Original Research Article

Ranking of the constraints faced by the *Khoya* producers in production and marketing of *khoya*, in Almora district of Uttarakhand.

ABSTRACT

The Almora district in Uttarakhand is renowned for its roasted *khoya*, a processed milk product. *Khoya* is sourced from the rural areas surrounding Almora, and its production and marketing play a vital role in supporting the local economy. In light of this, a comprehensive study was conducted to assess and rank the challenges faced by *khoya* producers throughout the production and marketing processes.To conduct this study, various constraints were identified, and a sample of 200 *khoya* producers supplying their products to nearby markets was selected through a multistage sampling approach. These producers were personally interviewed to gather insights into their challenges. The study employed the Garrett ranking technique to determine the relative importance of these constraints in the *khoya* production and marketing context.The findings of the study revealed that in the production stage, the most significant challenges were a lack of knowledge concerning cattle disease symptoms with mean score of 58.16, high cost of feedfor dairy animals, with mean score of 54.33. In the marketing stage, the primary constraints along with their mean scores included post-preparation losses (70.78), low prices obtained for *khoya*, (60.47) delayed payment (51.78), and ongoing storage issues (27.00).In light of these results, it is evident that there is an urgent need to improve veterinary services to address the issue of cattle disease symptoms, as well as to establish fair pricing mechanisms in the rural belts under consideration. These measures are essential to support and sustain the *khoya* industry and the livelihoods of the local producers.

Keywords:*Khoya* producers, constraints, Garett ranking, Production, Marketing

1. INTRODUCTION

In the Indian rural scenario, the economy thrives on the interdependent relationship between the agriculture and livestock sectors. The dairy industry, in particular, is a dominant force, with millions of rural milk producers contributing a substantial 62 percent of the nation's total milk production**(Department of Animal Husbandary and Dairying, 2019).** Livestock, including cattle and buffaloes, play a crucial role as they are sustained by crop residues, and their dung is used as valuable manure for crop cultivation. This livestock sector is a vital component of the agrarian economy, and animal husbandry stands as the most widely practiced economic activity in rural areas.

Animal husbandry serves as a key source of self-employment for millions of farm households in rural regions**Khan et al. (2009)**.Dairying, especially through the use of crossbred cattle and high milk-yielding buffaloes, has created a lucrative business environment. Due to its ability to generate cash easily and its reduced vulnerability to uncertainties, small-scale farm households often prioritize dairy production over crop cultivation.Besides this climate change is a major issue faced globally effecting the agrarian economy on a larger scale so, dairy activities complement the income of milk producers without disrupting their existing agro-economic systems

The transformation of raw milk into high-end products through milk processing offers small-scale dairy producers the prospect of higher returns. This not only enhances their income but also provides a means to manage seasonal fluctuations in milk supply effectively. Entire communities can benefit from this process, leading to the creation of employment opportunities related to milk collection, transportation, processing, and marketing. Over the years, cottage industries have added significant value to these milk products, contributing significantly to the Indian economy**Patil, (2009).** One such value-added product is *Khoya*, which is defined by the Prevention of Food Adulteration Act (amended in March 2006) as a processed product derived from cow, buffalo, goat, or sheep's milk, or a combination of these, involving rapid drying, with a minimum milk fat content of 30 percent based on its dry weight.

Khoya is basically partially dehydrated value added product of milk, which contains good quantity of proteins, fats, bone forming minerals and lactose**. Agarwal et al. (2018)**

A noteworthy example of the significance of this dairy industry is found in the Almora district of Uttarakhand. This exquisite hill station is renowned for its unique roasted *khoya*-based sweets, including Baalmithai, chocolate, and Singauri, celebrated for their distinct flavors. The Government of Uttarakhand has recognized the value of these roasted *khoya*-based sweets and has included them in the **"One District Two Products"** scheme, initiated on October 25, 2021. This inclusion underscores the sustainability of *khoya* production in the region.

