

A REVIEW OF AGRIBUSINESS IN BHUTAN: CHALLENGES, OPPORTUNITIES AND PROSPECTS

JANGA BDR. GAYLAL^{1*} AND JAMBAY DORJEE¹

¹National Livestock Research Centre, Bumthang

*Author for correspondence: jangstshetry@gmail.com

Copyright© 2025 Janga Bdr. Gaylal. The original work must be properly cited to permit unrestricted use, distribution, and reproduction of this article in any medium

Abstract: *The agribusiness sector in Bhutan serves as a cornerstone of the nation's economy, supporting the livelihoods of over 60% of the population while playing a vital role in ensuring food security and preserving cultural heritage. Despite its importance, the sector faces multifaceted challenges such as limited market access, financial constraints, labour shortages, vulnerability to climate change, and inadequate infrastructure. This review examines the current state of agribusiness in the country, focusing on challenges, opportunities, and prospects for growth. Key opportunities for agribusiness in Bhutan include the promotion of organic farming, tapping into high-value and niche markets for both livestock and crop products, and expanding agro-processing capabilities. Sustainable forestry and non-timber forest products (NTFP) also present huge potential for income diversification in the rural communities. This study emphasizes the need for enhanced infrastructure, financial inclusion, adoption of climate-smart agricultural practices and public-private partnerships (PPP) to drive transformation of the agribusiness sector in the country. By effectively addressing these existing challenges and leveraging the opportunities, Bhutan can achieve sustainable growth, contribute to rural development and align with the principles of Gross National Happiness (GNH) while responding to both national priorities and global demand for sustainable agricultural products.*

Keywords: Agribusiness; Bhutan; Challenges; Crops; Forestry; Livestock; Opportunities; Prospects

1. INTRODUCTION

Agriculture refers to crops, livestock and forestry & logging (NSB 2024). Agribusiness is a sector that includes all activities related to the manufacturing and distribution of agricultural supplies, farm production operations, as well as the storage, processing, and distribution of farm products and goods (Davis and Goldberg 1957; FAO 2010). In Bhutan, the agribusiness encompasses various activities, including crop cultivation, livestock rearing, forestry, and related value-added processes such as processing, packaging, and marketing (World Bank 2017). Agribusiness in Bhutan plays a crucial role in the nation's economy, contributing substantially to its Gross Domestic Product (GDP), employment

generation, and food security (Dendup 2018; World Bank 2017). The Royal Government of Bhutan (RGoB) has implemented various initiatives in Bhutan to support the agribusiness sector. These include the provision of subsidies, agricultural extension services, improved access to credit, and promotion and adoption of modern technologies and farming practices (World Bank 2017). Additionally, Bhutan has emphasized organic farming practices, building on its traditional knowledge and sustainable natural resource management systems. Bhutanese farmers have maintained soil fertility through the use of farmyard manure and leave litter even after decades of agricultural development. The approach aligns with Bhutan's image as an environmentally conscious nation and

capitalizes on the growing demand for organic products globally (Tashi and Wangchuk 2016). The agribusiness sector in Bhutan comprises agriculture, livestock and forestry & logging with a GDP of 14.96% in 2023 (National Statistics Bureau [NSB] 2024). Bhutan relies heavily on agriculture as a primary source of livelihood for its population. The agriculture sector accounts for 43.50% of employment in the country (NSB 2024), and agribusiness plays a pivotal role in the employment and economy of the country. With rich agricultural traditions and a commitment to sustainable development, Bhutan presents a unique landscape for agricultural growth and innovation (Chogyel and Kumar 2018). Despite the importance of the agribusiness sector in Bhutan, its development has been hindered by several challenges. These challenges include limited access to markets, fragmented value chains, and vulnerability to climate change impacts (Chhogyel and Kumar 2018). However, the RGoB has taken proactive measures to address these challenges and promote agricultural modernization and diversification. The 12th Five-Year Plan (FYP) and the Agriculture Development Strategy outline key priorities to improve agricultural productivity, promote value addition, and ensure sustainability across the agricultural value chain (International Centre for Integrated Mountain Development (ICIMOD) 2018). These initiatives highlight Bhutan's commitment to achieving both economic growth and environmental conservation, aligning with the principles of Gross National Happiness (GNH). The objective of this study was to conduct a comprehensive review of agribusiness in Bhutan, focusing on the current status, challenges, opportunities, and prospects. The study not only explores the intricate interplay between agriculture, the economy, and society in Bhutan but also lays the foundation for

evidence-based policy formulation, strategic interventions, and collaborative partnerships to address issues faced by the agribusiness sector in the country.

2. MATERIALS AND METHODS

To carry out this review, an extensive literature search was conducted covering academic databases, digital libraries, and government publications. The search phrases used included "agribusiness in Bhutan", "agribusiness", and "Bhutan agriculture practices, livestock farming practices, forestry & logging", "Organic agriculture in Bhutan", "agriculture opportunities in Bhutan". Both peer-reviewed journals and grey literature sources were referred to ensure a comprehensive coverage of relevant documents. A total of 49 international papers, 25 national papers, three international news report, and three national news reports were used as resources. Additionally, data were retrieved from the Ministry of Agriculture and Livestock (MoAL), Ministry of Energy and Natural Resources (MoENR), Royal Monitory Authority (RMA), National Centre for Hydrology and Meteorology (NCHM) and National Statistics Bureau (NSB) data repositories.

