

# Sustainable development goals for the dairy sector and opportunities to increase milk consumption

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## Abstract

The dairy sector is widely recognized as a strategic component of sustainable development due to its contributions to economic growth, food security, nutrition, and poverty reduction. In Mongolia, despite abundant livestock resources and a long-standing tradition of milk and dairy consumption, actual milk intake—particularly processed milk—remains below internationally recommended levels. This paradox highlights the need for an integrated approach that links sustainable dairy sector development with consumer-oriented marketing strategies. This study aims to examine opportunities to increase milk consumption within the framework of sustainable dairy sector development by integrating sustainability marketing theory, agricultural marketing concepts, and international dairy sustainability frameworks. The study draws on a comprehensive review of international literature and policy documents, including the Sustainable Development Goals (SDGs), the Dairy Sustainability Framework (DSF), and sustainability marketing theory, alongside an empirical consumer survey. Primary data were collected through a questionnaire survey of 300 undergraduate students at the Mongolian University of Life Sciences. Quantitative and qualitative methods were employed, and the data were analyzed using SPSS, applying buyer decision-making models, marketing funnel analysis, and behavioral segmentation techniques. The results indicate that 68% of respondents consume less milk than the recommended intake level, while 63.7% expressed a clear willingness to increase their milk consumption. The findings further suggest that milk consumption among low-consuming students could increase by up to 92.7% if key constraints—such as lack of habitual consumption, limited consumer awareness, and insufficient product availability—are addressed. The study contributes to the literature by proposing a theoretical and methodological framework for sustainability marketing in the dairy sector that integrates production potential, consumer behavior, and sustainable development objectives. The findings offer practical implications for policymakers, dairy producers, and marketers seeking to promote sustainable dairy consumption, enhance household incomes of small-scale producers, and support the achievement of SDGs 1–3 in Mongolia and similar transition economies.

**Key words:** Dairy production, milk, food security, nutrition, consumer behavior, marketing, SDG

## Introduction

Globally, the dairy sector is regarded as one of the vital food sectors capable of sustainably meeting the steadily growing nutritional needs of the population over the long term. For instance, the Food and Agriculture Organization of the United Nations defines dairy development as “a sustainable, equitable, and powerful instrument for achieving economic growth, food security, and poverty reduction” (UNFAO, 2017). Similarly, the Global Dairy Agenda for Action emphasizes that dairy production is a rapidly growing sector that bears continuous responsibility for conserving natural resources, supporting livelihoods, and improving the capacity to provide safe and nutritious food from healthy livestock (Global Dairy Agenda for Action, 2015). In both developed and developing countries, the dairy sector serves as a key driver of rural economic revitalization by ensuring sustainable livelihoods for small-scale farmers and providing a flexible resource base for economic growth. The sector contributes significantly to the achievement of 13 out of the 17 Sustainable Development Goals, particularly through its roles in promoting economic growth, enhancing food security, and reducing poverty (UNFAO, 2017).

In the contemporary context, where countries pursue sustainable development policies that balance economic growth, social well-being, and the rational use of natural resources, the Government of Mongolia has adopted several strategic policy documents supporting agricultural and livestock development. These include the “Sustainable Development Vision of Mongolia–2030” and the “Long-Term Development Policy of Mongolia: Vision–2050,” both of which emphasize increasing milk production and consumption. In parallel, Mongolian scholars and researchers have produced a growing body of research on sustainable development concepts in agriculture, particularly within the livestock sector. In Mongolia, the dairy sector remains a fundamental source of food supply at both household and national levels and continues to serve as a cornerstone of sustainable economic development. The “Long-Term Development Policy of Mongolia” highlights objectives such as stabilizing food supply and accessibility through agricultural production, increasing the contribution of agricultural output to gross domestic product, and developing livestock production systems that preserve traditional heritage while aligning with green economy principles (Government of Mongolia, 2021).

The development of Mongolia’s dairy sector is closely linked to both traditional milk and dairy product production and the advancement of the dairy processing industry. Within these two directions, this study focuses specifically on livestock milk and dairy products, with particular attention to milk consumption. Historically, Mongolians have relied on pastoral livestock husbandry for over 5,000 years as their primary livelihood, producing more than 400 varieties of food products, including approximately 200 meat-based dishes, 150 dairy and milk-based foods, and over 50 types of pastries and other food items (Tsevel, 1959). Milk and dairy products prepared using traditional methods have remained essential components of the population’s daily diet up to the present day. Therefore, based on the sub-targets of Sustainable Development Goals 1–3—namely supporting livelihoods, ensuring access to essential and nutritious food, strengthening household food security, and promoting healthy, affordable, and sustainable diets ((UNFAO, 2017); see Table 1)—this study aims to explore opportunities to increase milk consumption among consumers within the framework of sustainable development.

