

Understanding the Co-Existence of Organized and Unorganized Milk Marketing Channels: A Case of Lalitpur District in Nepal

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ABSTRACT

The paper explains the coexistence of organized and unorganized milk marketing channels in Nepal in terms of the distinct advantages that each type of channel offers. Findings from the primary data reveal that farmers incur no out-of-pocket expenses when selling milk irrespective of the channel. However, both marketing channels involve significant number of non-pecuniary transaction costs. The improper implementation of the existing two-axis pricing system discourages farmers, particularly those producing low-fat milk, from participating in organized channels. The study suggests that monetary incentives alone are insufficient to shift farmers from unorganized to organized marketing channels. The paper recommends proper implementation of the two-axis pricing system to make organized channels inclusive and attractive to all producers. Further, adequate logistical support and transportation infrastructure should be provided for the efficient functioning of milk marketing channels.

Keywords: Milk Marketing, Organized Channels, Unorganized Channels, Transaction Costs, Nepal

JEL Code: Q13, L14, O13, D23, R11

I

INTRODUCTION

Marketing channels play a crucial role in ensuring that agricultural produce reaches its target consumers, fetches fair prices, and contributes to the overall profitability of farming enterprises (Chand, 2012; Ghosh, 2013). An efficient marketing channel reduces post-harvest losses, improves farmers' incomes, and contributes to a stable market, which, in turn, encourages increased investment in agriculture (Chaboud & Moustier, 2021; Dsouza et al., 2023). In case of certain products, such as, dairy, fruits and vegetables, the role of marketing channels become even more critical because of commodities' highly perishable nature (Srivastava, 2018) and high susceptibility to bacterial and other contamination (Amentie et al., 2016). In the case of dairy products such as milk, an effective and efficient marketing channel becomes indispensable to ensure that consumers receive fresh raw milk at a competitive price while maximizing the returns for producers (Kumar et al., 2011; Prakash, 2022).

In the developing countries, the coexistence of organized and unorganized marketing channels for agricultural produces is a common characteristic of the marketing apparatus (Reardon & Berdegue, 2002; Chamberlin & Jayne, 2013). The objective of this paper is to determine the factors explaining the coexistence of organized and unorganized marketing channels. The paper meets this objective through a case study of milk marketing channels conducted in the Lalitpur district of Nepal.

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Currently, Nepalese farmers use half of the milk that they produce for self-consumption, and only the remaining half reaches market for sale. About 66% of marketable milk is sold through unorganized channels, and the remaining 34% passes through organized channels (MoALD, 2022). Consequent upon that organized channels ensure fair prices, ethical practices, attract investment, and enhance overall milk production, Nepal's Dairy Development Policy 2022 aims to raise the share of milk sold through organized channels to 60% by 2043 (MoALD, 2022). To fall in line with this national goal, the provincial and local governments introduced a per-liter cash transfer scheme against milk sold through organized channels, particularly through farmers' cooperatives. The objective of this initiative is to encourage farmers to shift from unorganized to organized marketing channels. However, despite these initiatives, the unorganized marketing channels continue to persist alongside organized marketing channels. This raises an intriguing question as to why the farmers may prefer unorganized marketing channels over organized channels despite the incentives provided by the government to promote the organized marketing channels. In this context, it becomes pertinent to examine the out-of-pocket expenses and non-pecuniary transaction costs associated with organized and unorganized marketing channels and other factors as well that may influence farmers' choice of marketing channels.

The existing research has largely focused on pecuniary costs, such as transportation and communication expenses, and some non-pecuniary costs like distance to market and transaction time when exploring the factors that affect the choice of marketing channels by farmers (BIRTHAL et al., 2009; SOE et al., 2015; BRAR et al., 2018; JITMUN & KUWORNU, 2019; KUMAR et al., 2018). However, important gaps remain in examining the roles of non-pecuniary costs related to price and product uncertainty, trust issues, and other behavioural factors (MU et al., 2016; TAVENNER & CRANE, 2018). Addressing these gaps is vital for comprehending why both types of marketing channels coexist, and also for developing strategies to enhance the efficiency, inclusivity, and resilience of marketing apparatus.

The paper assumes critical importance in the specific context of Nepal given the significant contribution that the dairy sector makes to the country's GDP, and hence the importance that policymakers attach to this sector.