3. RESULTS AND DISCUSSION

3.1 Agriculture and agribusiness

Bhutan's agriculture is predominantly subsistence-based, with most farmers engaged in crop, livestock, and non-wood forest products (Ministry of Agriculture and Forests (MoAF) 2019). The key crops include rice, maize, wheat, barley, and various fruits and vegetables, while livestock farming includes the rearing of cattle and poultry and in forestry include logging and non-timber forest products (NSB 2024). The country's mountainous terrain and climate conditions, which vary

greatly by altitude, favour the mechanism of multiple cropping (Katwal and Bazile 2020). Despite the challenges of limited arable land, farming is still integral to Bhutan's economy (World Bank Group 2017).

Agriculture and livestock farming remains the primary occupation for a majority of Bhutan's population (NSB 2024), particularly in rural areas, where farming communities rely on traditional agricultural practices passed down through generations (Dendup 2018).

3.2 Importance to the economy

The agribusiness has a notable contribution to the GDP. The line graph illustrates the percentage contribution of the crops, livestock, and forestry & logging sectors to Bhutan's GDP from 2000 to 2023. Overall, all three sectors show a declining trend in

their economic contribution over the years. The crops sector experienced a steady decline until around 2014, followed by a modest recovery between 2015 and 2021, peaking in 2021 before dropping slightly again. The livestock sector mirrored this trend, with a dip until 2015 and a gradual increase thereafter, particularly noticeable after 2021. Forestry and logging exhibited the sharpest and most consistent decline, especially after 2004, and stabilized at a low level around 2.5–3% from 2013 onwards. This trend indicates a decreasing reliance on primary agricultural and natural resource sectors in Bhutan's economy over the past two decades. Agribusiness activities such as farming, livestock rearing, and food processing play a crucial role in driving rural economies and sustaining livelihoods (NSB 2023).

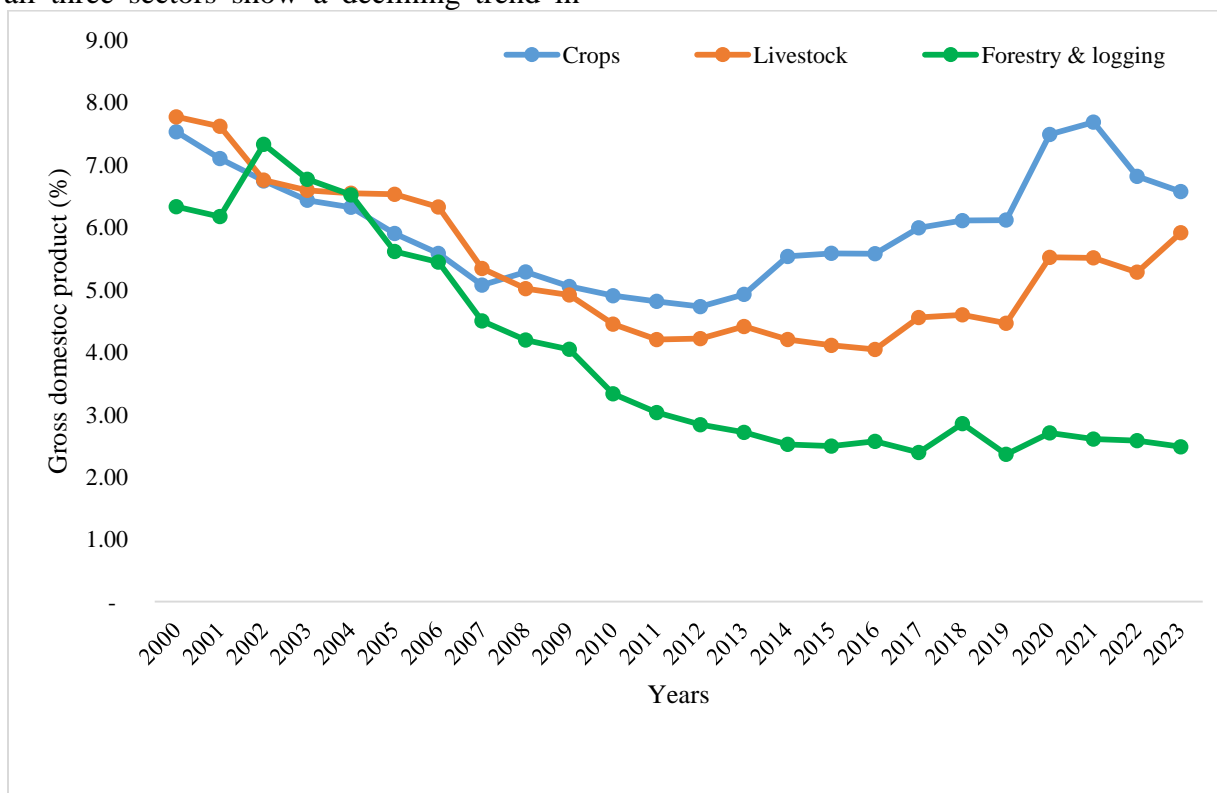


Figure 1: Graph shows gross domestic product contribution trend by crops, livestock and forestry & logging (Source: National Statistics Bureau 2001-2024).

