gains during the stocker phase are a critical component of the overall efficiency and cost competitiveness of the industry, and these gains are even more critical when relatively expensive grain is used to finish animals. Increased stocker production in Mexico also implies a decrease in export supplies of cattle ideal for the stocker enterprise in the United States. If weights of imported cattle increase, these cattle will be more likely to enter U.S. feedlots directly. Extended stocker programs could also affect total Mexican cattle inventories, although just how is not clear.



## Dynamics and Development of the Mexican Feedlot Industry

Development of the feeding industry in Mexico differs markedly by region. These differences are a function of variations in regional markets, meat preferences, cattle sources, feed availability, competing agricultural activities, and impacts of international trade. In much of Mexico, market preferences for fed beef appear to be increasing rapidly and support increased feeding in areas like the Huasteca and Guadalajara. Reduced cattle supplies and increased competition from the United States, however, have caused some stagnation in the growth of feeding in some traditional feeding areas, including Monterrey, Torreon, and Sonora. In areas like Torreon and Sonora, the development of other agricultural industries, such as dairy, pork, and poultry, creates additional competitive pressures. Producers in these regions have responded by switching to different cattle sources, feed resources, and/or target markets.

Without official data on the Mexican feedlot industry, it is challenging to determine its current status and the rate at which change occurs in the industry. Drought-reduced cattle inventories, increased heifer retention to rebuild cow herds, and rising cattle exports have, at present, reduced feeder cattle supplies. While some areas are increasing feeder cattle numbers, other areas appear to have an excess.

Total fed cattle production depends on feedlot capacity, percent utilization, and the rate of turnover. The rate of turnover depends on the length of the feeding period and the general intensity of feeding operations. Potential turnover rates vary from about 2.5 times per year for feedlots with long feeding periods (130-150 days) to 3 or more times per year for feedlots with shorter feeding periods (90-120 days). The average turnover for the Mexican feeding industry is likely closer to 2.5 times per year. Total productive capability in the industry is not known with certainty, though feedlot production of roughly 2 million head per year is feasible if capacity and turnover rates are fully utilized. The industry appears to be working at 65-75 percent of capacity and, with an annual turnover rate of 2.5 times, is probably producing 1.25 to 1.5 million head per year (table 1).

The shift from grass-fed beef to grain-fed beef in Mexico has major implications for the overall levels of beef production necessary to meet both changing consumer preferences and increased total demand for meat. Domestic production is limited by forage availability for the cow herd, which is currently dominated by production systems that finish beef on pastures. A general increase in more intensive stocker and finishing systems will release forage resources for increased cow-calf production.

Table 1

**Approximate feedlot capacity, 2011**

<b>Region</b>	<b>Head</b>
Mexicali, Baja California	120,000
Sonora	100,000
Comarca Lagunera	60,000
Monterrey, Nuevo Leon	125,000
Tampico/Huasteca	35,000
Culiacan, Sinaloa	90,000
Guadalajara, Jalisco	190,000
Other	60,000
Total	780,000

Source: Author estimates based on industry sources.

## Feeder Cattle Production Systems

Growing consumer demand for meat and rapidly changing consumer preferences for high-quality meat drive the expansion of semi-intensive and intensive cattle production systems in Mexico, particularly in southern Mexican States. Historically, a large percentage of beef in Mexico came from cattle finished on pastures in extensive production systems. Cattle in these extensive systems require 2-3 grazing seasons to reach slaughter weight, and are 3-4 years of age at slaughter. Meat characteristics of grass-fattened animals include a more distinctive meat flavor, a different appearance (yellow fat and darker meat), and a coarser texture (due to older age). A recent survey of seven Mexican packing plants found yellow fat in 13 percent of carcasses (Mendez et al., 2009).

Mexican consumers now prefer lean meat with minimal fat that is white, brighter in color, and has a smoother, more tender texture; such changes in preferences may vary regionally or be more prevalent in urban areas. To achieve the desired results, animals must be intensively fed for a minimal period of time before slaughter to ensure white fat. More intensive production generally results in younger animals at slaughter with brighter meat color and smoother meat texture.

There are two semi-intensive production systems: 1) animals are finished for 70-110 days in confined feeding operations, and 2) animals are finished using high-quality forage and/or supplemental grazing. These systems typically reduce age at slaughter (by 6 to 12 months) to 18-30 months, on average.

In limited instances, cattle may be backgrounded with high quality forage/supplementation, followed by a feedlot finishing period, or by placing animals in feedlots at lighter weights (and younger age), feeding them longer (130-180 days) and finishing at 13 to 18 months of age. These animals produce very lean carcasses with white fat or, in specific situations, a higher level of fat and marbling. When these animals are slaughtered at the youngest average age, they produce meat of a quality similar to U.S. fed beef.