II

MATERIALS AND METHODS

2.1 Data

The study is based on data collected from 102 households in the Lalitpur district of Nepal. The data was collected between November 2023 and January 2024. Lalitpur district, spanning 396.9 sq. km, comprises three distinct regions: rural, semi-urban, and urban (Lalitpur District Administration Office, 2024). The rural region, known as Southern Lalitpur, is a traditional milk production hub where nearly every household is engaged in cattle rearing and milk sales, supported by cooperatives and private

dairies. The urban region, dominated by service-sector activities, serves as a market center for milk and milk products but has minimal agricultural activity. The semi-urban region has the combined characteristics of both rural and urban regions. It also hosts major dairy factories that collect milk from rural and semi-urban areas for urban consumption. Both organized and unorganized marketing channels coexist in this district, which makes it an ideal setting for analyzing the choice of milk marketing channels.

Since milk production activities are concentrated in the rural and semi-urban regions of Lalitpur district, we selected seven localities from the rural region and four localities from the semi-urban region for this study. These localities refer to specific villages or settlements within the respective municipalities that have a relatively high concentration of milk-producing households. Specifically, while the rural region comprises three rural municipalities-Konjyosom, Mahankal, and Bagmati Gaunpalikas, the semi-urban region includes two urban municipalities, i.e., Mahalaxmi and Godawari Nagarpalika. The selected rural localities were Bukhel, Kaleshwor, Manikhel, and Gotikhel in Mahankal Gaunpalika; Sankhu in Konjyosom Gaunpalika; and Ghusel and Bhainse in Bagmati Gaunpalika. Similarly, the semi-urban localities included Kotdanda, Godawari Nayabato, Godawari Patalechhap, and Jharuwarashi in Godawari Nagarpalika. We did not select any locality from Mahalaxmi Nagarpalika due to the low incidence of cattle rearing in that municipality. The afore-mentioned localities were selected purposively, keeping in mind the representation of the socio-economic characteristics, livestock-rearing practices, and marketing choices of the households across the district.

In the next stage, we used a simple random sampling technique to select 10% of milk-producing households from each locality. In total, 102 milk-producing households were sampled, and interviews were conducted with the household heads using a structured questionnaire. Informed consent was obtained from each respondent before the interview, and all ethical standards for conducting field surveys were strictly followed.

2.2 Methods

This study examines the transaction costs associated with milk marketing channels, by distinguishing between out-of-pocket expenses and non-pecuniary costs. While out-of-pocket expenses on packaging, transportation and marketing of milk are considered, and the non-pecuniary costs encompass both tangible and intangible factors like time, effort, risk, and uncertainty associated with selling of milk.

To gather data, a detailed questionnaire was designed to capture these non-pecuniary costs. Farmers rated their transaction cost experiences and perceived challenges on a five-point scale for both their current and alternative marketing channels. A rating of 1 represented "not a problem," 2 represented "a minor problem," 3 represented "a problem," 4 represented "a relatively significant problem," and 5

represented "a major problem." In other words, a rating of 1 indicates the least transaction cost, whereas a rating of 5 indicates very high transaction costs.

To reduce data dimensionality and uncover underlying factors driving channel selection, factor analysis is conducted to extract latent variables representing variations across all transaction cost factors (Table AII). This step is crucial for simplifying the subsequent regression analysis by reducing the number of variables and addressing multicollinearity. In the next step, Probit model was applied to examine the impact of transaction costs on the binary variable representing the choice of the marketing channel (1 if the household chooses organized marketing channel, and 0 otherwise), controlling for other socio-economic factors.

The Probit model specification is as specified below.

$$P(C = 1|X) = \Phi(\beta_0 + \beta_1 X_1 + \dots + \beta_n X_n) \dots \dots \dots (1)$$

Where, $P(C = 1|X)$ = Probability of choosing the organized marketing channel given the set of 'n' independent variables (X_i). Φ is the cumulative distribution function (CDF) of the binary dependent variable.

Table 1 features the list of explanatory variables (X_i) used in the regression analysis in equation (1) along with their expected signs. These variables have been identified from the literature reviewed. Table AI in the appendix presents the descriptive statistics of the explanatory variables.