3.3 Agribusiness diversity

3.3.1 Crop diversity

Bhutan has rich crop diversity, encompassing a wide range of plant species that are vital to food security, nutrition, and livelihoods (NSB 2023). The country cultivates several types of cereals such as rice, maize, wheat, and barley, which form the staple diet of the population (Food and Agriculture Organization (FAO) 2023). In addition to cereals, oilseeds and pulses like mustard, soybean, and beans are grown, contributing to both dietary protein and edible oil production (FAO 2022). Bhutanese farmers also produce a variety of vegetables, including cabbage, chilli, radish, and tomato, which are essential for balanced nutrition. The spice category, with crops like ginger and turmeric, holds cultural and economic importance, often used in traditional cuisine and as cash crops (FAO, 2022; Ministry of Economic Affairs (MoEA) 2022). Roots and tubers such as potatoes, sweet potatoes, and yams are cultivated in different agro-ecological zones, providing both food and income (Scott et al. 2000). Fruits like apples, oranges, and bananas further enhance crop diversity, supporting nutrition and offering export potential. This diverse agricultural landscape reflects Bhutan's adaptation to its varied climate and topography while promoting food sovereignty and sustainability. These diverse agricultural output highlights Bhutan's ability to cultivate a range of crops adapted to its various agro-climatic zones and adapt the mechanism of mixed cropping (Katwal and Bazile 2020).

3.1.2. Livestock diversity

Livestock diversity in Bhutan plays a crucial role in ensuring food security, rural livelihoods, and cultural heritage (Sherpa 2010). Livestock farmers in Bhutan raise a variety of livestock species that provide a

wide range of products (FAO 2023). Dairy animals such as cows and yaks produce milk, which is used to make butter, cheese, and the traditional hard cheese known as *chugo* (NSB 2023). These dairy products are not only dietary staples but also important for trade and religious offerings. Meat production includes pork, beef, chevon, mutton, and chicken, catering to diverse dietary preferences across the country (NSB 2023).

Fish farming and capture fisheries contribute to protein intake, particularly in southern regions (NSB 2023). Poultry also supports egg production, which is a key source of nutrition and income (NSB 2023; Food and Nutrition Australia 2013). Beekeeping is practiced in some areas, producing honey that is valued for its medicinal and economic benefits (Bhujel et al. 2022). In the highlands, yaks provide not only milk and meat but also yak fibre, which is used for weaving and making traditional garments (Wangdi et al. 2023). Similarly, sheep are raised for wool, contributing to local textile production. The yak fibre and sheep wool also contribute to Bhutan's textile industry (Choki et al. 2022; Dorji et al. 2017). This rich livestock diversity reflects Bhutan's adaptation to its varied agro-ecological zones and supports sustainable agriculture, rural development, and cultural continuity. Traditional livestock rearing methods coexist with limited market-oriented approaches, which cater to both subsistence needs and increasing demand for livestock products. Modern commercial farming offers opportunities to enhance productivity and meet growing market demand for dairy, meat, and wool products (IFAD 2015).

3.1.3 Diversity in Forestry Agribusiness

Forestry sector in Bhutan plays a pivotal role in the country's agribusiness landscape, especially NTFP and logging, contributing

to both economic development and environmental sustainability (FAO 1996; World Bank 2019). This sector holds a 5.42% contribution to the GDP in the year 2023 (NSB 2024). Rich biodiversity of Bhutan supports the production of NTFP (UWICE 2011). Agribusiness ventures in NTFP involve the sustainable harvesting, processing, and marketing of these valuable resources. The community-based enterprises and cooperatives are crucial players in these NTFP value chains, contributing to rural livelihoods and the conservation of biodiversity (UWICE 2011; Harbi et al. 2023). The timber industry is a major component of this sector (MoENR) 2023). Community forestry initiatives, alongside sustainable certification programs, are integral to responsible forest management in Bhutan, ensuring that timber resources are used in an environmentally and socially responsible manner (UWICE 2011). These practices not only support the timber industry but also promote conservation and sustainable livelihoods for local communities. According to Derebe and Alemu (2023), the production of NTFP and timber supports agribusiness development and contributes to the progress of the agrarian community.

3.2 Challenges in agribusiness

3.2.1 Access to Markets

As per the World Bank (2017), Bhutanese farmers face isolation on two fronts: internally, where accessing markets in nearby towns can be challenging, and externally, as establishing connections with a wide range of trading partners is difficult and expensive for a landlocked country like Bhutan. These challenges impede its growth and sustainability (Poudel 2018).

To support the sale of fruits and vegetables, the Food Corporation of Bhutan Limited (FCBL) operates auctions that handle a

variety of products, including apples, areca nut, citrus, other fruits, potatoes, spices, and vegetables with a volume of 22,256.62 metric tons (MT) in 2023 (FCBL 2024). The export links established by the FCBL provide access to the growing number of farmers to markets (World Bank 2017). The study by Bhutan Agro Industries Limited (BAIL) (2023) revealed that the marketing channel is being linked with the farmers to market the agricultural produce. According to the MoAF (2020), the global and regional market access network was established with several countries. The Indo-Bhutan Free Trade Agreement (FTA) signed in 1972 facilitates duty-free trade between Bhutan and India, granting Bhutan transit rights through India to access third-country markets. It is a crucial advantage for a landlocked nation (MoAF 2020). Further, in 2022 Bhutan-Bangladesh Preferential Trade Agreement was signed, and this agreement grants Bhutan duty-free access to the Bangladeshi market. The trade route through Assam and Meghalaya enhances connectivity, making it easier and more efficient for goods to move between Bhutan and Bangladesh (South Asia Sub-regional Economic Cooperation (SASEC) 2023).

Additionally, in 2004 Bhutan the member country of the South Asian Association for Regional Cooperation (SAARC), including Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka herein under South Asian Free Trade Area (SAFTA) Bhutan benefits from reduced tariffs and trade barriers within the SAARC region, promoting regional trade and economic integration (SAARC) 2020).

The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) promotes collaboration in various sectors, including trade, technology, and transport. Participation of Bhutan in BIMSTEC in

2004 opened opportunities for economic cooperation and market access across South and Southeast Asia (RGoB 2021).