Khoya production is a vital economic activity in the local rural areas surrounding Almora, significantly enhancing the income of rural farmers. To support the upliftment of these rural communities, it becomes imperative to address the challenges faced by *khoya* producers in both the production and marketing of *khoya*. Therefore, efforts have been made to assess and rank the constraints faced by dairy producers engaged in *khoya* production, aiming to find solutions and further bolster this important facet of the rural economy, this research can be utilized for taking the necessary measures and formulations of policies in the favor of local *khoya* producers, thus supporting rural economy.

2. Methodology

The focus of this study is the Almora district in Uttarakhand, known for its popular roasted *khoya*-based sweets such as Baalmithai, Singauri, and chocolate, which are sourced from the nearby rural areas of the district. To conduct this research, a multistage sampling method was employed. In the first stage, the Hawalbagh block was purposively selected due to its substantial population of milch animals and the high demand for roasted *khoya* sweets in the Almora region. This block attracts a majority of rural people engaged in *khoya* production activities.

In the second stage, a list of *khoya*-producing villages was obtained from the Block Development Office, and five villages with an average production capacity of at least 10 kg of *khoya* per day were chosen. These villages were identified as Khunt, Dhamus, Shitlakhet, Daulaghat, and Falsima.

In the third stage, the village heads of the selected villages were contacted, and a comprehensive list of *khoya*-producing farm households was compiled. These *khoya* producers were categorized into three classes based on the size of their milch animal herds: small (5-8 milch cattle), medium (8-12 milch cattle), and large (>12 milch cattle). It was found that approximately 400 households from the selected villages were engaged in *khoya* production, with 178 being small producers, 184 falling in the medium category, and 38 in the large category.

To form a sample for the study, 50 percent of *khoya* producers were selected using a probability proportional to the number of *khoya* producers in each category. This resulted in a sample of 200 *khoya* producers, consisting of 89 small *khoya* producers, 92 medium producers, and 19 large producers.The study aimed to identify constraints related to the production and marketing of *khoya*, as *khoya* production is vital for the livelihoods of these producers. The sampled *khoya* producers were interviewed to ascertain the constraints they faced at different stages of production and marketing. These constraints were then ranked using the Garrett ranking technique. Each *khoya* producer was asked to rank the constraints based on their personal experiences.

The ranking outcomes were transformed into scores using a formula, with the scores converted into a percent position.The formula for working out percent position is presented as under.

Percent position = $100 \times (Rij - 0.5)/Nj$

Where,

Rij = rank given for i^{th} constraint by j^{th} individual;

Nj = number of constraint ranked by j^{th} individual.

These percent positions for each rank were further converted into scores using a reference table provided by **Garrett and Woodworth (1969).** The individual scores for all stages were then summed and divided by the total number of sampled *khoya* producers. The mean scores were arranged in descending order, resulting in the ranking of the identified constraints. This approach allowed for a systematic assessment of the challenges faced by *khoya* producers in the Almora district, aiding in the formulation of strategies to address these issues.

3. Results and Discussion

Constraints, in the context to this study, refer to the factors that exert an influence on the performance of an entity or organization, impeding its ability to attain its full potential goals. As a result, the analysis of constraints assumes a crucial role in the formulation of strategies aimed at mitigating these challenges.The constraints analysis was conducted separately for the production and marketing stages, and the findings are presented as follows:

Production Stage

As the dairy farmers of the study area were the only producers of *khoya*, so most of the production related constraints were related with the dairy farming. In the production stage, seven constraints were identified. *Khoya* producers were requested to rank these constraints on a scale from I to VII, based on the severity they experienced. Given that dairy producers were the primary producers of *khoya* in the region, the majority of production-related constraints were closely related to dairy production. Using the Garrett table, these rankings were converted into scores. Mean scores for each constraint were subsequently calculated, and the constraints were ranked in descending order from I to VII based on the values of their mean score. This ranking provides valuable insights into the relative significance of these constraints at the production stage.

Table 1 and Table 2 displays the ranking of constraints faced by*khoya* producers at production and marketing stage of *khoya*respectively.

