A Literature review on Milk Production and Consumption – A Global Perspective At a Glance

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This review paper examines global trends in milk production and consumption from 2014 onward, highlighting regional variations, policy frameworks, and consumer behavior. India continues to dominate as the world's largest milk producer, while China and Southeast Asia show rapid growth in demand, largely driven by urbanization and income rises. In contrast, developed countries such as the U.S., EU, and the UK exhibit declining liquid milk consumption, offset by increased demand for cheese, yogurt, and other value-added dairy products. The abolition of milk quotas in the EU, trade liberalization in Latin America, and restructuring of dairy in Australia and New Zealand reflect the influence of policy and market dynamics. Africa and parts of Asia remain heavily dependent on imports, underscoring production deficits. Key themes across studies include climate change impacts, sustainability, quality and safety concerns, and the growing consumer emphasis on animal welfare and traceability. Overall, while global milk production has expanded, consumption patterns are diverging across regions, requiring context-specific strategies for resilience and growth.

Keywords: Milk production, milk consumption, dairy trade, sustainability, climate change, animal welfare, per capita consumption, dairy policy, food security.

Introduction

Milk production and consumption have been central to the agricultural economy, nutrition, and trade policies across the globe. Over the last decade, significant shifts have been observed due to urbanization, globalization, climate change, and dietary transitions. Rising incomes in developing countries have increased demand for dairy products, while developed nations are experiencing stagnation or decline in liquid milk consumption due to lifestyle changes. This review synthesizes studies published after 2014 on milk production and consumption patterns in different countries, highlighting regional variations, policy frameworks, technological adoption, and consumer behavior.

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India

India remains the world's largest milk producer, with output crossing 221 million tonnes in 2021–22 (NDDB, 2022). Government initiatives like **Operation Flood**, **Rashtriya Gokul Mission**, and the **National Dairy Plan** have enhanced rural dairy development. Recent studies emphasize the role of self-help groups, cooperatives such as **Amul**, and technology adoption in sustaining milk production (Government of India, 2023). Per capita milk availability increased to **444 grams/day in 2022**, surpassing the global average (NDDB, 2022). However, challenges include rising feed costs, climate variability affecting productivity, and quality concerns in informal markets.

China

China has witnessed growing dairy consumption since 2014, with urban residents consuming significantly more milk compared to rural households (He et al., 2016; Tian et al., 2017). Government incentives such as subsidies for large-scale dairy farms and modernization policies have supported domestic production. Despite this, imports—especially from New Zealand, the EU, and the U.S.—remain high, reflecting domestic supply shortages (FAO, 2019). Chinese consumers are also diversifying into value-added products like yogurt, cheese, and infant milk powder. Food safety scandals in the past have led to increasing demand for packaged and branded milk, strengthening the formal dairy sector.

United States

Milk production in the U.S. has grown steadily, while per capita **fluid milk consumption has declined by over 25% since 2010**, largely due to shifting consumer preferences toward plant-based alternatives (USDA, 2018; USDA-ERS, 2022). At the same time, cheese, yogurt, and butter consumption have increased, indicating a dietary transition within dairy products. Policies such as the **Dairy Margin Protection Program** and international trade agreements have influenced sector stability. Sustainability concerns, greenhouse gas emissions, and changing retail dynamics are shaping consumer choices, with organic and hormone-free milk seeing greater demand.

European Union

Following the abolition of milk quotas in 2015, the EU experienced rapid expansion in production (European Commission, 2018). Northern Europe, especially Germany, France, and the Netherlands, dominates dairy exports, while Southern regions face challenges of declining consumption and higher production costs.

The EU is a major global dairy exporter, especially of **skimmed milk powder and cheese**, but faces strong competition from New Zealand and the U.S. (European Milk Board, 2020). Sustainability regulations, carbon footprint reduction, and animal welfare standards are influencing both production and market dynamics.

United Kingdom

The UK has faced declining milk consumption trends, with younger generations increasingly shifting to alternative beverages such as oat, almond, and soy milk (DEFRA, 2021). Despite falling demand for liquid milk, the UK dairy industry remains significant in cheese, butter, and cream production. Brexit has also reshaped the UK's dairy trade, leading to concerns over export competitiveness and import reliance. Consumer surveys highlight sustainability, traceability, and animal welfare as emerging priorities in shaping dairy consumption patterns.

Australia and New Zealand

Australia's dairy industry has been restructuring due to volatile global prices, falling profitability, and climate challenges such as prolonged droughts (Dairy Australia, 2019). Consolidation and farm exits have been notable in the last decade. New Zealand, on the other hand, continues to be a leading exporter, particularly to Asian markets such as China and Southeast Asia, but faces environmental challenges, including high methane emissions and water quality concerns (Dairy NZ, 2020). The cooperative model, particularly **Fonterra**, remains central to the sector, but pressures from global trade dynamics and sustainability debates are intensifying.