Sustainable development has been a cornerstone of global policy discourse since the Brundtland Report, which defined it as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. This foundational concept has evolved into the United Nations’ 2030 Agenda for Sustainable Development,

encompassing 17 Sustainable Development Goals that integrate economic, social, and environmental dimensions. Within the food systems domain, sustainable development emphasizes resilient production, equitable access to nutrition, and minimized environmental footprints. The dairy sector exemplifies this interplay, contributing to SDGs such as no poverty, zero hunger, good health and well-being, and responsible consumption and production, among others (Breeman et al., 2015; Mehrabi et al., 2020).

The concept of sustainable development was formally articulated in the Brundtland Report as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development [WCED], 1987). This principle later evolved into the United Nations 2030 Agenda for Sustainable Development, comprising 17 Sustainable Development Goals (SDGs) that integrate economic growth, social equity, and environmental protection (United Nations, 2015).

Within global food systems, the dairy sector plays a strategic role in contributing to multiple SDGs, particularly those related to poverty reduction, food security, nutrition, and inclusive economic growth (Food and Agriculture Organization of the United Nations, 2017). Dairy farming provides regular income streams, enhances household food security, creates rural employment, and supports women's economic participation in many developing and transition economies (Food and Agriculture Organization of the United Nations, 2019). Globally, approximately 149 million dairy farms operate worldwide, and nearly one in seven people depend directly or indirectly on dairy production for their livelihoods (Global Dairy Agenda for Action, 2016).

The Dairy Sustainability Framework (DSF), developed through collaboration among international dairy organizations, provides a structured approach to improving sustainability performance across environmental, social, and economic dimensions of the dairy value chain. The framework emphasizes reducing environmental impacts, supporting livelihoods, and enhancing well-being, including product safety, animal welfare, and working conditions (Global Dairy Agenda for Action, 2016). By covering the entire value chain—from production and processing to distribution and consumption—the DSF aligns dairy sector development with global sustainability objectives.

Sustainability marketing extends traditional marketing theory by integrating ecological and social considerations into value creation and exchange processes (F. M. Belz & Peattie, 2009). Rather than focusing solely on short-term demand stimulation, sustainability marketing promotes long-term relationships, responsible consumption patterns, and co-creation of value among stakeholders.

In agricultural contexts, marketing plays a critical role in connecting production systems with consumer demand while addressing perishability, seasonality, quality variability, and spatial market fragmentation (Kohls & Uhl, 2002). Dairy products, in particular, require coordinated supply chains and effective communication strategies due to their nutritional characteristics and short shelf life. The integration of sustainability marketing with agricultural marketing theory suggests that increasing milk consumption cannot rely exclusively on production expansion. Instead, demand-side interventions—such as consumer education, accessibility improvements, segmentation strategies, and trust-building mechanisms—are essential to ensure that available milk resources translate into actual consumption.

Consumer behavior models provide important insights into dietary decision-making. The Theory of Planned Behavior (Ajzen, 1991) posits that attitudes, subjective norms, and perceived behavioral control influence behavioral intentions and actual behavior. In the context of food

consumption, factors such as health awareness, habitual patterns, income constraints, accessibility, and cultural norms significantly shape purchasing and consumption decisions (Verbeke, 2005; Grunert, 2002). Studies on dairy consumption indicate that awareness of nutritional benefits, perceived affordability, product availability, and established habits strongly influence milk intake levels (Food and Agriculture Organization of the United Nations, 2019). Even in contexts where production capacity is sufficient, consumption may remain low if behavioral, informational, or structural barriers persist.

In pastoral-dominant economies, traditional dietary patterns and rapid urbanization may further complicate consumption dynamics. Mongolia represents a distinctive case: despite abundant livestock resources and a long history of dairy-based food culture, processed milk consumption remains below recommended intake levels, particularly in urban populations. This divergence suggests that production potential alone does not automatically translate into adequate nutritional outcomes.

While international literature extensively examines dairy production efficiency and environmental sustainability, fewer studies integrate sustainability marketing principles with dairy sector development in pastoral and transition economies. In particular, there is limited empirical research connecting sustainable dairy frameworks with consumer-oriented strategies aimed at increasing milk consumption in contexts characterized by strong traditional practices and rapid socio-economic transformation. This study addresses this gap by integrating sustainable development theory, the Dairy Sustainability Framework, sustainability marketing concepts, and consumer behavior models to examine milk consumption patterns in Mongolia. By linking supply-side production potential with demand-side behavioral factors, the study proposes a conceptual foundation for sustainability-oriented dairy marketing in pastoral economies.