The implications of increased production intensity reach far beyond the characteristics of the meat. Increased beef production intensity has significant implications for the total level of production possible in the system for two reasons. First, intensive and semi-intensive cattle finishing systems reduce the age at slaughter by at least 1 year, compared with grass-finished cattle, releasing forage for other uses. Second, fed beef production implies at least limited use of concentrate feeds, which are directly substituted for forage. Thus, some fixed forage base, now augmented by use of nonforage feeds, has more total production potential than if a forage-only production system is used. As a result, total beef production potential is increased by using more intensive production systems.

## Feedlot Production Practices in Mexico

In Mexico, the majority of animals are placed in feedlots at 528-616 pounds (240-280 kg). In some cases, animals may be placed lighter, as low as 440 pounds (200 kg). Heifers will generally be placed at lighter weights, from 506 to 572 pounds (230-260 kg), while males are generally placed at 550-616 pounds (250-280 kg) but can be placed as high as 660 pounds (300 kg). In a few instances, heifers are placed at up to 700 pounds (350 kg) and bulls at up to 900 pounds (450 kg). In general, cattle are placed heavier and fed for shorter duration in southern areas compared with the north.

Most animals remain on feed for 90-120 days, or occasionally are fed as few as 45 days or as many as 180 days. The length of the feeding period is affected by many factors, including the sex of the animal, the target market, the type of ration fed, and the focus of feedlot management.

Finished cattle weights are generally in the range of 880-990 lbs (400-450 kg). Chilled carcass weights average between 484 and 748 lbs (220-340 kg) (Mendez et al., 2009). Male animals occasionally approach 1,100 lbs (500 kg) and in rare instances up to 1,210 lbs (550 kg). Mexican market preferences are for lean meat with very little external fat. Mendez et al. (2009) reported that 90 percent of carcasses had subcutaneous fat depths of 0.4 inch (1 cm) or less. Finished cattle weights are generally in the range of 880-990 lbs (400-450 kg). Chilled carcass weights average between 484 and 748 lbs (220-340 kg) (Mendez et al., 2009). Male animals occasionally approach 1,100 lbs (500 kg) and in rare instances up to 1,210 lbs (550 kg). Mexican market preferences are for lean meat with very little external fat. Marbling is generally not a strong part of market preference and is not required. In a survey of 7 Mexican packing facilities, Mendez et al. (2009) reported that 90 percent of carcasses had subcutaneous fat depths of 0.4 inch (1 cm) or less, and 94 percent of sampled carcasses had marbling scores of 300 or below 4. Their findings also uncovered distinct differences in consumer preferences in northern markets compared with the remainder of the country, as carcass yield-related traits of northern cattle fattened in feedlots consistently outperformed pasture-finished cattle.

Cattle in feedlots generally gain approximately 2.2-3.3 pounds (1-1.5 kg) per day, with most gains falling between 2.4 and 2.9 pounds (1.1-1.3 kg) per day. In some cases, optimal combinations of genetics, management, and feed quality can result in gains up to 4 pounds (1.8 kg) per day. Feed rations vary widely, and thus, feed conversions similarly vary over a wide range, from 14.3 to 20.9 pounds (6.5-9.5 kg) of feed on a dry-matter basis per pound of gain. Most feedlots average 15.4-17.6 pounds (7-8 kg) on a dry matter basis. Dressing percentages vary from 58 to 63 percent, with most at 59-61 percent.