Bhutan, connecting to the European Union (EU), Generalised System of Preferences (GSP) allows Bhutan to export certain products to the EU with reduced or zero tariffs. This preferential treatment helps Bhutanese products become more competitive in the EU markets. On the contrary, the GSP for Bhutan ends in 2027 (Generalised System of Preferences Hub 2025).

As a Least Developed Country (LDC), Bhutan benefited from the European Union's Everything But Arms (EBA) Initiative since 2000. The EBA grants duty-free and quota-free access to all products, except arms and ammunition exported to the EU. This initiative significantly enhances Bhutan's trade prospects with Europe (Cernat et al. 2003).

3.2.2 Access to finance

Access to finance remains a critical factor in doing business (Asian Development Bank (ADB, 2010). According to RMA (2022), the most excluded group in terms of access to financial services is those involved in agricultural farming, with 28.5% remaining unbanked. These individuals experience greater levels of exclusion from formal financial services and indicating a huge gap in financial inclusion for rural communities.

3.2.3 Climate Change Vulnerability

According to the NCHM (2024), the socio-economic sectors of Bhutan are highly sensitive to climate change and are facing a range of challenges as a result of its impacts. Major sectors of the economy, particularly agricultural (crop, livestock and forestry), are under increasing pressure from climate change related risks. Economy of Bhutan remains heavily reliant on natural resources,

particularly through agriculture, hydropower, and tourism (FAO 2009). Additionally, approximately 67% of households, primarily in rural areas, depend directly or indirectly on forests and nature-based goods and services for their livelihoods (NCHM 2024).

3.2.4 Agriculture technology

According to the Walter (2004), the adoption of agriculture technologies by the farmers is influenced by fears of financial loss, the high cost of machineries and limited access to knowledge sharing regarding technology.

Walter (2004) reported high technologies adoption rates like animal traction for potatoes (50%) and fodder pumpkin (40%) have higher adoption rates due to low risks, minimal costs, and ease of farmer-to-farmer knowledge transfer. In contrast, complex and costly innovations like temperate fodder and newer potato cultivation methods have low adoption rates of less than 5% despite high income potential. Subsidy support is critical for high-cost technologies and their adoption (e.g., 60 US\$/ha for temperate fodder), while technologies like animal traction require minimal financial assistance. Research-intensive innovations, such as rice varieties and new potato cultivation methods, rely heavily on extension services for effective dissemination, highlighting the need for tailored outreach strategies to promote the adoption of advanced agricultural solutions. Further, according to the inherently fragile nature of mountain

environments restricts farmers from experimenting with risky innovations.

3.2.5 Land Degradation

Bhutan has 1137.92km² of agricultural land (NLCS 2023). However, the land resources are increasingly under threat from various forms of land degradation, which puts the livelihoods of the agrarian community at risk (MoAF 2014). In addition, Zam (2020) revealed that land fragmentation poses a foremost threat to the Bhutanese agricultural system. Sklenicka (2016) revealed that the result of ownership changes through sales or family inheritance is also a cause of land use changes.

Norbu et al. (2003) identified several types of land degradation in Bhutan. Water-induced degradation, such as gullies, landslides, ravine formation, and local flooding, is particularly widespread and destructive. In-situ chemical degradation, such as the depletion of soil organic matter and nutrient mining, along with physical degradation like topsoil capping and subsoil compaction, are also major concerns. These forms of land degradation and fragmentation pose severe threats to Bhutanese agriculture.

3.2.6 Labour and Input Access

Labour shortages continue to affect agricultural productivity (FAO 2022). A study by BAIL (2022) revealed that more than 65% of the agrarian community faces major labour shortages in carrying out agricultural activities. According to Dema (2024), the agriculture sector will be allowed to employ foreign workers to address and sustain agricultural activities. To support agricultural activities, the Royal Government of Bhutan (RGoB) has introduced initiatives such as subsidies for machinery (Wang et al. 2019). The majority of inputs in Bhutan are government-driven, and are supplied through government

initiatives presenting huge opportunities for the production, commercialisation, and distribution of organic fertilisers, bio-pesticides, organic feed, organic seeds, seed cleaning and processing machines, labelling and packaging, and mushroom spawn production facilities (MoAL 2020). Belt et al. (2015) reported that access to agricultural inputs is a crucial factor in improving the productivity and sustainability of the farming sector.

3.3 Agribusiness opportunities in Bhutan

3.3.1 Crops

The agriculture sector is a critical part of Bhutan's economy, presenting various opportunities in crop production, particularly in organic farming, high-value crops, and agro-processing (MoA 2006; Tobgay 2005; BAIL 2023)

Commitment of Bhutan to organic farming provides a unique opportunity for agribusinesses to focus on producing organic crops (National Centre for Organic Agriculture (NCOA) 2022; MoA 2006). Organic certification provides agricultural products a competitive edge in global markets and increases agricultural product prices, as there is increasing international demand for organic produce (Zhang et al. 2024). Bhutan grows cereal, oilseeds & pulses, vegetables, spices, roots & tubers and fruits, and these crops will have the added advantage of an organic brand (NSB 2023). FAO (2007) states that national organic certification can enable agribusinesses to access premium markets.

High value crops can drastically improve the livelihoods of agrarian communities (ADB 2010). According to Cock (2022), these high-value crops usually generate higher revenue per unit of land and also yield higher output per unit of labour compared to traditional staple crops grown in labor-

intensive systems. High value crops in Bhutan include apple, oranges, kiwi, strawberries, avocado, asparagus, potato, cardamom, ginger, herbs, and more (MoAF 2020). Likewise, high value nuts are walnut, pecan & almond; high value oilseeds are mustard, groundnut, soybean, sunflower, perilla & niger; and high value cereals are rice, buckwheat, maize, wheat & quinoa among others (NSB 2021).

