

The Global Dairy Sector: Facts 2019¹

Sustainable production, processing and consumption of milk and dairy products benefit people and the planet and can help to achieve the Sustainable Development Goals.

- **Milk is one of most produced and valuable agricultural commodities worldwide.** In 2018, with a total production of 843 billion liters valued at USD 307 billion, milk ranked third by production tonnage and was the second agricultural commodity in value terms worldwide.ⁱ Milk contributes to 27% of the global value added of livestock and 10% of that to agriculture.
- **Dairy products are key to nutrition and health.** Milk and dairy products are nutrient-dense foods supplying energy and significant amounts of protein and micronutrients including calcium, magnesium, selenium, riboflavin, vitamins B5 and B12, which are essential to reduce hunger and malnutrition particularly amongst the most vulnerable (e.g., pregnant women and children). Consumption of milk is associated with a reduced risk of non-communicative diseases such as osteoporosis and possibly colorectal cancer and type 2 diabetes.^{viii} Most countries with dietary guidelines, recommend dairy as a component in a balanced diet. At global level, milk contributes on average 134 kcal of energy/capita per day, 8.3 g of protein/capita per day and 7.6 g of fat/capita, or 5%, 10% and 9% to the global supply of energy, protein and fat respectively. It is the fifth largest provider of energy and the third large provider of protein and fat for human beings.
- **Dairy products are also a source of affordable nutrition to meet recommended nutrient levels.** For example in the US, at about \$0.23 per 100 kcal, milk and milk products cost less per kcal than meat, poultry and fish (\$0.41 per kcal), fruit and vegetables; similar to eggs, sugars, sweets and other beverages; and scarcely more expensive than grains, dry beans, legumes and nuts.^{viii} In Germany, the price of 100 kcal of milk and milk products is about (€0.19); only fats, that include butter and margarine (€0.08 per 100 kcal); noodles, rice and bread (€0.11); and sweets and nibbles (€0.13) are less expensive.^{ix}
- **Milk is a local commodity.** Milk and dairy products are produced and consumed in almost all countries around the world and, in most of them, it ranks among the top five agricultural commodities, in both production quantity and value term.ⁱⁱ Whole fresh cow milk represents 81% of global milk production, followed by milk from buffaloes (15.1%), goats (2.2%), sheep (1.3%) and camels (0.4%).
- **Milk is a global commodity.** Milk and dairy products account for about 14% of global agricultural trade. In particular, whole milk powder (WMP) and skimmed milk powder (SMP) are the most traded agricultural commodities globally as percentage of production traded, while fresh dairy products, with less than 1% of production traded, are the least traded agricultural commodity.ⁱⁱⁱ

¹ This document is an updated version of a FAO document available at: <http://www.fao.org/3/cb2992en/cb2992en.pdf>

- **The dairy sector is growing fast:** World milk production is projected to increase at 1.7% percent per year over the next decade. World per capita consumption of fresh dairy products is estimated to increase by 1 percent per year in the next decades. The share of fresh dairy products in world, due to demand growth in developing countries.^{iv} Because of the sheer size of the dairy industry, these growth rates can produce big development payoffs for people's livelihoods, for the environment and for public health.
- **The dairy sector is heterogeneous.** World milk production largely derives from cattle, buffaloes, goats, sheep and camels. Milk animals are raised in a multitude of production systems, that allow for flexibility and increased efficiency in addressing constraints that may exist in various regions of the world. Those include specialized dairy-only systems, whose main objective is the production of milk; market-oriented and subsistence-oriented integrated dairy-crop systems, that target the joint production of several outputs, including milk, meat and crops; and pastoral systems that rely on mobility to produce milk and, to a lesser extent, other livestock products and services.
- **Dairy animals are a popular asset in rural areas.** More than one out of four of the 570 million farm holdings worldwide (over 150 million farmers), keep at least one milk animal, including cows, buffaloes, goats and sheep. In particular, there are between 110 and 120 million farm holdings keeping dairy cattle and another 100 million keeping buffaloes, goats and sheep respectively. Farmers often keep mixed herds with more than one species of dairy animal.^v Cows are by far the most common dairy animal, with farmers in developing countries usually keeping them in herds of two or three heads. In developed economies, herds can be larger but virtually all dairy farmers are still family owned: the average dairy farms in the UK and the US manage 90 and 300 dairy cows respectively.^{vi}
- **Dairy animals support livelihoods.** Dairy animals are a regular source of food and cash for farmers, who either consume or sell milk and dairy products every day, which is not the case with crops or meat. Dairy animals are a store of wealth and enhance resilience: farmers can sell them in times of need to generate cash; use animals as collateral for loans; and even transport them long distances, thereby maintaining an important asset base when forced to leave their homestead. Dairy animals generate manure, which is valuable as fertilizer, fuel and construction material, and can be also marketed. They also contribute to crop productivity through animal traction and provide social status and social capital, thereby facilitating networking, which is at the core of effective market and supply chain relations and alliances.
- **The dairy industry creates jobs.** Dairy producers are often organized in cooperatives or liaise with other value chain actors to process and sell milk and dairy products to consumers. At the global level, skimmed milk (75%), cheese (12%) and butter (3%) represent over 90% of all processed milk. Processing activities, from pasteurization to yogurt manufacturing, not only add value to raw milk but also create jobs. Employment is a major pathway out of poverty and job creation is a global challenge: 470 million jobs are needed globally for new