TABLE 1. EXPLANATORY VARIABLES WITH THEIR EXPECTED SIGNS

Explanatory Variables	Expected signs
Difficulty while transporting milk to the point of sale in organized marketing channel (1-5)	-
Difficulty while transporting milk to the point of sale in unorganized marketing channels (1-5)	+
Challenges because of fat-percentage-based pricing in organized marketing channels (1-5)	-
Challenges because of the milk production fluctuations in unorganized marketing channels (1-5)	+
Age of head of household (in years)	+/-
Square of the age of the household's head	+/-
Education of head of household (in years)	+/-
Dairy experience (in years)	+/-
Number of adult members in the household	+/-
Dummy: 1 if household is a member of cooperative, 0 otherwise	+
Dummy: 1 if the household has access to extension services, 0 otherwise	+
Dummy: 1 if household is from a rural area, 0 otherwise	+/-

III

RESULTS AND DISCUSSION

3.1 Existing Milk Marketing Channels in the Survey Area

Our analysis of survey data reveals the coexistence of organized and unorganized milk marketing channels in the study area. In unorganized channels, farmers sell milk directly to neighboring households, tea shops or sweet shops through informal agreements based on mutual trust. As per the existing literature, one can find the presence of middlemen (milk vendors/milk suppliers) in the unorganized channel who collect milk from the producers and sell it in the market in some places like Kathmandu district in Nepal (Thapa et. al. 2025). However, none of the sampled milk producers in Lalitpur district reported the selling of milk to middlemen. Transactions involve cash payments, usually at the end of each month, with prices and quantities decided in advance. Price revisions are infrequent and often influenced by changes in the organized channels. Producers typically deliver milk to buyers, though in some cases, buyers collect it from farmers' homes.

In organized channels, milk is sold to collection centers managed by cooperatives or private dairy operators, where it is weighed, tested for fat percentage, and paid for based on government-regulated pricing systems. Although regulations mandate fortnightly payments, delays are common, with payments often made monthly or later. Milk collection and transportation to processing factories are managed through three models: private dairy companies that oversee collection and transport; contractors who manage collection centers and supply milk as per the terms of the contract; and a hybrid model where cooperatives own the facilities, but private entities handle operations. This dual-channel system (organized and unorganized) highlights the diverse marketing strategies opted by farmers in the region because of various related transaction costs.

3.2 Out-of-Pocket Expenses and Non-Pecuniary Transaction Costs Associated with Milk Marketing Channels

The surveyed households reported no out-of-pocket marketing expenses while selling their milk. This is primarily due to the absence of transportation and communication expenses, as milk producers typically deliver their milk on foot. Additionally, packaging costs were non-existent as milk was transported in reusable milk cans, which are considered fixed assets. Furthermore, no household reported paying commissions while directly selling milk. However, dairy farmers were experiencing number of non-pecuniary transaction costs in terms of time and efforts in selling milk through organized and unorganized marketing channels. Table 2 features the list of the non-pecuniary transaction costs.

TABLE 2. NON-PECUNIARY TRANSACTION COSTS RELATED TO MILK MARKETING CHANNELS

Transaction cost headings	% of households reporting different levels of challenges				Total (%)
	Not a problem	Minor problem	A problem	Relatively significant problem	
Challenges in knowing the revised ongoing price while selling through organized channels	97.94	1.03	-	1.03	100
Challenges in knowing the revised ongoing price while selling through unorganized channels	91.75	4.12	3.09	1.03	100
Challenges because of the uncertainty about the milk price while selling through organized channels	85.57	9.28	1.03	4.12	100
Challenges because of the uncertainty about the milk price while selling through unorganized channels	93.81	6.19	-	-	100
Challenges due to the difficulties in transporting milk to the point of sale in organized channels	52.58	3.09	10.31	18.56	100
Challenges due to the difficulties while transporting milk to the point of sale in unorganized channels	11.34	10.31	9.28	1.03	100
Challenges due to milk production fluctuations in organized marketing channels	97.94	1.03	1.03	-	100
Challenges due to milk production fluctuations in unorganized marketing channels	20.62	24.74	24.74	18.56	100
Challenges due to the far-percentage-based pricing in organized marketing channels	69.07	1.03	6.19	12.37	100
Challenges as a result of delayed payment while selling through organized marketing channels	92.78	1.03	-	5.15	100
Challenges as a result of delayed payment while selling through unorganized marketing channels	84.54	11.34	1.03	3.09	100
Challenges of accounting mischief while selling through organized marketing channels	93.81	3.09	-	3.09	100
Challenges of accounting mischief while selling through unorganized marketing channels	94.85	5.15	-	-	100
Challenges to maintain cordial relations with the buyers in organized marketing channels	93.81	5.15	1.03	-	100
Challenges to maintain cordial relations with the buyers in unorganized marketing channels	84.54	12.37	3.09	-	100