Agro-processing, includes activities like packaging, canning, refrigeration, packaging, freeze-drying, dehydration, and pre-treatment. The agro-processing improves access to international markets, particularly for high-value organic products such as fruits, vegetables, herbs, mushrooms, nuts, oilseeds, cereals, and spices (MoAL 2020). Likewise, Gayatri and Sumitra (2024) observed that adding value of agricultural produce at each step of production enhances its quality and leads to more robust and sustained market demand. According to Tretiak et al. (2021), agribusinesses that focus on niche crops have the potential to gain better pricing for their products. This is often due to factors such as limited supply, unique qualities and specific market demands. Bhutanese niche products like locally-grown herbs, spices, teas and edible flowers, among others, are already entering the market (Kuensel 2023).

FAO (2019) highlighted that climate-smart agriculture (CSA) presents numerous opportunities through sustainably enhancing agricultural productivity and incomes, building resilience and adapting to climate change. UK AID (2021) pointed out that the agribusinesses have an opportunity to invest in CSA practices. Dendup et al. (2023) indicated that Bhutanese farmers are implementing climate smart technologies and practices in their fields. This suggests

that climate-smart farming has high potential in Bhutanese farming systems to boost agricultural productivity.

3.3.2 Livestock and live high value products

Livestock provides essential sources of income, nutrition, and livelihoods for a large portion of the rural population (Herro 2013). Khadka and Thapa (2020) emphasized that the livestock agribusiness is an important aspect of mountain economies and livelihoods. Brito et al (2021) further reported that agribusinesses offer opportunities to scale up dairy farming.

Asian Productivity Organisation [APO] (APO 2010) reported that organic livestock farming has become a huge agribusiness in recent years. As global trends shift toward health-conscious and environmentally aware consumers, organic livestock farming represents a growing niche market (FAO 2017; Essoussi and Zahaf 2009). There is a growing market for organic dairy products (Oruganti 2011), which aligns with the national commitment to organic agriculture in Bhutan (MoA 2006). Further, organic farming is also promoted by our neighboring country like India (Ministry of Agriculture & Farmers Welfare 2025). Additionally this supports in developing organic dairy farming in Bhutan.

According to the MoAF (2010), meat demand was projected to increase by 46% by 2025. NSB (2024) reported a growing demand for pork, beef, yak, chevon (goat meat), mutton, chicken, and fish. As stated by the United Nations Industrial Development Organisation (UNIDO) (2013), agribusinesses with meat production have the potential to transform the rural economies. FAO (2019) projects a moderate increase in all meat prices by 2028. Pradhan and Chhetri (2022) concluded that meat production holds huge potential as a

successful agribusiness venture for agri-entrepreneurs. The value-added meat products, such as sausages, nuggets, and processed meat, can access niche markets and increase the marketability of meat. Additionally, the agribusinesses have potential in the areas of wool and fibre processing (Kerven and Laker 2002).

FAO (2013) identified poultry farming as another area with considerable growth potential. According to NSB (2023), poultry outnumbered the livestock population amongst six different types of livestock: poultry, cattle, horse, goat, sheep and pig in the country. The rising demand for eggs and chicken meat suggests agribusinesses with huge opportunities to expand poultry farming operations.

As livestock farming intensifies, the demand for quality livestock feed is increasing (Gaylal and Dorjee 2024). A study by Wangchuk and Dorji (2008) showed that the agribusinesses can capitalise on this growing need by locally producing and supplying animal feed. There are 11 animal feed mills in the country, and it has the potential to boost the economy through feed milling agribusiness (Gaylal and Dorji 2024).

According to the FAO (2010), high-value livestock products are premium goods derived from animals that fetch drastically higher prices in the marketplace due to their quality, rarity, or specialised production methods. For instance, products like Kobe beef, Wagyu beef, which comes from a specific breed of Japanese cattle, and caviar from sturgeon, honey bee royal jelly, black chicken represent highly specialised and luxury items within the livestock sector (Botsman 2014; Gotoh 2018; Lopez et al. 2020; Kanelis et al. 2024; Sehrawat et al. 2021; Siddiqui et al. 2024).

3.3.3 Forestry and logging

Bhutan's forest coverage accounts for 69.71% (National Forest Inventory [NFI] 2023). With the increasing demand for forest-based products, agribusinesses have the opportunity to engage in value-added production, eco-tourism, and promotion of sustainable logging practices (UWICE 2011). In addition, there is potential for agribusinesses to engage in the production of high-quality timber and timber products (MoEA 2020).

Bhutan's forests are rich in non-timber forest products (NTFP), such as medicinal herbs, mushrooms, wild fruits, bamboo, resin, and fodder (FAO 1996). According to SAARC (2017), there is huge potential to sustainably harvest and process these products for commercial agribusinesses. NTFP such as *Cordyceps*, and *Himalayan yew* have market potential both domestically and internationally (UWICE 2017; WWF 2010). In addition to product-based enterprises, agribusinesses can diversity into eco-tourism activities leveraging on rich forest diversity in the country (Samal and Dash 2022). Studies by the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation (UNREDD) (2023) and Gurung and Scholz (2010) suggested that the community-based forestry management programs can be integrated with tourism initiatives.