Milk consumption levels vary significantly across developed, developing, and less developed countries. In the context of continuously growing global food demand and the increasing emphasis on healthy and sustainable lifestyles, there is an urgent need to sustainably expand milk production and further develop dairy markets worldwide. The International Dairy Federation has identified the main areas of dairy research as including the environmental impacts of dairy production, animal health and welfare, dairy sector policy and economics, food safety, dairy science and technology, dairy marketing, and dairy farming systems (IDF, 2014). At the same time, there is a growing need to align economic and marketing policies in the dairy sector closely with sustainable development objectives, while addressing livestock production, breeding and genetics, animal health and welfare, pasture management, water supply, and labor conditions within an integrated and comprehensive system.

During the course of conducting research on milk and dairy product consumption, several challenges were encountered, including restrictions related to the COVID-19 pandemic, the absence of dedicated financial support for the research, and the limited availability of comprehensive market and consumption studies on milk and dairy products in online sources.

## **Methods**

Scholars increasingly emphasize the importance of developing the dairy sector holistically within the framework of sustainable development. As a result, various models, approaches, and conceptual frameworks for sustainable dairy sector development have been proposed, and

international associations and program organizations have begun to collaborate more closely with dairy farmers and dairy business operators.

Based on marketing science, theories and methodologies of sustainability marketing, and selected global models and practices in the dairy sector, this study aims to review the methodological framework for sustainable dairy sector development and to identify opportunities to increase milk consumption within the context of sustainable dairy sector development.

The study employed a mixed-methods approach, combining policy document analysis, literature review, demand–supply estimation methodologies (National Statistical Office of Mongolia, 2015), and both quantitative and qualitative research methods.

Within the scope of the research objectives, a document-based literature review was conducted drawing on theories and methodologies of marketing management, agricultural marketing, and sustainable development, as well as policy and methodological materials related to sustainable dairy sector development issued by the International Dairy Federation and Asian dairy associations. Based on this review, a theoretical and methodological framework for the development of sustainable dairy sector marketing was synthesized.

The livestock sector is one of the key pillars of Mongolia’s economy, and for Mongolians, milk is a traditional, “organic,” strategic, and nutritionally rich food. Increasing milk production and consumption has long been regarded as a national policy priority and a core area of public and sectoral intervention. During discussions on the study of milk consumption as a key component of achieving sustainable dairy sector development goals, a proposal was made to examine milk consumption among students of the Mongolian University of Life Sciences within the sub-objective “Protecting Public Health through Increasing Milk Consumption,” implemented under the joint project L2766-MON: Higher Education Reform Project of the Ministry of Education, Culture, Science and Sports of Mongolia and the Asian Development Bank. In alignment with the objectives of this project, the research team refined the study objectives, design, plan, and methodology through multiple consultations with project stakeholders and subsequently initiated the empirical study.

Under the project’s sub-objective, a total of 300 first- to fourth-year students of the Mongolian University of Life Sciences were surveyed. The study examined consumption patterns of major traditional Mongolian dairy products derived from livestock milk—namely milk, yogurt, sour cream, cream, butter, clarified butter, white butter, clotted cream, dried curds (*aaruul*), curds (*eezgi*), and cheese—as well as selected processed dairy products, including milk, yogurt, sour cream, and butter. From the overall findings, the present study focuses specifically on milk consumption patterns.

The student milk consumption survey was designed using a problem- and objective-oriented research framework. The questionnaire was developed based on the five-stage buyer decision-making model. Sample units and sample size were determined using probability and purposive sampling methods, and data were collected through questionnaires and interviews. The collected data were processed and analyzed using SPSS software. Drawing on the concepts of the “marketing funnel” and behavioral segmentation analysis, milk consumption segments were identified, and opportunities to increase milk consumption were assessed based on demand–supply conditions, consumption and purchasing characteristics, and the reasons underlying insufficient milk consumption.

## **Results**

## **Sustainable Development Goals, Trends in Sustainable Dairy Sector Development, and Research Approaches**

In Mongolia, issues related to sustainable dairy sector marketing represent a relatively new and increasingly important area of research. This field has attracted growing academic interest due to its relevance to sustainable development, food security, and agricultural modernization. In reviewing existing studies, this research focuses on three main dimensions: the core theoretical concepts of sustainable development, the models and methodologies commonly applied in studies conducted by global dairy organizations, and patterns of milk consumption.