Survey respondents reported that they did not find price discovery as problematic. Approximately 99% of them indicated that knowing the revised price in the organized channels is not a problem, and about 96% of the respondents reported the same for the unorganized marketing channel. This suggests that the mechanisms in place for price dissemination are effective in minimizing price discovery costs. Regarding price uncertainty, survey results indicate that it is not a major concern for producers in either marketing channel. None of the milk producers in the unorganized marketing channel reported price uncertainty as a problem. In the organized marketing channel, 85.57% of producers reported that price uncertainty was not a problem. Together, these findings suggest that information costs related to price discovery and price uncertainty are low across both marketing systems. In organized marketing channels, this can be attributed to a transparent pricing system. The federal government typically sets milk prices once a year, and this information is widely disseminated through the media and milk collection centers. As a result, milk producers can easily access price updates without significant hassle. This regulation reduces price uncertainty, thereby minimizing the risks associated with price fluctuations in organized marketing channels. In unorganized marketing channels, price discovery and price uncertainty are not major concerns may be because the regulated price of milk in organized channels serves as a reference price in unorganized markets, thereby reducing the challenges producers face in negotiating a selling price. Additionally, prices in unorganized channels are often pre-decided between buyers and sellers, which further alleviates concerns about price uncertainty.

Among non-pecuniary costs factors, the level of difficulties in transporting milk to the point of sale, 55.67% of farmers reported that it was “not a problem” or “a minor problem” in the organized marketing channels. Only, 15.46% of them described it as a “major problem.” In total, transporting milk to the point of sale in organized marketing channels is a concern for nearly 45% of the sample households. Similarly, when producers were asked about the difficulties they faced or would face while selling milk through unorganized channels, the difficulty was more serious as 78% of them reported it as a problem. Together, these findings highlight the critical role of logistical support and transportation infrastructure in the efficient functioning of milk marketing channels.

Research indicates that organized milk marketing channels handle seasonal and other fluctuations in milk production better than unorganized channels (Satashia & Pundir, 2021). The present study also observed that the fluctuations in milk production were not a problem for 97.94% of respondents when selling through organized channels. Conversely, the handling of fluctuations in production is more problematic in unorganized channels. Although 45.36 % of milk producers considered it as “not a problem” or “a minor problem”, 24.74% of milk producers saw it as “a problem,” whereas 18.56% and 11.34% of them reported it as “a relatively significant problem,” and as “a major problem”, respectively. These findings suggest that while organized

marketing channels effectively accommodate fluctuations in milk production, unorganized channels present significant challenges for a sizeable portion of producers. These results underscore the importance of organized marketing channels in providing a stable and reliable outlet for milk producers, particularly during periods of production fluctuations.

Furthermore, studies have raised concern about the fat-based pricing system in organized milk marketing channels (Xia & Sexton, 2009; Badshah & Kumar, 2019; Damodaran, 2023). Survey data, though, suggests that a significant percentage of producers (69.07%) had no problem with this practice, a sizeable share of producers found this practice problematic. Specifically, 6.19% of producers found it problematic, 12.37% of them viewed it as a relatively significant concern, and 11.34% of producers classified it as a major hurdle. These findings highlight a division within the farming community about the fat-based pricing approach in organized marketing channels³, indicating that while most of the producers are comfortable with it, a sizeable share of the producers feels that it is a challenge. Other studies have also raised similar concerns about the fat-based pricing system in organized milk marketing channels (Badshah & Kumar, 2019; Damodaran, 2023; Team Pashudhan Praharee, 2023).

Past studies have identified concerns about delayed payments, fraudulent accounting practices, and strained relationships between producers and buyers, relatively more in unorganized than in the organized milk marketing channels (Charlebois & Haratifar, 2015; Tavenner & Crane, 2018). Survey data reveal that 92.78% of respondents reported that delayed payment was not a problem in the organized marketing channel. In the unorganized marketing channel, 84.54% of farmers stated that delayed payment wasn't a concern. These findings highlight that a delayed payment is not a major type of non-pecuniary transaction cost when deciding on the choice of marketing channels. Survey results further indicate that concerns about accounting practices are largely a non-issue in both types of marketing channels. Specifically, 93.81% of respondents regarded the existing accounting practices in organized marketing channels as "not a problem. On the other hand, 94.85% of farmers did not consider it a problem in unorganized marketing channels.