4. CONCLUSION AND RECOMMENDATION

The agribusiness sector in Bhutan plays a vital role in the national economy, supporting rural livelihoods and contributing to national food security. However, the sector faces multifaceted challenges such as limited market access, financial constraints, labour shortages, climate vulnerability, and underdeveloped infrastructure. Addressing

these issues requires a multi-pronged approach, such as strengthening market connectivity through investments in storage and transportation facilities and digital platforms to help link farmers to domestic and international markets. Expanding financial inclusion through targeted credit and insurance schemes, and subsidies can support smallholder farmers and agribusiness enterprises. Besides, the adoption of climate-smart agricultural practices, such as resilient crop varieties and livestock breeds, efficient irrigation systems, and sustainable farming practices, is crucial to mitigate climate-related risks while enhancing productivity.

Modernisation of agricultural practices through mechanisation, farmer training, and robust extension services can further improve efficiency and productivity. The commitment of Bhutan to organic agriculture presents a strategic advantage, particularly in high-value agricultural products. The sustainable use of forestry resources through the promotion of NTFP, offers additional rural income opportunities while supporting biodiversity conservation.

Public-private partnerships (PPPs) can play a pivotal role in strengthening value chains such as agro-processing, logistics, and certification systems. Through supportive policies and sustainable investment in innovation, infrastructure and capacity development, the agribusiness sector in Bhutan can evolve into a resilient, competitive and sustainable contributor to national development while upholding the principles of Gross National Happiness.

References

- ADB. (2010). Giving Small Businesses a Boost in Bhutan. Asian Development Bank.
<https://www.adb.org/results/giving-small-businesses-boost-bhutan>
- (Accessed on 30 November 2024).
- ADB. (2010). Raising farmer incomes through high-value crops. Agriculture and Food Security.
- APO. (2010). Organic Agriculture and Agribusiness: Innovation and Fundamentals. Asian Productivity Organization, Japan.
- BAIL. (2023). Bhutan Agro Industries Limited in the Service of Bhutanese Farmers: An Impact Study. Bhutan Agro Industries Limited, Thimphu.
- Belt J, Kleijn W, Chibvuma PA, Mudyazvivi E, Gomo M, Mfula C, Mkojera E, Opio M, Zakaria I, and Bofo K. (2015). Market-based solutions for input supply: making inputs accessible for smallholder farmers in Africa.
- Bhujel P, Wangchuk T, Choki S, Gurung KR, Dorji K, Raika V, and Wangchuk S. (2022). Honey yield evaluation from the traditional and modern moveable frame hives. *Bhutan Journal of Animal Science*, 1(1): 28-33.
- Brito LF, Bedere N, Douhard F, Oliveira HR, Arnal M, Peñagaricano F, Schinckel AP, Baes CF, and Miglior F. (2021). Review: Genetic selection of high-yielding dairy cattle toward sustainable farming systems in a rapidly changing world. *Animal*, 15.
- Cernat L, Laird S, Monge-Roffarello M, and Turrini A. (2003). The EU's Everything But Arms Initiative and the Least-developed Countries. United Nations University, 1-30.
- Chogyel N and Kumar L. (2018). Climate change and potential impacts on agriculture in Bhutan: a discussion of pertinent issues. *Agriculture & Food Security*.
- Choki P, Wangchuk T, Raika V, and Sangchuk S. (2022). Socio-economic importance of yak hair products in Bhutan. *Bhutan Journal of Animal*

- Science, 6(1): 69-75.
- Cock J, Prager S, Meinke H, and Echeverria R. (2022). Labour productivity: The forgotten yield gap. *Agricultural Systems*.
- Davis JH and Goldberg RA. (1957). A concept of agribusiness. Boston: Division of Research, Graduate School of Business Administration, Harvard University.
- Dawa LS. (2010). Dairy co-operatives in Bhutan. Understanding Potentials towards Co-operative Chain Development. University of Applied Sciences, The Netherlands.
- Dema C. (2024). Kuensel. <https://kuenselonline.com/government-to-allow-foreign-workers-for-agriculture/> (Accessed on 25 November 2024).
- Dendup T. (2018). Agricultural Transformation in Bhutan: From Peasants to Entrepreneurial Farmers. *Asian Journal of Agricultural Extension, Economics & Sociology*. Vol. 23(3): 1-8.
- Dendup T, Yangzom T, and Tamang ND. (2023). Climate-smart agriculture in western Bhutan. College of Natural Resources, Royal University of Bhutan, Punakha.
- Derebe B and Alemu A. (2023). Non-timber forest product types and its income contribution to ruralhouseholds in the Horn of Africa: a systematic review. *Forest Science and Technology*, 19(3)2:10-220.
- Dorji J, Tamang S, and Dorji TY. (2017). Decline of Jakar sheep population in pastoral communities of Bhutan: A consequence of diminishing utility, alternate income opportunities and increasing challenges. *Pastoralism: Research, Policy and Practice*.
- Essoussi LH and Zahaf M. (2009). The Organic Food Market: Opportunities and Challenges. *Organic Food and Agriculture – New Trends and Developments in the Social Sciences*, 63-88.
- FAO. (2007). Organic certification schemes: managerial skills and associated costs. Food and Agriculture Organization, Italy.
- FAO. (2009). Asia-pacific forestry sector outlook study ii. Food and agriculture organization of the united nations regional office for Asia and the pacific. Food and Agriculture Organization, Italy.
- FAO. (2010). Adding value to livestock diversity. Food and Agriculture Organization, Italy.
- FAO. (1996). Non-wood forest products of Bhutan. Food and Agriculture Organization, Italy.
- FAO. (2017). The future of food and agriculture trends and challenges. Food and Agriculture Organization, Italy.
- FAO. (2013). Poultry development review. Food and Agriculture Organization, Italy.
- FAO. (2022). Food systems profile Bhutan. Catalysing the sustainable and inclusive transformation of food systems. Food and Agriculture Organization, Italy.
- FAO. (2022). The state of food security and nutrition in the world. Repurposing food and agricultural policies to make healthy diets more affordable. Food and Agriculture Organization of the United Nations, Italy.
- FAO. (2023). Meat. FAO agricultural outlook 2023-2032. Food and Agriculture Organization of the United Nations, Italy.
- FAO. (2019). Meat. FAO agricultural outlook 2019-2028. Food and Agriculture Organization of the United Nations, Italy.

