PART TWO

INTERNATIONAL TRADE

CHAPTER 4
GLOBAL PRODUCTION & TRADE

Global milk production continues to grow each year driven by population growth and strong per capita demand. Milk is desirable to global consumers for many reasons. Milk protein contains all nine essential amino acids and is a source of fat and carbohydrates. Milk is not only nutritious, but it tastes good as well. Milk production is growing in some countries that not only have the income that fuels demand, but an environment conducive to milk production (feed and water supply), and a modern supply chain to process and delivery dairy products. In other countries, demand is outpacing supply due to local limitations on milk production, combined with rising tastes and preferences for dairy. As a result, some countries depend on imports to meet some or all of their domestic needs, whereas others have an exportable surplus. There are several large milk producing countries that are entirely self-sufficient in dairy. The point is, trade is increasingly needed in many countries to meet the growing demand for dairy products. In this chapter, we will focus on global milk production, demand for dairy products, and trade.

GLOBAL PRODUCTION

The Organization for Economic Co-operation and Development (OECD) and the Food and Agriculture Organization of the United Nations (FAO) have jointly estimated that global milk production grew at a compounded annual growth rate (CAGR) of 1.9% from 681.2 million metric tons (mmt) in 2007 to 823.3 mmt in 2017.[1]Most of this milk was produced by dairy cattle (83%), but some was also produced by buffaloes (14%), goats (2%), sheep (1%), and camels (0.3%).[2] Milk production is most prevalent in countries located in temperate zones, where dairy cattle are more adaptable to local weather conditions. However, milk is also produced in countries with more extreme weather by non-cattle species such as water buffaloes.

[1] OECD, "OECD-FAO Agricultural Outlook 2018-27."

[2] Food and Agriculture Organization of the United Nations, "Milk Facts," May 2018.

The top ten milk producing countries in the world accounts for over 60% of global milk production. To arrive at that figure we started with the OECD-FAO database and replaced EU-28 milk production with individual country data from Eurostat.[3] Since the Eurostat data used reflected on farm milk production, as opposed to milk delivered to plants, our final figure for global milk production was slightly higher than that reported by OECD-FAO. The results are in table 4.1.

What is most surprising about the results is that four of the top ten countries are geographically part of Asia (India, Pakistan, China and Turkey). While these Asian countries have relatively low levels of income and per capita dairy consumption, they have very large populations. Thus, even though they produce a lot, they also consume all available domestic production. In the case of China, consumption exceeds the domestic milk supply, resulting in a growing need for imports. The rest of the top ten countries are in temperate zones with adequate amounts of water and feed. These countries also have rela-

TABLE 4.1
TOP TEN MILK PRODUCING COUNTRIES IN 2017

	thou mt
India	169,320
United States	97,749
Pakistan	53,700
China	39,500
Germany	32,614
Russian Federation	30,504
Brazil	29,089
France	25,943
New Zealand	21,454
Turkey	19,980
Global milk production	829,844
Top ten countries as percent of global production	62.6%

Note: thou mt = thousand metric tons.

Source: OECD-FAO Agricultural Outlook 2018-27.

[3] Source: https://ec.europa.eu/eurostat/data/database.

tively high levels of income and populations of European descent. In terms of a regional breakout (figure 4.1), a third of global milk production is from Asia, followed by Europe (26%) and North and Central America (15%). The balance of milk, roughly 26%, is scattered throughout the world. Note that two of the world's largest exporters of dairy products, New Zealand and Australia (collectively referred to as "Oceania") accounts for just 4% of global milk production.

The next question is how many lactating animals are there in the world that produce this supply of milk, and where are they located? Obviously, the answer depends in part on the species of animals. The FAO reported that about 83% of global milk production is from dairy cattle, followed by 14% from water buffalo. These two species account for the majority of global milk production. In terms of numbers, FAO data indicates that 274 million dairy cattle and 66.5 million water buffalo produced roughly 97% of the worlds milk in 2017 (table 4.2). There were large numbers of sheep and goats that produced milk as well, but the volume was very small. In terms of dairy cattle, just over 40% were in Asia, fol-

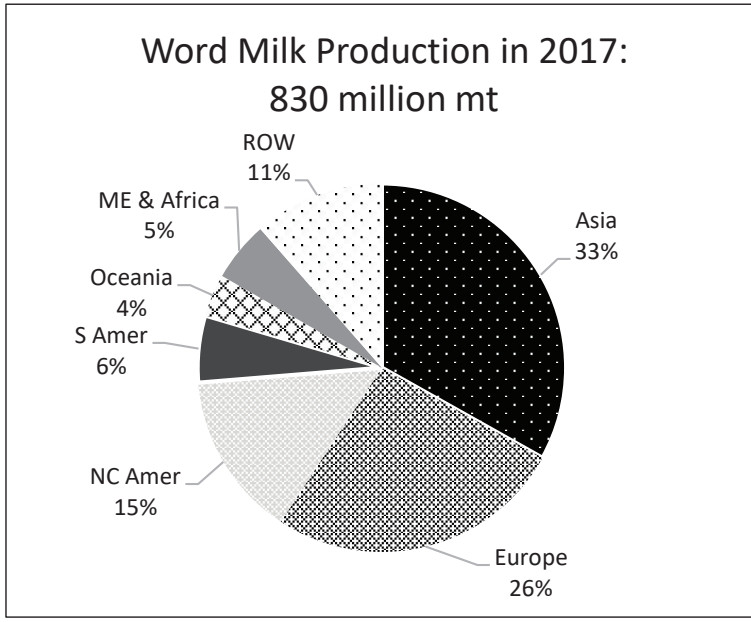

FIGURE 4.1
Regional breakout of global milk production in 2017.
Source: OECD-FAO Agricultural Outlook 2018-27, and Eurostat.

TABLE 4.2
REGIONAL DAIRY LIVESTOCK NUMBERS, BY SPECIES, 2017

	thousand head				
	Cattle	**Buffalo**	**Goats**	**Sheep**	**Camels**
Africa	71,185	1,549	85,067	82,519	7,109
Americas	49,846	0	7,894	2,934	0
Asia	110,725	64,694	114,345	127,641	882
Europe	35,959	257	10,393	32,090	1
Oceania	6,619	0	1	0	0
World	274,335	66,499	217,699	245,184	7,992

Source: FAOStat, http://www.fao.org.

lowed by 26% in Africa, 18% in the America's, 13% in Europe, and 2% in Oceania. In terms of water buffalo, these are mainly located in Asia.

GLOBAL DEMAND

Global demand for milk and dairy products has grown over time as consumers supplemented their diets of plant-based sources of fat, protein and carbohydrates (small grains) with meat and dairy products. A critical element of this transition has been growing income, and a gradual change in what economists call "tastes and preferences." As global income rose and consumers transitioned from poverty and subsistence into the middle class, they allocated more of their disposable income to the purchase of dairy products.

It should be clear that "consumption" of milk and dairy products is not just the purchase of raw or packaged fluid milk products. It may involve purchases of finished dairy products such as yogurts, cheese, butter, and cream or condensed milk. It may also involve indirect purchases of dry or condensed dairy products that are used in food processing such as bakery products, soups, milk-based drinks, etc. Therefore, "consumption" should involve all of these different forms of consumer purchases.

In the analysis that follows, it is assumed that all dairy products are processed and consumed in the same year. This is particularly true for fresh dairy products such as packaged fluid milk, yogurt, sour cream, etc. There are a few exceptions to this rule: dry milk products such as skim milk powder, whole milk powder, and dry whey could easily have a shelf