entrants to the labor market between 2016 and 2030.^{xiii} Evidence from Bangladesh, Kenya and Ghana suggests that for every 100 liters of milk traded between 1.2 and 5.7 full time jobs are created.^{xiv} In Great Britain, there are about 13,000 dairy farms that create a total of 28,000 full-time jobs only at farm level.^{xv} The 6,200 Australian dairy farms generate about 39,000 full-time jobs.^{xvi} The over 736 Chinese dairy enterprises employ over 270,000 people.^{xvii} Overall, about 240 million people are likely to be directly or indirectly employed in the dairy sector.^{xviii} With an estimated 150 million dairy farms worldwide, it is likely that the dairy sector supports the livelihoods of up to one billion people worldwide.

- **Milk production supports empowerment.** Livestock are possibly the most popular asset among rural women in developing countries as animals are more easily acquired – e.g. through inheritance or markets – than land and other physical and financial assets. Dairy cows are directly owned by women in 25% of cattle keeping households^x, which implies that over 37 million of dairy farms are female headed. Women, however, regardless of their owning milk animals, play a major role in dairy production systems: they often feed the animals; milk them; clean the animals and their stall; compost manure and are often responsible for breeding, health and the sale of milk. Dairy often serves as the first stepping-stone for rural women to start consolidating a better place for themselves in the society, especially in rural areas.^{xi} As about 22% of world's women of working age are employed in agriculture and about one fourth of agricultural holdings keep milk animals, both male and female headed, about 80 million women are to some extent engaged in dairy farming.^{xii}
- **The dairy industry has a role in public health.** While intake of dairy products is part of a healthy diet, zoonotic and food-borne diseases originating from dairy animals can be harmful for people. There are about forty-five zoonotic bovine pathogens, with the majority (69%) present the world over. For 44% of these pathogens, human to human transmission also occurs.^{xix} At the same time, the consumption of dairy products, and in particular the intake of raw milk and other unpasteurized products, can result in food-borne illnesses.
- **The dairy industry relies on natural resources such as land, water, nutrients and energy.** Feeding dairy cows, sheep, goats and buffaloes requires around 1 billion ha of land, or 7% of total land on earth. The majority of this area is grasslands (pastures and rangelands) but the dairy herd also uses about 150 million ha of arable land. The global dairy herd consumes about 2.5 billion tons of dry matter feed annually. The global dairy herd is converting materials that are not edible to humans into high quality protein and essential micro-nutrients^{xx}. The estimated dry matter intake of the global dairy herd consists of 4% grains, 54% of grass and leaves, 33% of fodder crop and crop residues, 5% of oil seed cakes and 4% of by-products.

- **Milk production efficiencies can help mitigate greenhouse gas emissions per liter of milk.**

At global level, methane production from enteric fermentation contribute 6% (equivalent to 2.7 Gt CO₂ eq.) to the global anthropogenic GHG emissions. Cattle accounts for 77% of the global enteric emissions (2.1 Gt), buffalo for 14% (0.37Gt) and small ruminants (sheep and goats) for the remainder (0.26 Gt). Enteric methane represents 51% to 67% of the herd's emissions, depending on the species and production system^{xxi}. The dairy sector is significantly reducing emissions: A report by the by the UN Food and Agriculture Organization (FAO) commissioned by the Dairy Sustainability Framework reported a decrease emissions intensity of milk production by almost 11% for the period 2005-2015 despite an increase of dairy production of 30%. Over the past 50 years, methane has declined in industrialized nations, not just per Kg of milk, but even in total.

Emission intensities vary greatly among different regions of the world because of the different agroecological conditions, farming practices and supply chains management. The variability between the high and low emission intensities is where opportunities for mitigation can be found. Methane, produced by rumination, has a global warming potential of 34 over 100 years. Yet, carbon dioxide is long-lived stock pollutant while methane is a short-lived flow pollutant, which disappears within 12 years. As long as ruminant emissions remain constant, methane concentration and warming effect will remain roughly constant as well. Further improvements on ruminant productivity, can decrease methane emissions and therefore, have a positive impact of climate change.