- FAO. (2023). Agricultural production statistics 2000–2022. FAOSTAT Analytical Brief 79. Food and Agriculture Organization of the United Nations, Italy.
- Food and Nutrition Australia. (2013). Literature review of the nutritional and health benefits of eggs. Food & Nutrition Australia Pty Ltd, Australia.
- Gayatri M and Sumitra G. (2024). Enhancing Agricultural products: The power of Value Addition. *Krishi Netra*, 2(2): 5-8.
- Generalized System of Preferences Hub. (2025). Bhutan. <https://gsphub.eu/country-info/Bhutan> (Accessed on May 8 2025).
- Gotoh T, Nishimura T, Kuchida K , and Mannen H. (2018). The Japanese Wagyu beef industry: current situation and future prospects a review Takafumi. *Asian-Australasian Journal of Animal Science*, 31(7):933-950.
- Gurung DB and Scholz W. (2010). Community-based ecotourism in Bhutan: Expert evaluation of stakeholder-based scenarios. *International Journal of Sustainable Development & World Ecology*, 15: 397-411.
- Herrero M, Grace D, Njuki J, Johnson N, Enahoro D, Silvestri S, and Rufino MC. (2013). The roles of livestock in developing countries. *Animal*, 7(1): 3-8.
- Harbi J, Cao Y, Milantara N, and Mustafa AB. (2023). Assessing the sustainability of NTFP-based community enterprises: a viable business model for Indonesian rural forested areas. *Forest*.
- ICIMOD. (2018). Organic Agriculture Development Strategies: Roadmap for 12th Five Year Plan and Beyond. International Centre for Integrated Mountain Development, Nepal.
- IFAD. (2015). Livestock productivity and marketing improvement programme. International Fund for Agricultural Development, Italy.
- Kanelis D, Liolios V, Rodopoulou MA, Papadopoulou F, and Tananaki C. (2024). Production and Quality Characteristics of Royal Jelly in Relation to Available Natural Food Resources. *Resources*, 13(55).
- Katwal TB and Bazile D. (2020). First adaptation of quinoa in the Bhutanese mountain agriculture systems. *PLoS ONE* 15(1): e0219804. <https://doi.org/10.1371/journal.pone.0219804>.
- Kondaiah N. (2024). Value added mat products and development of processed meat sector. *Natural Products Radiance*, 3(4): 281-283.
- Kuensel. (2023). Exporters' guide for Bhutanese niche products. <https://kuenselonline.com/exporters-guide-for-bhutanese-niche-products/> (Accessed on 15 November 2024).
- Lopez , Vasconi M, Bellagamba F, Mentasti T, and Moretti VM. (2020). Sturgeon Meat and Caviar Quality from Different Cultured Species *Annalaura. Fishes*, 5(9).
- MAFW. (2025). Promotion of organic farming. Ministry of Agriculture & Farmers Welfare, India. [https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2100761#:~:text=Government%20is%20promoting%20organic%20farming,Eastern%20Region%20\(MOVCDNER\)%20scheme](https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=2100761#:~:text=Government%20is%20promoting%20organic%20farming,Eastern%20Region%20(MOVCDNER)%20scheme.). (Accessed on 22 June 2025).
- MoA. (2006). National Framework for Organic Farming in Bhutan. Ministry of Agriculture, Thimphu.
- MoAF. (2010). An analysis of household food demand in Bhutan. Ministry of Agriculture and Forests, Thimphu.
- MoAF. (2014). The national action program