Countries worldwide have increasingly embraced the concept of development that integrates human development, economic growth, and the rational use of natural resources within a framework of interdependence and mutual interaction. This approach, widely referred to as “sustainable development,” has guided the formulation and implementation of theoretical frameworks, methodological approaches, and core policy documents aimed at ensuring sustainability across all sectors.

The widely accepted definition of sustainable development was introduced in 1987 by the World Commission on Environment and Development, which defined it as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Bakei, 2016). This definition continues to serve as a foundational reference in sustainability-related research.

### **Global Perspectives on Sustainable Dairy Sector Development**

Globally, the dairy sector is regarded as one of the essential food sectors capable of sustainably meeting the continuously growing nutritional needs of the population over the long term. Dairy production is considered a rapidly growing sector that bears ongoing responsibility for conserving natural resources, supporting livelihoods, and continuously improving its capacity to supply safe and nutritious food derived from healthy livestock (Global Dairy Agenda for Action, 2016).

The Food and Agriculture Organization of the United Nations further emphasizes that dairy development represents a sustainable, equitable, and powerful instrument for achieving economic growth, food security, and poverty reduction (Food and Agriculture Organization of the United Nations, 2017). In addition, dairy farming is recognized as making a valuable contribution to sustainable development through the following mechanisms:

- Providing a stable and continuous source of income
- Supplying nutritious food
- Distributing and mitigating economic and production risks
- Improving the efficiency of resource utilization
- Generating employment both at the farm level and along related value chains
- Creating income-generating opportunities for women through dairy activities
- Enhancing financial stability and social status

These characteristics underscore the dairy sector’s multifaceted contribution to sustainable development.

### **Dairy Sector Contributions to the Sustainable Development Goals**

Within the framework of the 17 Sustainable Development Goals (SDGs), the FAO has identified the dairy sector as contributing significantly to a broad range of global objectives, including

poverty eradication, zero hunger, good health and well-being, quality education, gender equality, access to clean water and sanitation, affordable and clean energy, economic growth and decent work, innovation and infrastructure development, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, conservation of marine and terrestrial ecosystems, peace and justice, and strengthened global partnerships for sustainable development.

These findings demonstrate that the dairy sector plays a strategic role not only in food production but also in advancing social, economic, and environmental sustainability at both national and global levels. (Table 1)

**Table 1. The contribution of the dairy sector to achieving the 17 Sustainable Development Goals**

<b>Nº</b>	<b>Goals</b>	<b>The Contribution of the Dairy Sector</b>
1	No Poverty*	Dairy farming supports local livelihoods and contributes to poverty-reducing economic growth.
2	Zero Hunger*	Dairy farming contributes to the provision of essential nutrients and strengthens household food security.
3	Good Health and Well-being*;	Dairy products constitute an essential component of healthy, affordable, and sustainable diets.
5	Gender Equality;	It plays a significant role in strengthening women’s economic and social empowerment in low-income countries.
6	Clean Water and Sanitation;	In comparison to other livestock-based food sources, the water footprint of dairy products is considered moderate and efficient.
7	Affordable and Clean Energy;	Dairy farming generates biogas that can be utilized as a sustainable and renewable energy source.
8	Decent Work and Economic Growth;	The dairy sector provides year-round access to productive employment opportunities.
10	Reduced Inequalities;	Small-scale dairy farming represents an effective pathway for poverty reduction.
12	Responsible Consumption and Production;	Dairy farming transforms inedible plant resources into nutritionally valuable food products.
13	Climate Action;	Productivity-enhancing farming practices help lower greenhouse gas emissions.

Source: (FAO, <http://www.fao.org>, 2017)

Note: \*- can be interpreted as a goal directed toward increasing milk consumption. Note that there is no contribution to SDG 4, 9, 11, and 14-17.

Among the 13 Sustainable Development Goals (SDGs) to which the dairy sector contributes, Goals 1–3 can be interpreted as being directly oriented toward supporting and increasing milk consumption among the population. These goals emphasize poverty reduction, food security, improved nutrition, and the promotion of healthy lives, all of which are closely linked to adequate milk consumption.

In both developed and developing countries, international food and dairy organizations widely recognize the dairy sector as a key resource for revitalizing rural economies by ensuring sustainable livelihoods for small-scale farmers and providing a flexible foundation for economic growth. Consequently, policies aimed at dairy sector development commonly focus on increasing production while simultaneously promoting the appropriate consumption of milk and dairy products. Globally, including regions such as Latin America and Africa, there are approximately 149 million dairy farms, and around 14 percent of the world’s population—equivalent to one in every seven people—depend on dairy production and farming for their livelihoods (Global Dairy Agenda for Action, 2016).