### *Rations and Feeding Practices*

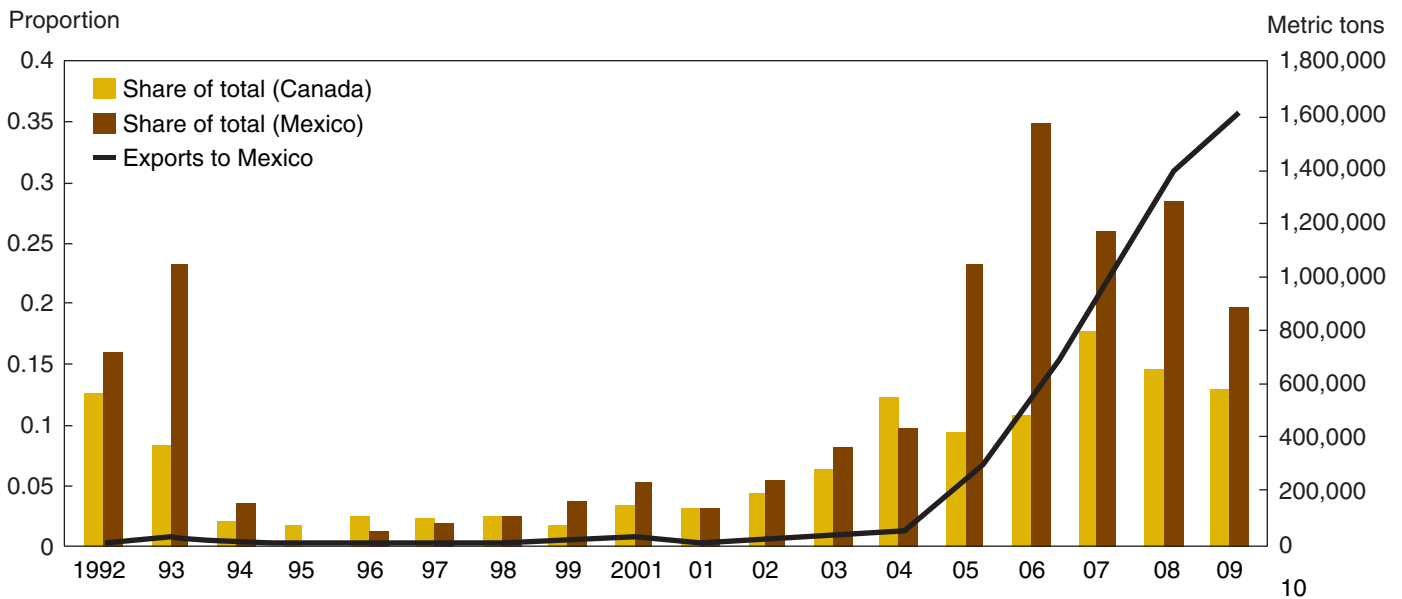
Feeding management varies considerably across operations. Some operations utilize carefully balanced rations and regular quality testing of feed ingredients, combined with careful feeding and bunk management practices. Other operations use more generalized feed formulations and less precise feed management practices. Feed grains are occasionally rolled or steam flaked,

but more often are ground or cracked. Use of variable forage sources, food residuals, and byproduct feeds increases the challenge of providing consistent, balanced rations. Crop production patterns and hot-weather effects cause variations in the seasonal quantity and quality of feed ingredients, increasing the feedlot management challenge.

Most feedlots use a cattle feeding regime that begins with a receiving ration and gradually increases in intensity through three or four stages, while others increase feeding intensity slowly. Feedlot rations can be generalized as principal energy, forage, protein, fat, molasses, and premix.

*Principal Energy*—Historically, grain sorghum has been the principal feed grain in Mexico. White and yellow corn are both used (and favored) in some regions, while wheat is used predominantly in other areas. Production and use of yellow corn in Mexico has increased dramatically in recent years (Mejia and Peel, 2009). Silage is also used in some instances. In some cases, residual food products, such as bread, tortillas, and snack chips, are important energy sources. If available, industrial byproducts, such as brewer’s grains, wheat middlings, rice millings, and fiber residual from sugar cane, are also used. Mexico is the largest importer of dried distillers’ grains with solubles (DDGS) from the United States, and exports of DDGS from the United States to Mexico have increased significantly as U.S. ethanol production has grown (fig. 5). Other byproduct feeds include trash and residual from grain cleaning and cotton ginning. These energy feeds typically make up 50- 80 percent of the ration, with the majority in the range of 60-70 percent.

Figure 5  
**Exports of U.S. dried distillers’ grains with solubles (DDGS) to Mexico and proportions of total DDGS exports to Canada and Mexico, 1992-2009**



Source: USDA, Economic Research Service.

*Forage*—Forage typically accounts for 8-20 percent of feedlot rations on a dry matter basis. Forage varies from fresh or wilted green chop of ryegrass or other improved grass to relatively high-quality hay from sorghum-sudan or cane to lower quality baled corn or grain sorghum stover. Some of the byproducts discussed above (e.g., sugar cane fiber and gin trash) also provide considerable fiber.

*Protein*—Depending on the energy and forage sources used in the ration, more or less additional protein may be necessary. The most common protein source in many areas is cottonseed meal (or occasionally whole cottonseed). Other common protein sources include soybean meal, fish meal, and poultry meal. Canola and sesame meal are used in some cases. Bioprotein sources, such as yeast-derived protein, are used in a small number of instances. Production and use of meat and bone meal from ruminants is restricted because of concerns over bovine spongiform encephalitis (BSE). Poultry litter is used to a limited extent, but is consciously avoided in some areas and by some producers.

*Fat*—Energy in rations is boosted with added fat (3-5 percent) in many cases, primarily from animal fat or a mixture of animal and vegetable fat. Vegetable fat is often preferred due to fear of BSE outbreaks.

*Molasses*—Molasses is used extensively in Mexican feedlot rations (7-12 percent) because it is widely available due to the relatively large Mexican sugar industry. It controls dust created when feed grains are processed by grinding, and it is an important energy source.