Table 1: Constraints faced during production stage

S.No.	Constraints	Mean Score	Rank
1.	Lack of knowledge regarding cattle diseases	58.16	I
2.	High cost of feed	54.33	II
3.	Lack of veterinary services	53.31	III
4.	Lack of green fodder	52.59	IV
5.	Low availability of time	51.18	V
6.	Fuel related problem	44.96	VI
7.	Low availability of animal feed	37.48	VII

At the production stage, seven significant constraints were identified, and *khoya* producers were tasked with ranking them on a scale from I to VII based on the severity of each constraint. The rankings were then converted into scores using the Garrett table and mean scores were calculated. The constraints were subsequently ranked in descending order from I to VII based on their mean scores, offering insights into their relative significance during the production stage. The constraints on the basis of their ranking are presented as under:

I. **Lack of Knowledge Regarding Cattle Diseases (Mean Score: 58.16):** The most severe problem faced by *khoya* producers was the lack of knowledge concerning cattle diseases. This issue is critical because it directly affects the health and milk production of cattle, which serves as the primary raw material for *khoya* production. The prevalence of new diseases among cattle further compounds this problem, leading to losses in milk production and a double challenge for *khoya* producers. This finding resonated with the finding of **Jain et al. (2022),** where poor knowledge regarding diseases of cattle was the major constraint realized in dairy farming.

II. **High Cost of Feed (Mean Score: 54.33):** The second most severe constraint was the high cost of feed. This elevates the production cost and affects profit margins as feed is a fundamental component of cattle nutrition. Increased feed expenses put financial pressure on *khoya* producers, limiting their profitability and investment

capabilities.**Raj, (2022),** derived the similar result in the constraint analysis of dairy farming in Bihar.

III. **Lack of Veterinary Services (Mean Score: 53.31):** Ranked third, the constraint of a lack of veterinary services was highlighted. This absence hampers the diagnosis and treatment of cattle-related issues, leading to reduced milk production and impacting the availability of raw material for *khoya* production.**Saran et al. (2020),** obtained similar results, when analyzed constraints of dairy in Bikaner region of Rajasthan.

IV. **Lack of Green Fodder (Mean Score: 52.59):** The fourth-ranked constraint pertained to the lack of green fodder, often caused by overgrazing. Green fodder is essential for sustaining dairy animals, and its scarcity can result in reduced milk production and lower-quality milk, directly affecting *khoya* production. These findings were consistent with the findings of **Gamit et al. (2021),** which highlighted scarcity of green fodder was main issue faced by livestock farmers of Assam.

V. **Lack of Time for *Khoya* Production (Mean Score: 51.48):** Ranked fifth, the shortage of time available for *khoya* production was a significant concern. The labor-intensive process of *khoya* preparation demands substantial time, and women, often responsible for both *khoya* production and household activities, have limited time to dedicate to this process, adversely affecting *khoya* quality and quantity.

VI. Fuel Scarcity (Mean Score: 44.96): The sixth-ranked constraint related to the availability of fuel, specifically the *overuse* of wood from the Baanj tree (*Quercusleucotrichophora*). This issue creates scarcity for other *khoya* producers, impacting the *khoya* production process and adding to costs and challenges.

VII. Seasonal Scarcity of Animal Feed (Mean Score: 37.46): The seventh constraint was the seasonal scarcity of animal feed. This issue can occur due to various factors, including seasonal variations in forage or feed crop availability. It impacts the nutrition of dairy animals, affecting milk quality and quantity used in *khoya* production. Addressing this constraint is crucial for sustainable and high-quality *khoya* production.

Similar findings were reported by **Reddy et al. (2003),**in the dairy farms of Andhra Pradesh.

Marketing constraints

The marketing constraints identified by the *khoya* producers were, ranked as follows.

I. Post Preparation Loss (Mean Score: 70.78): The most severe marketing challenge encountered by *khoya* producers pertains to post-preparation loss. The quality and consistency of *khoya* can vary significantly due to differences in the type of milk used, cooking duration, and preparation skills. Achieving the desired texture and flavor can be a complex task, and improper cooking can lead to spoilage due to microbial action, particularly when temperatures are uneven during the cooking process. Variations in the type of milk used contribute to inconsistencies in the quality and fat content of *khoya*, directly impacting the composition and quality of the final product. Additionally, precise control over cooking duration is a skill-dependent process, and inadequate control can result in undesirable texture and flavor, making the product less appealing to consumers. Cooking *khoya* at uneven temperatures can create a favorable environment for microbial growth, increasing the risk of spoilage. Consumer expectations for *khoya* are specific and demanding, and variations in quality and consistency can lead to dissatisfaction, eroding trust and reducing market demand. Addressing the post-preparation loss challenge is imperative, as it directly affects *khoya* producers' ability to market a consistent, high-quality product.