To clarify the role of the dairy sector in sustainable development and to support its systematic development, global and European dairy organizations have developed and implemented the Dairy Sustainability Framework (DSF) with the support of researchers and experts. This framework has evolved into a comprehensive model for aligning dairy sector development with global sustainability trends across three core dimensions: reducing environmental impacts,

supporting livelihoods, and enhancing well-being. Within the environmental dimension, six key indicators are emphasized, including the use of biogas, improvement of soil fertility, enhanced management of waste, water, and land resources, and the conservation of biodiversity. The livelihoods dimension focuses on market development and rural economic growth, while the well-being dimension includes improving working conditions, ensuring product safety and quality, and protecting animal health and welfare. In total, the DSF comprises 11 indicators designed to establish a system for sustainable dairy sector development and to measure its outcomes (Global Dairy Agenda for Action, 2016).

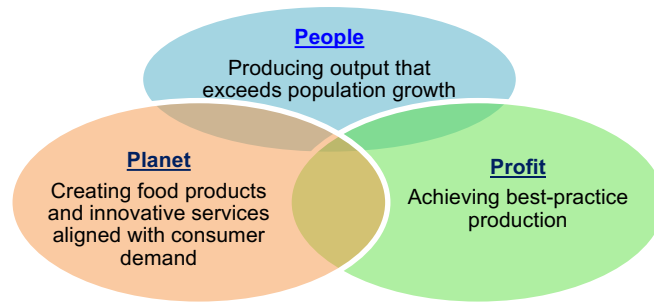
Some scholars argue that the dairy sector can align its development with sustainability objectives by addressing three major challenges: producing sufficient output to meet population growth, creating differentiated food products and services that respond to consumer demand, and achieving excellence in production efficiency. These challenges are closely linked to the sustainability concept of Planet, People, and Profit (the “triple P”), which emphasizes the balance between environmental responsibility, social well-being, and economic viability (Roel Jongeneel, 2013).

The scope of the Dairy Sustainability Framework encompasses the entire dairy value chain, including milk markets, procurement, distribution, transportation, and logistics. This comprehensive coverage directly connects the framework to “dairy marketing” grounded in the principles of agricultural marketing and marketing management. In the current global context, where countries pursue development strategies that balance economic growth, social well-being, and the rational use of natural resources, comprehensive and system-based models for dairy sector development are being formulated to support sustainable development at both national and agricultural sector levels. In Mongolia, the Government has adopted and implemented key policy documents supporting livestock and agricultural development, including the “Sustainable Development Vision of Mongolia-2030” and the “Long-Term Development Policy of Mongolia: Vision-2050.” In parallel, scholars and researchers have increasingly focused on sustainability concepts in agriculture, particularly within the livestock sector.

**Theoretical and Methodological Framework for Sustainable Dairy Sector Marketing.** Based on a review of literature sources—including scholarly works, research studies, and academic articles that elaborate the trends of sustainable development in agriculture and the dairy sector, sustainability marketing (F. Belz & Peattie, 2009), marketing management, agricultural marketing, and product marketing theories and methodologies—it is possible to synthesize an overview of theoretical and methodological approaches applicable to sustainable dairy sector marketing.

The findings suggest that, in terms of methodological approaches and practical frameworks, global and European dairy organizations have adopted and implemented several influential models developed by researchers and experts. These include the Dairy Sustainability Framework (DSF), often referred to as the “scope” or framework for dairy sector sustainability (Dairy Sustainability Framework, 2022), as well as the “Triple P” challenge approach. These frameworks can be used to conceptualize and structure sustainable dairy sector development and marketing (see Figure 1).

**Figure 1. “Triple P” approach**



Source: Roel Jongeneel (2013) Building on theories and methodologies of marketing management and agricultural marketing, approaches to sustainability marketing, concepts of sustainable agricultural development, the specific characteristics of agricultural production activities, and empirical findings from studies on milk and dairy product marketing, the theoretical and methodological framework for sustainability marketing in the dairy sector can be defined as follows (Tsagaan-Uvgun, 2017) (see Figure 2).

This theoretical and methodological framework represents the initial outcome of the present study. Further research will be required to refine the framework in greater detail and to expand the overall scope of the study in future investigations. Milk production and consumption constitute core components of the sustainability marketing framework for the dairy sector. During the exploratory phase of the research—aimed at defining research problems, objectives, and methodologies based on secondary data—it became evident that an in-depth examination of milk and dairy product consumption among students was necessary. This finding highlighted the importance of incorporating empirical analysis of consumer behavior, particularly among young consumers, into the broader framework of sustainable dairy sector development.