*Premix*—In most cases, a premix of vitamins, minerals, and ionophores (feed additive that increases feed efficiency and rate of gain) is used in the ration.

### ***Animal Type, Source, and Management***

Faced with tremendous variability in cattle quality, market preferences, and interaction with the U.S. market, Mexican feedlots vary widely by region. In the north, where many of the high-quality (No. 1 and 1 ½) steers are exported, feedlots are composed of half or more No. 1 to 1 ½ heifers and are supplemented with No. 2 bulls from farther south.<sup>5</sup> Quality of cattle in other feeding areas will vary with equal mixes of No. 2 and lower-quality bulls and heifers to higher proportions of males. In most instances, males are fed as bulls, but some feeding of steers occurs in the north. The majority of irrigated pastures are located in the northwest, allowing for cattle to move to feedlots at a younger age, while feedlot cattle in other parts of the country tend to be somewhat older.

Cattle are sourced from all parts of Mexico, with a large majority of cattle in the northern half of the country either exported or fed in feedlots. Smaller but increasing shares of Gulf Coast and southern cattle are fed in feedlots or finished in semi-intensive supplementation systems on pasture. A limited number of cattle are sourced from Central America,<sup>6</sup> primarily due to disease related issues. Increasingly, cattle are moving from areas farther south in a northward flow to feedlots.

<sup>5</sup>Muscle thickness is the ratio of muscle to bone at a given degree of fatness and is measured in grades. Three muscle thickness grades are currently used, No. 1, No. 2, and No. 3, from thickest to thinnest, respectively.

<sup>6</sup>Cattle sourced from Central America must be in Mexico at least 60 days before they are eligible for export to the United States, according to bovine import protocol set by the USDA, Animal Plant Health Inspection Service (APHIS), [http://www.aphis.usda.gov/import\\_export/animals/live\\_animals.shtml](http://www.aphis.usda.gov/import_export/animals/live_animals.shtml).

## *Animal Health and Disease Management*

Animal health and disease-related issues restrict movement of cattle between Mexico and the United States, as well as between Mexican States and Central America.

*Bovine tuberculosis* (TB) is the primary disease that limits Mexico's access to export markets for cattle. TB is endemic in the country, though reasonably well controlled in most areas. Mexico has supported a Federal TB eradication program since 1971 and, in conjunction with individual States, has made substantial progress, particularly in the northern States, where cattle production often is focused on calves for export. TB remains widespread in concentrated areas of dairy production in the northern States, threatening the status of surrounding beef cattle production areas. In other parts of the country, isolated regions have achieved a TB status that permits cattle exports, but that status is difficult to maintain because of surrounding endemic areas.

*Brucellosis* is currently endemic and widespread in Mexican cattle. Mexico also has a Federal brucellosis eradication program, but it requires greater resources, and implementation has been slow. The prevalence of brucellosis prevents exports of breeding animals, but its biggest impact is on productivity. Brucellosis causes spontaneous abortion in cattle.

*Rabies* in cattle occurs primarily in Mexico's tropical areas, is typically spread through the bites of vampire bats, and causes significant losses, particularly of young animals. In recent years, educational programs have helped producers identify the habitat of vampire bats (as opposed to the various other insectivorous bats in the region) and implement more effective control efforts, sharply decreasing rabies incidence in cattle in some regions.

*Ticks* (various species) are also widespread in cattle across Mexico, but tick loads (tick density on animal) are particularly heavy in tropical areas. Certain species of ticks also cause 'tick fever' (*babesiosis* or 'cattle fever'). Aside from direct disease impacts, heavy tick loads impact productivity. During wet periods, when tick infestations are highest, cattle must be treated every 10-14 days with an acaricide. Acaricide-resistant ticks are increasingly common, leading to greater concern about the effectiveness of current tick control measures (Peel, Johnson, and Mathews, 2010).

Mexican steers and heifers exported to the United States must be:<sup>7</sup>

- Properly identified;
- Retained in the export region for at least 60 days prior to shipment as long as that region remains disease free (i.e., not been quarantined for diseases in Mexico and inspected by an authorized veterinarian);
- Tested for tuberculosis and dipped for ticks prior to export; and
- Spayed (if a heifer), thus removing the ability to reproduce.

<sup>7</sup>USDA, APHIS import protocol for cattle from Mexico can be found at [http://www.aphis.usda.gov/import\\_export/downloads/pro\\_imp\\_bo\\_feeders\\_mx.pdf](http://www.aphis.usda.gov/import_export/downloads/pro_imp_bo_feeders_mx.pdf).