The linkages between the dairy sector, peoples and the planet are multiple and all-encompassing: investments that promote a sustainable development of the livestock industry, therefore, can contribute to achieve several SDGs, including:

- **End poverty (SDG1):** the dairy sector directly and indirectly supports the livelihoods of 150 million farmers, including the poor ones. It also generates employment opportunities along the value chain, which not only represent a major pathway out of poverty but also contributes to **full and productive employment and decent work for all (SDG 8) and to reduce inequality (SDG10)**.
- **End hunger and achieve food security (SDG2) and contribute to healthy lives (SDG3),** because of the important role of milk in the provision of energy, protein and micronutrients.
- **Achieve gender equality (SDG5),** because of the key role that women play in the dairy sector. 37 million farms are female headed with 80 million women engaged in dairy farming to some extent.
- **Promote sustainable consumption and production patterns (SDG 12), combat climate change (SDG13), protect and restore terrestrial ecosystems including biodiversity (SDG 15) and sustainable management of water and sanitation (SDG 6)** through the adoption of best practices, many of which have been proved effective in different contexts.
- The linkages between the dairy industry, people and the planet are however complex and multifaceted. Collective and concerted action through multi-stakeholder processes and integrated approaches are therefore needed for formulating and implementing sustainable

investments and policies, consistently with **SDG 17: Partnerships for the Goals**.

ⁱ All statistics presented in this note are elaborated from FAOSTAT (accessed in August 2016), unless otherwise stated. FAO: Rome. In many cases, neither statistics for the dairy sector are not readily available nor are available datasets to produce them. The accuracy of the elaborated statistics presented in this note, therefore, should be taken with caution.

ⁱⁱ FAOSTAT data indicate that all world countries are producers of milk. In the FAOSTAT milk production dataset, there are 27 countries with missing or non-reporting milk production. The largest, with a population of 5.5 million, is Singapore. All the others have a population of less than 1 million. In total, they account for 0.11% of the world's population.

ⁱⁱⁱ OECD-FAO (2016). OECD-FAO Agricultural Outlook 2019-2028. OECD: Paris & FAO: Rome.

^{iv} Ibidem.

^v Elaborated from FAO International comparison of the results of the WCA 2000 round (1996-2005) available at <http://www.fao.org/economic/ess/ess-wca/wca-2000/ess-wca2000-tables/en/> and from Lowder et al. (2016). The Number, Size, and Distribution of Farms, Smallholder Farms, and Family Farms Worldwide, World Development, in press.

^{vi} DEFRA (2016). Statistical data set: Structure of the agricultural industry in England and the UK at June 2016. Department for Environment, Food and Rural Affairs: London; and USDA (2015). Agricultural Statistics 2015. National Agricultural Statistics Service, United States Department of Agriculture: Washington D.C. <http://quickstats.nass.usda.gov/>

^{vii} IFCN (2015). IFCN Dairy Report 2015. Kiel: Germany.

^{viii} FAO (2013) FAO Report "Milk and Dairy products in human nutrition" page. 163. Rome: Italy
Drewnowski A. (2010). The cost of US foods as related to their nutritive value. American Journal of Clinical Nutrition 92: 1181–1188

^{ix} Westenhöfer J. (2013) Energy Density and Cost of Foods in Germany. Ernährungs Umschau international 60(3): 30–35.

^x Njuki J. and Sanginga P.C., eds. (2013). Women, Livestock Ownership and Markets. Bridging the Gender Gap in Eastern and Southern Africa. Routledge: London and New York; IRDC: Ottawa; ILRI: Nairobi.

^{xi} FAO (2015). Empowering women in Afghanistan: Reducing gender gaps through Integrated Dairy Schemes, FAO: Rome.

^{xii} Elaborated from the World Bank Development Indicators (accessed on August 2016). World Bank: Washington D.C.

^{xiii} <http://www.un.org/sustainabledevelopment/economic-growth/>

^{xiv} Omore A. et al. (2011). Employment generation through small scale dairy marketing and processing. Experiences from Kenya, Bangladesh and Ghana. ILRI: Nairobi and FAO: Rome.

^{xv} DEFRA (2016) Statistical data set: Structure of the agricultural industry in England and the UK at June 2016. Department for Environment, Food and Rural Affairs: London.

^{xvi} Dairy Australia (2015). Australian Dairy Industry in Focus 2015. Dairy Australia: Southbank (Melbourne).

^{xvii} IBIS World (2016). Dairy Product Production in China: Market Research Report. IBIS World: Beijing.

^{xviii} Elaborated from FAOSTAT and the World Bank Development Indicators Database.

^{xix} McDaniel C. J. et al. (2014). Humans and Cattle: A Review of Bovine Zoonoses. Vector Borne and Zoonotic Diseases 14(1): 1-19.

^{xx} Mottet, A., et al. (2016). Livestock: in our plates or eating at our table? The feed/food debate. Global Food Security. Submitted.

^{xxi} Gerber, P. et al. (2013). Tackling climate change through livestock: a global assessment of emissions and mitigation opportunities. FAO: Rome.