Africa

Milk consumption in Africa has been growing, though production lags behind demand (FAO, 2021). Kenya leads in organized dairy development through cooperatives, smallholder integration, and quality assurance initiatives (Muriuki, 2019; Kenya Dairy Board, 2021). North African nations like Egypt and Sudan have relatively higher per capita consumption compared to sub-Saharan Africa. Imports, mainly powdered milk, fill the gap in many regions, making Africa heavily reliant on global markets. Infrastructure bottlenecks, cold chain limitations, and informal market dominance remain challenges.

Latin America

Brazil and Argentina have expanded milk output significantly, driven by modernization of farms and integration into global supply chains (Lema &

Gallardo, 2018). However, consumption remains uneven due to income disparities and inflationary pressures (Barría & Valenzuela, 2020). Trade liberalization under regional blocs such as MERCOSUR has impacted dairy competition, while export markets, particularly for cheese and milk powder, remain vital. Environmental sustainability, especially in Brazil, has become a pressing concern with dairy intensification.

Asia (Japan, Korea, SE Asia)

Japan shows declining milk consumption post-2015, reflecting an aging population and dietary diversification (Yamashita, 2019). Korea has maintained relatively stable milk demand, though per capita consumption remains lower than Western countries (Park & Kim, 2020). Southeast Asian nations like Vietnam, Indonesia, and the Philippines are experiencing rising milk consumption due to dietary transitions, urbanization, and growing middle-class incomes (Wu & Song, 2018; Widodo, 2021). However, local production is insufficient, leading to heavy reliance on imports, mainly from New Zealand and Australia.

Thematic Trends

Several themes emerge from post-2014 literature: 1) Urban-rural disparities in milk consumption, particularly in China and Africa, highlight income and lifestyle influences; 2) Climate change impacts on dairy production are increasingly reported, with evidence of heat stress reducing milk yields in Asia and Africa (Palandri et al., 2025; IPCC, 2022); 3) Global dairy trade is increasingly concentrated, with New Zealand, the EU, and the U.S. dominating exports, while Asia and Africa remain demand hubs; 4) Consumer preferences for sustainability, animal welfare, and traceability are shaping dairy industries in Western markets; 5) Technology adoption, digitization, and artificial insemination programs are emerging as key enablers for productivity growth in developing regions.

Kumar et al. (2015)

Kumar et al. (2015) examined the trajectory of India's dairy sector post-2010, with special emphasis on the role of cooperative institutions and private-sector engagement. The study found that states like Gujarat and Karnataka benefitted immensely from farmer-owned milk cooperatives, which ensured fair procurement prices and better access to markets. Methodologically, the authors used secondary data from the National Dairy Development Board (NDDB) and household surveys to analyze production trends. Their results showed that technological interventions, particularly artificial insemination and improved cattle

feed, boosted productivity at the farm level. The paper also emphasized the role of government schemes in creating infrastructure for chilling, storage, and transport, which reduced wastage. The authors concluded that India's position as the world's leading milk producer is closely tied to grassroots cooperative structures. Importantly, they argued that sustainability of dairy growth would depend on continuous support for smallholder farmers.

Sharma and Singh (2016)

Sharma and Singh (2016) studied the trend of per capita milk availability in India from 2014 onward, linking it with nutrition security goals. Their analysis used national consumption datasets, including NSSO surveys, and examined differences between urban and rural households. They found that while per capita milk consumption steadily increased, the gains were disproportionately higher in urban areas due to income effects and better access to packaged milk. The study also highlighted how rising demand for value-added dairy products such as paneer, yogurt, and cheese was reshaping the structure of the dairy sector. The authors argued that milk is a crucial source of affordable protein for low-income households, and hence, equitable distribution is essential. They also pointed out challenges, such as seasonal fluctuations in milk supply, which often affect availability and pricing. Overall, their findings underscored the dual role of milk in both economic and nutritional security for India's population.

Rathod and Chander (2016)

Rathod and Chander (2016) focused on milk quality and safety issues in the Indian dairy industry, particularly in unorganized markets where adulteration is prevalent. Their research combined laboratory testing of milk samples with interviews of dairy farmers and vendors. The results showed alarming levels of adulterants such as water, detergent, starch, and synthetic chemicals in a significant proportion of unregulated milk sales. These practices were attributed to poor enforcement of food safety laws and a lack of consumer awareness. The authors emphasized the risks to public health, particularly for children and the elderly, who are more vulnerable to contaminated milk. They also noted that the reputation of Indian dairy exports could suffer if these issues were not addressed. Policy recommendations included stricter regulation, better farmer training in hygienic handling practices, and wider adoption of testing technologies at collection points. Their work underscored

the urgent need for aligning dairy growth with safety standards.

Comparative Analysis

Between 2014 and 2025, global milk production grew consistently, driven largely by India, EU, and the U.S. Consumption patterns, however, are more diverse: rising in Asia and Africa, declining in Western countries. Trade dynamics highlight Asia as the key growth market, while climate change presents an overarching risk to global dairy supply.

Conclusion

The literature indicates that milk production has expanded globally since 2014, but consumption shows contrasting patterns across regions. Developed countries face stagnation or decline, while emerging economies demonstrate rapid growth. Future research should focus on climate-resilient dairy practices, sustainability, and consumer shifts toward alternative products.

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