## ***Cattle and Meat Marketing***

In Mexico, cattle are typically purchased for feedlots directly from producers by buyer representatives. Private treaty sales are rarely reported, and there is no system for collecting or corroborating such private sales, especially for feeder cattle. Chihuahua and Sonora are the only States with sizable auction facilities, but they are not used to a great extent by feedlots in other regions. Cattle are usually purchased on a live-weight basis, with the pay weight determined on the truck near the source. Slaughter cattle and carcasses are reported more often, and a Federal price reporting system exists for larger cities.

Carcasses are priced on a pesos/kilogram basis and, increasingly, on a chilled basis. Historically, carcasses were marketed on a hot carcass basis, which in most instances included the hot carcass plus edible viscera (organs). While hot markets still exist, their numbers are dwindling. Differences in carcass price reporting are generally due to whether or not the byproduct drop value is included—the buyer gets only the carcass or gets the carcass plus the offal and hide. Viscera may also be marketed separately. Hides are often marketed separately by the cattle owner. In a small but increasing number of cases, meat is marketed in primary cuts (quarters, reflecting Spanish style cutting).<sup>8</sup> Primary cuts are currently sold in “full sets,” essentially in carcass units. Nationwide, relatively little boxed beef production occurs at this time, with the exception of the Mexicali region, where roughly 90 percent of the beef is boxed, and areas of Hermosillo, Sonora, and Chihuahua.

### ***Regional Summary***

Differences in feed resources and cattle types are largely due to differences in geo-climates (fig. 6). Characteristics of major Mexican cattle feeding regions vary considerably as a result of geo-climatic differences and regional market preferences.

*Mexicali, Baja California*—The Mexicali area is a geographically isolated area that primarily serves Tijuana and the Baja California region. The Mexicali Valley includes a large area of irrigated land (by the Colorado River) used primarily for vegetable, wheat, and forage production. Wheat is the major feed grain used in feedlot production. Since few cattle are available locally, this area utilizes cattle from the farthest distance, on average, of any feeding area. Cattle fed here include No. 1 heifers and some steers from Sonora and Chihuahua, as well as bulls from the Pacific Coast. A limited number of cattle are sourced from all parts of Mexico and Central America.

The Mexicali region is geographically well defined and limited in size, but has a strong economic basis for the industry. Because of the geographical location and isolation, the industry is well situated relative to competition from the United States and other Mexican production areas. The high income level of the region provides a strong market basis for fed beef. The industry is one of the most technically advanced and represents the highest average level of intensity in stocker and feedlot production. The State of Baja California has the highest ratio of federally inspected slaughter plants, or “Tipo Inspección Federal” (TIF), to municipal slaughter of all Mexican States.<sup>9</sup> The area is well situated for possible exports to U.S. West Coast markets.

<sup>8</sup>Styles of cutting beef carcasses vary from country to country or region to region. Spanish-style cuts are oriented more for grilling and slow cooking.

<sup>9</sup>TIF slaughter plants have the highest sanitary standards and are the most advanced in technological processing. The plants are certified and inspected by Secretaria de Agricultura Ganaderia, Desarrollo Rural, Pesca y Alimentacion (SAGARPA). TIF plant services include slaughtering, carcass handling, packaging, refrigerated storage, and fabrication of processed products. Municipal plants offer limited services, primarily slaughtering and carcass cutting. They are not required to follow sanitary control measures and often lack the equipment and resources necessary to properly dispose of byproducts (Batres-Marquez, Clemens, and Jensen, 2007).



Figure 6

### Geo-climatic regions of Mexico



Source: Food and Agriculture Organization (FAO), 2005.

*Monterrey, Nuevo Leon*—The Monterrey area (including eastern Coahuila) is one of the oldest and most established cattle feeding regions. The close proximity of Monterrey to the United States has resulted in substantial merging of Mexican meat preferences with U.S. production styles, resulting in feeding that, in some cases, approaches the U.S. style, but still has less fat and marbling. In other cases, feeders in this region are focusing on the central Mexican market and are providing meat that is very lean. In all cases, however, there is a strong local preference for white fat and younger animals, which favors feeding heifers, while bulls are fed for markets farther south. Animal supplies consist principally of No. 1 heifers remaining from exports to the United States (mostly from Nuevo Leon and Coahuila) and No. 1 ½ and 2 animals from the northern Gulf Coast region. Increasingly, animals from farther south are brought in when necessary to supplement deficits in local and regional supplies.

The State of Nuevo Leon has a mandatory meat grading system that is analogous to the U.S. system, but with different grade definitions. This is the only such system in use in Mexico. The four grades are Select (*Selecto*), Good (*Bueno*), Standard (*Estandar*), and Commercial (*Comercial*). The grading criteria are based on age (less than 42 months of age, based on ossification), lean color, fat coverage, and marbling. Most feeders achieve 80-85 percent Good, with less than 5 percent achieving Select. Commercial is used for older cows and bulls. Good, in this system, is roughly equivalent to Select in the U.S. system, while Select is close to low Choice in the U.S. system.