**Figure 2. A Theoretical and Methodological Framework for Sustainability Marketing Development in the Dairy Sector**



Source: Authors

### **Milk Consumption Study**

Increasing milk consumption serves as an important driver for achieving sustainable dairy sector development goals by improving access to healthy food for consumers and increasing household incomes of milk producers. This relationship is evidenced in studies examining the contribution of the dairy sector to the Sustainable Development Goals (see Table 1). Accordingly, this study analyzes global and Mongolian milk consumption patterns based on secondary data and compares them with the findings of consumer survey results in order to identify opportunities for increasing milk consumption.

**Global Milk Consumption.** Globally, more than six billion people consume milk and dairy products. With rising per capita income levels and increasing awareness of the health benefits of dairy products, per capita milk consumption has shown a significant upward trend. In developing countries alone, per capita milk consumption has nearly doubled since the 1960s. Per capita milk

consumption varies substantially across countries. According to classifications used by the Food and Agriculture Organization of the United Nations, countries with per capita consumption above 150 kg are considered high-consumption countries, those with consumption between 30 and 150 kg are classified as medium-consumption countries, and those with less than 30 kg per capita consumption are categorized as low-consumption countries.

At the global level, average per capita consumption of milk and dairy products has reached approximately 82.0 kg (Milk Consumption by Country, 2024). While the average per capita consumption in Asia stands at 60.4 kg, high-income countries record a significantly higher average of 196.0 kg per capita. In terms of regional distribution, Asia accounts for approximately 39% of total global milk consumption, followed by Europe with 28% and North America with 13% (Food and Agriculture Organization of the United Nations, 2024) (see Table 1).

**Table 1. Per Capita Milk Consumption Level by Country**

Consumption Level	Average Annual Consumption (kg)	Countries
High	above 150 kg	Argentina, Armenia, Australia, Costa Rica, Europe, Israel, Kyrgyzstan, North America, and Pakistan
Medium	30-150 kg	India, Islamic Republic of Iran, Japan, Kenya, Mexico, Mongolia, New Zealand, North and South Africa, Most of the Middle East, Latin America, and Caribbean countries
Low	up to 30 kg	Vietnam, Senegal, Most of Central Africa, Most countries of East and Southeast Asia

Source: <http://www.fao.org/dairy-production-products>. 2025.10.20

### Milk Consumption in Mongolia

According to data published by Our World in Data, Mongolia’s per capita milk consumption amounts to 241.1 kg, placing the country among high-consumption nations. However, findings from previous studies as well as results from the present sample survey indicate that actual milk consumption is two to three times lower than the level recommended by the World Health Organization, which suggests an annual consumption of approximately 100 kg of milk per person. Historical sources related to milk and dairy production and consumption in Mongolia indicate that, traditionally, Mongolians consumed more than 400 types of food products, including approximately 200 meat-based dishes, 150 dairy and non-meat foods, and over 50 varieties of pastries and other food items (Tsevel, 1959). These records provide strong evidence that until the 1960s, milk and dairy products constituted staple foods in the Mongolian diet, with relatively high levels of consumption. However, as lifestyles have changed, the consumption of milk and traditional dairy products has declined. Urban consumers, in particular, tend to consume mainly milk and yogurt, with significantly reduced consumption of other traditional dairy products. The findings of the present consumer survey further confirm this trend.

Although the number of livestock and breeding animals has increased annually—indicating strong potential for expanding milk production—the volume of industrially processed milk has not grown at a pace sufficient to match population growth. As of 2023, a total of 126.8 million liters of milk were processed industrially, representing only 15.5% of the total potential milk production from livestock. This corresponds to approximately 34 liters of processed milk per capita (Ministry of Food and Agriculture, 2024). When compared with the recommended daily milk intake for an average adult, domestic milk production has the potential to meet national demand by approximately 1.5 times. Nevertheless, significant disparities exist between urban and rural consumption patterns. For example, per capita milk consumption in Ulaanbaatar is 1.9 times lower than in rural areas and 1.4 times lower than the national average (see Table 2). Several studies have similarly highlighted pronounced differences in milk demand and consumption characteristics across population groups.