- (nap) to combat land degradation. Ministry of Agriculture and Forests, Thimphu.
- MoAF. (2019). RNR Census of Bhutan. Renewable natural resources statistics division. Ministry of Agriculture and Forests, Thimphu.
- MoAF. (2020). Agriculture sector Bhutan: overview. Ministry of Agriculture and Forests, Thimphu.
- MoENR. (2023). National forest inventory. Department of Forests and Park Services, Ministry of Energy and Natural Resources, Thimphu.
- National Centre for Organic Agriculture (2022). Department of Agriculture. Ministry of Agriculture and Forests. Royal Government of Bhutan, Thimphu.
- NLCS. (2023). Bhtan land use land cover 2020. National Land Commission, Thimphu.
- Norbu C, Baillie I, Dema K, Jamyang, Dema Y, Tshering K, Tamang HB, Turkelboom F, and Norbu S. (2003). Types of land degradation in Bhutan, *Journal of Bhutan Studies*, 8: 88-114.
- NCHM. (2024). Climate projection report of Bhutan insights from cmip6 projections. National Centre for Hydrology and Meteorology. Ministry of Energy and Natural Resources, Thimphu.
- NFI. (2023). National forest inventory. Department of Forests and Park Services, Ministry of Energy and Natural Resources, Thimphu.
- NSB. (2021). Agriculture survey report. National Statistics Bureau, Thimphu.
- NSB. (2024). National statistics bureau. National account statistics, Thimphu.
- NSB. (2023). Integrated agriculture and livestock census of Bhutan. National account statistics, Thimphu.
- NSB. (2023). Quarterly labour force survey report. National statistics bureau, Thimphu.
- Orunganti M. (2011). Organic Dairy Farming – A New Trend in Dairy Sector. *Veterinary World*, 4(3): 128-130.
- Poudel Y. (2024). Kuensel. <https://kuenselonline.com/agribusiness-faces-hurdles-amid-low-private-sector-participation-and-financing-challenges> (Accessed on 30 November 2024).
- Pradhan M and Chhetri R. (2022). Badal poultry farm, Gomtu, Samtse dzongkhag. Case Studies of Successful Farmers, Agri-enterprises and Farmers' Groups and Cooperatives in Bhutan. , College of Natural Resources, Royal University of Bhutan, Punakha.
- Rahmati EA, Mohammadi H, and Karbasi A. (2022). Investment Priorities in the Livestock and Poultry Agribusinesses Value Chains. *J. Agr. Sci. Tech*, 24(6): 1281 -1296.
- RMA. (2022). Access to Finance Demand Side Survey 2022. Royal Monetary Authority of Bhutan, Thimphu.
- RGoB.(2021). The Ministry of Foreign Affairs observes BIMSTEC Day. Royal Government of Bhutan. <https://www.mfa.gov.bt/the-ministry-of-foreign-affairs-observes-bimstec-day/> (Accessed on May 5 2025).
- SAARC. (2017). Community-Based Non-Wood Forest Products Enterprise: A Sustainable Business Model. South Asian Association for Regional Cooperation.
- Samal R and Dash M. (2022). Ecotourism, biodiversity conservation and livelihoods: Understanding the convergence and divergence. *International Journal of Geoheritage and Parks*, 11:1-20.
- Scott GJ, Rosegrant MW, and Ringler C. (2000). Roots and Tubers for the 21st

- Century Trends, Projections, and Policy Options. International Food Policy Research Institute, USA.
- Siddiqui SA, Toppi V, and Syifah L. (2024). A comparative review on Ayam Cemani chicken — A comparison with the most common chicken species in terms of nutritional values, LCA, price and consumer acceptance. *Tropical Animal Health and Production* 56.
- Sklenicka P. (2016). Classification of farmland ownership fragmentation as a cause of land degradation: A review on typology, consequences, and remedies. *Land Use Policy*, 57: 694-701.
- South Asian Association For Regional Cooperation. (2020). Agreement On South Asian Free Trade Area Safta. <https://www.saarc-sec.org/index.php/resources/agreement-s-conventions?limit=20&limitstart=0> (Accessed on 6 May 2025).
- South Asia Subregional Economic Cooperation. (2023). Bangladesh and Bhutan Sign Agreement on the Movement of Traffic-in-Transit and Protocol. <https://www.sasec.asia/index.php?page=news&nid=1472&url=ban-bhu-sign-transit-agreement> (Accessed on 7 May 2025).
- Tobgay S. (2005). Agriculture diversification in Bhutan. International Association of Agricultural Economists Conference, Australia.
- Tretiak N, -Baidy LH, Sakal O, Kovalenko A, Shtohryn H, Kovalyshyn O, and Vrublevska O. (2021). Cultivation of niche crops and prospects of eco-innovative agricultural production in Ukraine. *Acta Scientiarum Polonorum*, 20: 29-46.
- UK AID. (2021). Private finance investment opportunities in climate-smart agriculture technologies. Commercial Agriculture for Smallholders and Agribusiness, United Kingdom.
- UNIDO. (2013). Agribusiness development transforming rural livelihood to create wealth. United Nations Industrial Development Organization, Austria.
- UWICE. (2011). Community forestry in Bhutan: putting people at the heart of poverty reduction. Ugyen Wangchuck Institute for Conservation and Environment. Ministry of Agriculture and Forests, Bumthang.
- UWICE. (2017). Review of cordyceps collection timing; duration and monitoring. Ugyen Wangchuck Institute for Conservation and Environmental Research, Bumthang.
- Walter R. (2004). Are Mountain Farmers Slow to Adopt New Technologies? *Mountain Research and Development*, 24(2) : 114-118.
- Wangchuk K and Dorji T. (2008). Animal feed production and management in Bhutan. Best Practices in Animal Feed Production and Management in SAARC Countries. SAARC Agriculture Centre, Bangladesh.
- Wangdi S, Tamang KTD, Wangchuk P, Tenzin U, and Sherub. (2023). Yak herding as the main source of livelihood: examining challenges and opportunities of highlanders in Bhutan. *Journal of Bhutan Studies*, 48: 68-92.
- WWF. (2010). Jewel of the sacred Himalayas. World Wide Fund for Nature.
- World Bank. (2017). Increasing agribusiness growth in Bhutan. World bank group.
- World Bank. (2017). Climate-Smart Agriculture in Bhutan. CSA Country Profiles for Asia Series. International Center for Tropical Agriculture (CIAT); The World Bank. Washington, D.C.

- World Bank. (2019). Bhutan forest note. pathways for sustainable forest management and socio -equitable economic development. Environment and Natural Resources Global Practice, South Asia Region.
- Zam T. (2020). Bhutan's land resources are under threat from various forms of land degradation, which pose a risk to the livelihoods of the agrarian community of the population that relies on agriculture. The University of Twente, The Netherlands.
- Zhang L, Liu D, Yin Q, Liu J. (2024). Organic certification, online market access, and agricultural product prices: evidence from Chinese apple farmers. Agriculture.