The Monterrey area is close to grain production in Tamaulipas (the largest grain sorghum producing State in Mexico), as well as sources of imported grain from the United States. The region has a relative shortage of forage. Few of the feeding operations include backgrounding or stocker operations,

and there is more of a tendency to place cattle lighter and feed them for longer periods of time. Statistics for the State of Nuevo Leon indicate a considerable area of improved pasture, but apparently a substantial proportion of this is used for backgrounding calves for export and for cow-calf production.

The feeding industry in northeast Mexico has both advantages and disadvantages. Monterrey represents the third largest urban market in Mexico. It has a high general economic level and distinguishably different meat preferences from the rest of the country. Regional supplies of cattle and grain also support production. The area, in many ways, represents the economic boundary between U.S. and Mexican markets and is subject to strong and volatile economic forces. The region must compete simultaneously with the U.S. market for No. 1 cattle and with the threat of large quantities of imported meat. The Monterrey market is probably the most “Americanized” and thus is more vulnerable to encroachment from U.S. beef supplies. The possibility of increased exports of spayed heifers to the United States will increase competitive pressure for cattle sources in the area.

*Tampico, Tamaulipas, and Huasteca*—The southern part of Tamaulipas and the Huasteca region represent a developing area in the Mexican cattle feeding industry. Most of the feeding operations are new or have substantially expanded in the last 5 years. This development follows dramatic changes in production and marketing patterns in the area in the last 10 years. Until a decade ago, most cattle produced in the area (principally No. 2 type animals) were finished on grass. Cattle feeders from central Mexico then began purchasing locally produced calves for shipment to finishing areas. More pasture was available for cow-calf production as calves were marketed at weaning. Bulls that were traditionally castrated to improve fattening on grass were now left intact according to feeders’ preferences for feeding bulls. (Steers in feedlots get too fat for Mexican preferences in most markets.) Producers soon began feeding cattle locally rather than shipping all weaned calves to other areas for feeding.

The feeding industry in the region is relatively small but growing rapidly, with a feeding capacity at 30,000-40,000 head. The area is close to grain, sorghum, and soybean production in Tamaulipas (about the same distance as Monterrey) but, like Monterrey, suffers from a relative shortage of forage. In the Tamaulipas and Huasteca regions, however, this shortage is more of a seasonal problem due to the dry tropical climate. A more common practice in the region is backgrounding calves with supplementation, but the region lacks quality pastures rather than insufficient quantities of forage. Cattle for feedlots come from a specific area, including the southern third of Tamaulipas, the northern third of Veracruz, and the Huasteca regions of San Luis Potosi, Queretero, and Hidalgo. Some Gulf Coast cattle from farther south are being placed in central Mexico as well.

This region is situated to expand considerably. The area has a clear focus on the markets of central Mexico and is well positioned to pull in more Gulf Coast cattle to be finished in feedlots rather than finished traditionally on pasture. The area is in some competition with the Monterrey area for feed grain, but this does not seem to be a serious problem for either area (both are close to U.S. grain sources, at least seasonally). The relative lack of forage in

Huasteca is an issue of concern, but effective use of lower-quality forage with supplementation provides the needed flexibility to control production costs.

*Jalisco, Guadalajara*—Jalisco and Michoacan are traditionally among the strongest cow-calf production regions in the temperate climate areas of Mexico. For this reason, the area has been a major supplier of beef, not only for the Guadalajara market but for Mexico City as well. Historically, much of the beef was finished on pastures, but urban consumer markets are rapidly developing preferences for fed beef (although with very little finish).

Jalisco is part of the agriculturally rich Bajio region and is a major crop producing State. It ranks high in grain production—second in planted corn area (and the highest level of production), fourth in grain sorghum, and seventh in wheat. The State is also a major producer of forage crops and ranks first in planted area of corn and oat silage, sixth in sorghum silage, fifth in alfalfa hay, and second in area of improved pastures. The State is the largest producer of milk, pork, poultry meat, and eggs, and has the third largest inventory of beef cattle (Jalisco is the second largest producer of beef). Thus, the State has considerable competition for feeds among livestock industries but also substantial production of forages, lower quality feeds, and crop and food residuals that can be utilized by the beef industry.

Feedlot production has occurred in the region to a limited extent for many years but appears to be growing with changing preferences in the beef market. Cattle are generally fed for short periods (70-100 days) and marketed with very little external fat and little or no marbling. Many cattle are sourced in the Jalisco/Michoacan area, but some are brought in from farther south. Most heifers and bulls are placed after traditional backgrounding on pasture or intensive backgrounding on irrigated pastures in the Bajio region. Because of the short feeding period, cattle in this region are often placed in feedlots at somewhat heavier weights.