To examine milk consumption patterns and identify opportunities for increasing consumption among university students, a consumer survey was conducted involving 300 first- to fourth-year students of the Mongolian University of Life Sciences. Data were collected through questionnaires and interviews. The results show that 76.6% of respondents (230 students) consume industrially processed or packaged milk. On average, respondents consume 1.9 liters of milk per month, equivalent to approximately 64 grams per day. This level of consumption is 2.3 times lower than the recommended daily milk intake for an average adult (54.8 kg per year), as estimated by the National Statistical Office of Mongolia (2015).

**Table 2. Average Monthly Milk Consumption per Capita: Urban and Rural Areas**

No	Indicators	National average	Urban	Rural
1	Estimated Monthly Milk Requirement per Capita, kg (NSO, Methodology for Calculating Food Security Statistical Indicators, 2015)	4.5	4.5	4.5
2	Average Monthly Per Capita Consumption of Food Products, kg ( <a href="https://www.1212.mn/">https://www.1212.mn/</a> )	10.6	7.6	14.2
3	Results of the Study on University Students' Milk Consumption, liters	1.9*	-	-

Source: \*Delegjargal.J and Nansalma.Ts (2017) Average Consumption of the 300 Students Participating in the Survey

With respect to milk consumption specifically, 68% of the respondents (205 students) consume less than the recommended intake level, 19% (56 students) meet the recommended level, and 13% (39 students) consume more than the recommended amount. In addition, 63.7% of the students (191 respondents) indicated their intention to increase their milk consumption.

A further disaggregated analysis of students with low milk consumption reveals that, provided income constraints are not binding, milk consumption could increase to as much as 92.7% if targeted interventions are implemented. These interventions include supporting the development of regular milk-drinking habits, improving access to relevant nutritional information, and enhancing the availability and delivery of milk at retail outlets located near students' residences.

### **Opportunities and Approaches to Increase Milk Consumption**

There is considerable potential to increase the consumption of traditionally prepared milk and dairy products. Milk contains approximately 300 bioactive components, including more than 20 types of fatty acids, over 20 amino acids, about 25 lipid compounds, nearly 30 mineral salts, 23 types of vitamins, four types of milk sugars, as well as various enzymes, hormones, and activating substances. Due to this rich composition, milk possesses nutritional properties capable of substituting many food products, while no other single food product has yet been identified that can fully replace milk in terms of its nutritional value (M. Indra & Narangerel, 2012) (Tsoodol, 1975).

One liter of cow's milk contains approximately 40 grams of fat, 33 grams of protein, and 47 grams of lactose. Consuming half a liter of milk per day can meet 30–50% of daily fat and protein requirements and provide approximately 650 kilocalories, highlighting the significant nutritional contribution of milk to daily dietary needs (R. Indra, 2009). According to estimates by the Ministry of Food, Agriculture and Light Industry of Mongolia (2020), Mongolia has the potential to produce approximately 1,074 thousand tons of milk from livestock, of which about 70% could be utilized in some form. When disaggregated by livestock type, it is estimated that 50% of milk from mares, camels, sheep, and goats, and 80% of cow's milk could be utilized. Under these assumptions, approximately 441.4 thousand tons of traditional dairy products could be produced using traditional methods and consumed as food (see Table 3).

**Table 3. Utilization of Milk Reserves Prepared by Traditional Methods, tons**

Type of Livestock	Milk Reserves	Utilized Reserves (70%)	Used for Drinking Milk (20%)	Traditional Dairy Products	Name of Dairy Food Products for Consumption
Mare	90.1	63.1	-	31.5 (50%)	Airag (Fermented Mare's Milk)
Cow	668.8	468.2	93.6	299.6 (80%)	Dairy Products and Drinking Milk
Camel	19.2	13.5	-	6.7 (50%)	Khoormog (Fermented Camel's Milk)
Sheep	123.6	86.5	-	43.3 (50%)	Dairy Products
Goat	172.3	120.6	-	60.3 (50%)	Dairy Products

Source: Calculation of the Ministry of Food, Agriculture and Light Industry (MOFALI). (MOFALI, <https://mofa.gov.mn/>, 2020) Only the calculation conducted in 2020 is available on the official website of MOFALI.

According to a study conducted by the Japan International Cooperation Agency (2017, August, p. 3:59), cow's milk (including yak milk) accounts for approximately 60% of total milk consumption in Mongolia, followed by goat milk at 31%, sheep milk at 5%, and camel milk at less than 1%. These findings indicate that Mongolian consumers have both the interest in and the potential to consume milk from all five traditional livestock species.

Although a unified and officially established methodology and data collection system for estimating the total consumption of Mongolian livestock milk and dairy products has not yet been developed, several empirical findings provide useful insights. According to the Baseline Survey Report of Herder Households, an average herder household owning approximately 333 head of livestock sells about 64 kg of milk and dairy products to the market and distributes around 453 kg of milk and dairy products to others (MMCG, 2017). Assuming that an average urban household consumes approximately 25 kg of dairy products annually, this level of supply could meet the dairy consumption needs of more than 20 urban households.