II. Low Prices Received from Collectors (Mean Score: 60.47): The second-ranked constraint revolves around *khoya* producers receiving low prices from collectors. Collectors often engage in extensive bargaining, driving down the prices received by producers. This negotiation disadvantage puts producers in a financially challenging position, as they may have to accept prices that do not adequately reflect the costs and efforts involved in *khoya* production. Low prices reduce profit margins, making it difficult for producers to cover production costs, sustain their livelihoods, or invest in improving production techniques.

Table 2: Constraints faced during marketing stage

S.No.	Constraints	Mean Score	Rank
1.	Post-preparation losses	70.78	I
2.	Low prices received from collectors	60.47	II
3.	Delay in payment	51.78	III

4.	Storage problems	27.00	IV

III. Delay in Payment of *Khoya* (Mean Score: 51.78): Ranked third, the challenge of delayed payment for *khoya* affects the motivation of producers to engage in additional production and impacts the overall supply of *khoya* in the market. Producers invest resources and rely on income generated from selling *khoya* for their livelihoods. Delayed payments disrupt cash flow, making it challenging to cover production costs, purchase inputs, and meet daily expenses. The financial instability and uncertainty can discourage producers from expanding production. Delayed payments can also lead to increased debt and interest payments, further diminishing profitability. Beyond individual impacts, delayed payment affects the *khoya* supply, potentially leading to shortages and influencing market prices.

IV. *Khoya* Storage Problems (Mean Score: 27.00): The fourth constraint concerns *khoya* storage. *Khoya* producers face challenges when collectors delay collection, and there is a lack of storage facilities. *Khoya* is highly susceptible to microbial attack when not stored under appropriate conditions, particularly during off-seasons or when collection is delayed. Inadequate storage facilities leave *khoya* vulnerable to microbial contamination, leading to substantial losses in quantity and quality. Furthermore, these storage challenges can harm producers' credibility in the market and hinder their ability to meet market demand during peak seasons. Addressing *khoya* storage problems is crucial for preserving product quality, reducing post-production losses, and ensuring the long-term sustainability and growth of the *khoya* industry.

Relatable findings were obtained by**Roy (2020),** regarding the problems faced in milk marketing in West Bengal.

4. Conclusion

The constraints faced by *khoya* producers at both the production and marketing stages are multifaceted and significantly impact their ability to sustain and grow this traditional dairy industry. Addressing these challenges is imperative for ensuring the continued production of high-quality *khoya* and improving the livelihoods of producers.At the production stage, constraints such as the lack of knowledge regarding cattle diseases, high feed costs, lack of veterinary services, and scarcity of green fodder directly affect the health and milk production of

cattle, which are the primary raw material for *khoya*. These constraints not only impact the quantity and quality of *khoya* produced but also strain the financial resources of producers, limiting their profitability and scope for improvement.

On the marketing front, challenges related to post-preparation loss, low prices received from collectors, delayed payment, and *khoya* storage problems affect the consistency and marketability of *khoya*. Post-preparation loss hampers the ability to deliver a consistent, high-quality product, while low prices and delayed payments diminish producers' income and motivation to expand production. *Khoya* storage issues can lead to substantial losses in quantity and quality, harming producers' market credibility and capacity to meet market demand.

Efforts to overcome these constraints should focus on improving cattle health, enhancing feed affordability, increasing access to veterinary services, ensuring green fodder availability, and addressing time constraints during *khoya* production. Additionally, fair pricing mechanisms, timely payments, and improved storage facilities are vital to enhancing the marketing environment for *khoya* producers.By addressing these constraints, the *khoya*producers can thrive, offering consumers a consistent and high-quality product while bolstering the economic well-being of producers. Furthermore, these measures can help preserve the rich tradition of *khoya* production and its importance in rural economies.

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