The Guadalajara region is the southernmost major concentration of feedlot production in the country, with large markets in both Guadalajara and Mexico City. The area has a clear focus on the differentiated beef preferences of central Mexico and on the types of cattle available in central and southern Mexico. The area has a generally favorable temperate climate and an abundant but diverse set of feed resources consisting primarily of forages of all qualities and some grain, but with a heavy emphasis on the use of residual and byproduct feeds and lower quality feeds not suitable for other livestock production. In recent years, cattle feeding has expanded in the Bajio, with cattle feeding in areas around Jalisco, including Aguascalientes, Queretero, and Michoacan. One of the newest and largest feedlots in Mexico was established in Michoacan by a major Mexican beef company in the last few years.

*Comarca Lagunera (Torreon/Gomez Palacio)*—The Lagunera region of southwest Coahuila and eastern Durango is a rich agricultural region built on irrigated crop production. Another traditional cattle feeding area, the region has undergone significant changes in recent years. Expansion in milk production, as well as poultry and pork production, in the region has decreased the relative role of fed beef production somewhat. This region includes diverse feeding operations, reflecting differences in production systems, cattle sources, and target markets.

Traditionally, the Torreon region evolved as a northern feeding area, much like Monterrey, feeding British/Continental and Zebu<sup>10</sup> cross cattle to meet northern preferences for meat with more finish and marbling. This is still the focus of some feeders in the areas that feed heifers and steers and produce meat principally for the Monterrey and Chihuahua markets. Torreon is well positioned in the central north to source cattle from the northeast in Coahuila and Nuevo Leon, as well as from the north and west in Durango and Chihuahua (fig. 7). However, competition with the U.S. market and other feeding areas in Mexico (along with drought-induced reductions in northern cattle inventories) has sharply reduced available supplies of northern cattle.

In recent years, many feeders in the region have sourced cattle from the Gulf Coast and southern Mexico. Depending on the quality of the cattle, males may be fed as steers for the northern meat markets or, more likely, as bulls for the central markets. Cattle for central markets are fed shorter periods and with somewhat less intensity than cattle for northern markets.

As a result of increased dairy production in the region, some feeders are now specializing in feeding Holsteins and, most recently, a number of new backgrounding operations are developing Holstein calves in confinement prior to finishing. These operations are using residual and waste feeds from dairy operations to develop calves in confinement in the absence of pasture-based backgrounding programs.

*Sonora, Hermosillo, Chihuahua*—The State of Sonora has a large area of irrigated crop production and is the largest wheat, cotton, and safflower producing State in Mexico. Sonora also produces forage crops, including alfalfa hay and ryegrass pasture. Sonora has large pork and egg industries and significant cow-calf production.

Figure 7

**Cattle feedlot in the Torreon region, Coahuila**



Source: Derrell Peel, Oklahoma State University.

<sup>10</sup>Zebu (*Bos indicus*) breeds used in Mexico include Brahman, Nelore, Gir, Indubrasil, and Guzerat. These breeds share a number of phenotypic characteristics, including the distinctive hump and pendulous hide. However, each of these breeds can be distinguished by color patterns, horn shape, and ear configuration.

The feedlot industry in Sonora is generally similar to other northern feeding areas, but the geographic position of the State is somewhat limiting. With one of the oldest feeding areas, the industry in Sonora appears to have lost some market position as feeding develops in Mexicali, Culiacan, and Torreon. With Mexicali positioned to serve the extreme northwest markets (Tijuana), and Culiacan and Torreon better positioned to serve other northern and central markets, Hermosillo has a distinct advantage only for relatively small regional markets and may play a mostly supplementary role for other markets. These limitations do not represent a threat to the industry as it exists, but it may represent something of an upper limit to development of the industry in the region. The same limitations may affect the region's ability to source cattle, with Mexicali and Torreon better positioned to attract northern cattle and Culiacan better positioned to attract cattle to the south. Sonora does, however, have a large base of irrigated ryegrass for backgrounding cattle in the dry winter period.

The State of Chihuahua consists largely of dry, temperate, and semi-arid climate zones amenable to extensive grazing operations. Cow-calf operations dominate the cattle sector, and Chihuahua accounts for over 40 percent of feeder cattle exports to the United States. Cattle from this and other nearby Mexican States are among the better quality cattle in Mexico and, with high percentages of English breeds (e.g., Hereford and Angus), finish well in feedlots.

*Sinaloa, Culiacan*—In many respects, the State of Sinaloa shares many crop production traits with its northern neighbor, Sonora. Like Sonora, Sinaloa has a large area of irrigated crop production. Because it has a predominantly dry tropical climate, however, the State has a larger component of temporal crop production than Sonora. Sinaloa has the third largest area of bean production but has the largest total bean production, due to larger irrigated yields. Sinaloa is the fifth largest grain sorghum producer and the fifth largest wheat producer in Mexico. Sinaloa is also the fourth ranking cotton producer. The State produces forage crops, including improved pasture and sorghum silage. Sinaloa has a large beef cow-calf industry and is a significant producer of pork and poultry meat.

