Food and Agriculture Organization of the United Nations

The Global Dairy Sector: Facts

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 2013, with a total production of 770 billion litres valued at USD 328 billion, milk ranked third by production tonnage and was the top agricultural commodity in value terms the world over.[i] Milk contributes 27% to the global value added of livestock and 10% to that of agriculture.
- **Milk is a local commodity.** It is produced and consumed in basically all world's countries and, in most of them, it ranks among the top five agricultural commodities in both quantity and value term.[ii] Whole fresh cow milk represents 82.7% of global milk production, followed by milk from buffaloes (13.3%), goats (2.3%), 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]
- **The dairy sector is growing fast**: World milk production is projected to increase by 177 million tonnes by 2025, at an average growth rate of 1.8% per annum in the next 10 years. Over the same period, per capita consumption of dairy products is projected to increase by 0.8% and 1.7% per year in developing countries, and between 0.5% and 1.1% in developed economies.[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, which can be stylized in four. Specialized landless 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. 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.** Over one out of four of the 570 million farm holdings worldwide, that is over 150 million farmers, keep at least one milk animal, including cows, buffaloes, goats and sheep. In particular, there are about 133 million holdings keeping dairy cattle; 28.5 million keeping buffaloes; 41 and 19 million keeping 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 2 or 3 heads. In industrialised economies, however, herds are often larger: the average dairy farms in the UK and the US manage 90 and 300 dairy cows respectively.[vi] However, farms with more than 100 cows represent less than 0.3% of all dairy farms globally.[vii]

- **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 time of need to generate cash; use animals as collateral for loans; and transport them even for long distances, thereby maintaining an important asset base when forced to leave their homestead. Dairy animals generate dung, 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.
- **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). 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 being. Dairy products are a source of affordable nutrition to meet recommended level. 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 kcal); noodles, rice and bread (€0.11); and sweets and nibbles (€0.13) are less expensive.[ix]
- **Milk production supports women 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 creates jobs.** Dairy producers are often organized in cooperatives or liaise with other value chain actors to process and sale milk and dairy products to consumers. At 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 labour market between 2016 and 2030.[xiii] Evidence from Bangladesh, Kenya and Ghana suggests that for every 100 litres 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 fill-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.

- **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. Excessive intake of antibiotics by milk animals can also contribute to anti-microbial resistance in human beings.

- **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, about 40% of the global livestock feed intake. 77% of this is grass and straws, meaning that the global dairy herd is converting materials that are not edible to humans into high quality protein and essential micro-nutrients[xx]. Producing these feed materials requires significant amounts of nutrients and water and can be associated with land degradation, water pollution, losses of biodiversity or deforestation.

- **The dairy herd contributes to greenhouse gas emissions**, especially through rumination. Dairy animals produce around 3.1 gigatonnes of CO2 equivalent per year or 40% of global livestock emissions, with dairy cattle accounting for 75% of it. Enteric methane represent 51% to 67% of the herd's emissions, depending on the species and production system[xxi]. Compared with carbon dioxide which is long-lived climate pollutant (up to 200 years atmospheric residence time) methane is short-lived but traps 84 times more heat than carbon dioxide over the first two decades after it is released into the air. Therefore, the potential of reducing negative impacts on climate through increased productivity of ruminants is important. Options aiming to reduce emissions per kg of milk exist and mainly target feed use efficiency, manure management and herd performances through improved animal health and husbandry.

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 importance role of milk in the provision of energy, protein and micronutrients and through investments that reduce the negative impact of the dairy industry on public health.
- **Achieve gender equality (SDG5)**, because of the key role that women play in the dairy sector.
- **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**

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[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 2016-2025. 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.

[vii] IFCN (2015). IFCN Dairy Report 2015. Kiel: Germany.

[viii] 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. Ernaehrungs 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.