Given that approximately 44,000 herder households own more than 500 head of livestock, there is significant potential for these households to supply traditional dairy products to over 400,000 urban households in the capital city. Such a system could help revive traditional dairy consumption practices and food culture, increase overall milk and dairy consumption, enhance herder household incomes, improve living standards, and contribute meaningfully to the sustainable development of the dairy sector.

There are also clear opportunities to increase milk consumption by raising awareness of the importance of milk among target markets and consumers and by encouraging habitual consumption. Findings from the present study indicate that two out of three students expressed a clear intention to increase their milk consumption. Among the 36.3% of students who reported that they would not increase their milk consumption, only eight respondents stated that they did not consume milk due to a lack of habit or perceived necessity (Delegjargal & Nansalma, 2017). The remaining respondents cited insufficient knowledge of the benefits of milk, lack of information, and the unavailability of suitable milk products in nearby food stores as the main barriers preventing regular milk consumption.

## Discussion

The findings show that milk consumption among the surveyed students remains considerably below the recommended intake level, despite Mongolia's strong livestock base and long tradition of dairy consumption. This suggests that low milk intake is not only a supply-side issue, but also a consumer-behaviour and market-access issue. The fact that 63.7% of respondents expressed willingness to increase milk consumption indicates a clear demand potential that has not yet been fully converted into regular consumption.

The main constraints identified in the study were limited milk-drinking habits, insufficient information on nutritional benefits, and weak product availability near students' residences—are consistent with established consumer behaviour theory. According to the Theory of Planned Behavior, intentions influence behaviour, but actual behaviour also depends on perceived control and enabling conditions (Ajzen, 1991). Similarly, food-choice studies show that consumers' decisions are shaped by habit, information, perceived quality, accessibility, and trust (Grunert, 2002; Verbeke, 2005). Therefore, increasing milk consumption requires not only general promotion, but also practical interventions that make milk more visible, accessible, affordable, and convenient for young consumers.

The nutritional relevance of milk further supports the policy and marketing importance of these findings. Milk and dairy products are important sources of high-quality protein, calcium, vitamin B12, iodine, and other nutrients, particularly for children, adolescents, adults, and older people (Givens, 2020). However, communication strategies should be evidence-based and should promote milk as part of a balanced and diversified diet, rather than as a single solution to nutrition problems.

Overall, the results support the need to integrate sustainability marketing into dairy sector development in Mongolia. Sustainable dairy development should not focus only on expanding production, but should also strengthen consumer awareness, retail availability, product trust, and habitual consumption. For Mongolia, this also creates an opportunity to link increased milk consumption with domestic dairy value chains, traditional dairy products, and improved income opportunities for herder households.

This study has several limitations. The survey covered only 300 students from the Mongolian University of Life Sciences and therefore cannot be generalized to all young consumers in Mongolia. The data were also self-reported, which may involve recall bias. Future studies should use larger and more representative samples, include price and income sensitivity analysis, and test specific interventions such as campus milk availability, nutrition information campaigns, smaller package sizes, and targeted habit-forming marketing strategies.

## **Conclusion**

Based on an in-depth review of theoretical and methodological literature on sustainable dairy sector development concepts, models, and approaches, this study concludes that the development and implementation of sustainable dairy marketing models and approaches tailored to Mongolia's context represent a key pathway for supporting the sustainable development of both the livestock and dairy sectors.

The full utilization of milk production potential derived from livestock production constitutes a significant opportunity to increase milk consumption among consumers.

The results of the milk consumption sample survey indicate that 68% of respondents (205 individuals) consume less than the recommended intake level, while 63.7% (191 respondents) expressed their willingness to increase milk consumption. These findings demonstrate a clear interest and motivation among consumers to include milk more actively in their daily diets.

Furthermore, the analysis suggests that milk consumption among low-consuming students could increase to as much as 92.7% if key constraints are addressed. These include ensuring sufficient income, supporting the formation of regular milk consumption habits, providing relevant

nutritional information, and improving the availability and delivery of milk at retail outlets located near consumers' residences.

Finally, revitalizing traditional knowledge and perceptions of milk as a nutritionally complete and irreplaceable food, alongside the effective implementation of marketing activities aimed at raising awareness of milk's benefits and fostering habitual consumption in target markets, has strong potential to significantly increase milk consumption among consumers..

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