Fed cattle production in Culiacan is heavily oriented toward central Mexican markets, utilizing predominantly Zebu-based cattle from the Pacific Coast (Sinaloa and Nayarit), as well as cattle from the Bajio region. The industry enjoys a relatively abundant and balanced set of feeds, including grains, protein feeds, and forages, and only moderate feed demand competition from pork and poultry.

*Humid Tropics (Veracruz, Tabasco, Campeche, and Yucatan)*—This large area presently accounts for little feedlot production, with perhaps capacity for 30,000-55,000 head. There are only a few large feedlots (5,000-25,000 head) in the region, including one in Merida and one in Veracruz, a handful of smaller feedlots (500-5,000 head), and numerous very small feedlots. However, larger feedlots have expanded significantly and limited cattle feeding now occurs in the tropical and southern States, including Oaxaca and Chiapas. Simultaneously, use of semi-intensive finishing programs that

combine grazing and supplementation is increasing in the region. These changes are occurring in response to changing consumer meat preferences (for more fed beef) and increased demand from northern feeding areas for cattle for feedlots.

Changes in production and marketing practices in the humid tropics may have significant implications for the total beef cattle industry in Mexico. Traditional grass-finished production in this region usually requires 2 years after weaning to finish cattle. Since 2005, several new production and marketing alternatives have arisen:

- Selling more calves at weaning for shipment to northern Mexico;
- Selling calves as feeders ready for placement in feedlots (local or northern);
- Semi-intensive finishing on pasture with supplementation; or
- Finishing in feedlots.

These alternatives reduce the post-weaning grazing period by 1-2 years and potentially release forage for increased cow-calf production. Because of the high stocking rates possible in this region, such changes could significantly alter the total productive potential of the beef cattle industry in Mexico.

## Mexico's Cattle and Beef Industry Poised for Growth but Faces Challenges

The Mexican cattle and beef industry has been very dynamic for the last two decades. In the 1990s, prolonged drought coupled with the 1994 peso devaluation and subsequent limitations on capital access led to herd liquidation. Cyclically high U.S. cattle prices through much of the 2000s resulted in feeder cattle exports from Mexico at rates beyond long-term sustainability. At the same time, growing beef demand and changing beef preferences by consumers led to increased beef imports and more cattle feeding in Mexico. The current strength of U.S. market prices and general strength of domestic beef demand have made it difficult to retain females for breeding. In recent years, restrictions on importing U.S. breeding stock due to animal health- and identification-related issues have also impeded herd rebuilding. Live breeding cattle exported to Mexico must be born after January 1, 1999 and are subject to animal identification requirements, all of which increase the total costs of importing U.S. breeding stock.<sup>11</sup> Continued growth in Mexican cattle exports to the United States is also vulnerable to issues of border security.

Continued population and economic growth suggest considerable potential for increased fed beef demand, including demand for U.S. beef imports. The Mexican beef industry will face tremendous challenges to remain competitive in the face of:

- Product and feed demand from other livestock industries;
- Crop production for land and water to produce feed, especially forage; and
- Inputs (feed and cattle) and meat on the international market.

Although beef demand, specifically demand for fed beef, has increased significantly in recent years, demand for pork and poultry in Mexico has also increased. Poultry consumption has doubled, while beef and pork consumption has grown more modestly. An increase in total livestock production also means increasing competition with other types of food and fiber production for limited agricultural resources. These factors will become more critical as the beef industry adopts intensive production systems to produce fed beef and competes more directly with other livestock industries.

The change in demand for fed beef also has tremendous implications for the type of cattle fed in feedlots, feeding strategies, and the quantity of fed cattle production. Moreover, a change from grass-fed beef to fed beef in Mexico has major implications for overall levels of beef production. Domestic production is limited by forage availability for the cow herd, which is currently limited by forage used for finishing beef on pastures. An increase in more intensive stocker and finishing systems will release forage resources for increased cow-calf production. Changing beef consumption patterns in Mexico also will impact marketing. Changes in retailing, especially rapidly expanding supermarkets and growth in away-from-home consumption, are part of a large set of lifestyle changes causing significant shifts in market infrastructure and marketing practices within the industry.

<sup>11</sup>USDA, APHIS guidelines for exporting U.S. breeding cattle to Mexico can be found at [http://www.aphis.usda.gov/import\\_export/downloads/mx\\_bo\\_breeding.pdf](http://www.aphis.usda.gov/import_export/downloads/mx_bo_breeding.pdf).

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