Contrary to earlier studies, the relative absence of such issues in our study area may be explained by the close-knit nature of rural communities, where producers and buyers (or those managing collection centers) often belong to the same locality. This sense of mutual dependence and accountability reduces the likelihood of deceitful behavior, fosters trust, and ensures that both parties adhere to agreed-upon terms without stringent external oversight. Furthermore, frequent and direct interactions

³In Nepal, the organized milk marketing channels are supposed to follow a 'two-axis pricing system' as recommended by the National Dairy Development Board of Nepal (NDDBN). As per this pricing system, milk collection centers should measure both fat and solid-not-fat (SNF) content of milk. However, in our study we found that milk collection centers measured only the fat content and assumed the SNF content to be twice the fat content. Therefore, in this study, the pricing system followed in the organized marketing channels is termed as 'fat-based pricing system' instead of 'two-axis pricing system' to represent the reality.

between buyers and sellers in such settings facilitate better communication and understanding, allowing for quick resolution of most disputes that may arise.

It transpired from the above discussion that although the farmers did not incur any out-of-pocket expenses, certain non-pecuniary factors such as transportation difficulties, fat-based pricing in organized channels, and handling of seasonal production fluctuations may have influenced producers' choice of marketing channels. However, these are preliminary findings, which are verified through regression analysis in Section 3.3.

3.3 Factors Influencing the Choice of Milk Marketing Channels

After exploring the non-pecuniary factors (Table 2), we proceed to identify those variables including the non-pecuniary factors which significantly influenced the choice of milk marketing channels by the milk producers, through a regression analysis. Table 3 presents the results of the Probit regression analysis.

The results of the regression analysis show that the coefficient of 'transportation difficulties in unorganized marketing channels' is positive and statistically significant, indicating that producers tend to choose organized milk marketing channels when they find it difficult to transport milk to the point of sale in unorganized channels. The estimated marginal effect suggests that as transportation difficulties in unorganized channel increases by one point, on average, the probability of a producer choosing an organized milk marketing channel also increases by about 4 percentage points, holding other factors constant. This preference may be due to poor transportation infrastructure and less reliable logistical arrangements to reach out to buyers, such as families and tea stalls, who are typically based in market centers. Due to these logistical challenges, producers prefer organized channel that has milk collection centers even in remote areas. These collection centers gather milk from the local farmers and transport the milk to dairy factories in the cities. This arrangement makes it easier for the milk producers, particularly based in rural areas, to sell their milk without having to travel long distances.

Additionally, a negative and significant coefficient for the 'fat-based pricing system' in organized marketing channels suggests that milk producers are likely to choose unorganized marketing channels if they perceive that the fat-based pricing method may cause uncertainty about their returns from sale. The estimated marginal effect indicates that such perceptions reduce the probability of choosing an organized marketing channel by approximately 7 percentage points. Our survey reveals that although the National Dairy Development Board (NDDB) has recommended the 'two-axis pricing policy' which considers both fat and Solid-Non-Fat (SNF) contents in milk, the milk collection centers often fix prices solely based on fat content, assuming that SNF content is double the fat content. This assumption does not hold good in the case of cow milk, as cow milk typically contains about 3.5 percent fat but 8.5 percent SNF (Team Pashudhan Praharee, 2023). Thus, the current pricing practice in organized

TABLE 3. RESULTS OF PROBIT MODEL (FACTORS INFLUENCING THE CHOICE OF MILK MARKETING CHANNELS)

Explanatory Variables	Coefficient	Average Marginal effect
Challenges due to the difficulties in transporting milk to the point of sale in organized marketing channel	-0.21 (0.15)	-0.01 (0.00)
Challenges due to the difficulties while transporting milk to the point of sale in unorganized marketing channels	1.07*** (0.33)	0.04*** (0.01)
Challenges because of the fat-percentage-based pricing in organized marketing channels	-2.16*** (0.80)	-0.07** (0.03)
Challenges due to milk production fluctuations in unorganized marketing channels	2.62*** (0.68)	0.09*** (0.03)
Age of head of household (in years)	0.03 (0.08)	0.00 (0.00)
Square of the age of the household's head	-0.00* (0.00)	-0.00 (0.00)
Education of head of household (in years)	0.24*** (0.06)	0.01** (0.0)
Dairy experience (in years)	0.06* (0.03)	0.00 (0.00)
Number of adult members in the household	0.57*** (0.19)	0.02** (0.01)
Dummy: 1 if the household is a member of a cooperative	-0.48 (0.67)	-0.02 (0.02)
Dummy: 1 if the household has access to extension services (vaccination services)	2.15*** (0.69)	0.07** (0.03)
Dummy: 1 if the household is from a rural area	-2.96 (2.30)	-0.10 (0.80)
Constant	-5.09 (4.09)	-
Observations*	97	97
Wald chi2(12)	60.68	
Prob>chi2	0	
Pseudo R ²	0.89	
Log pseudo likelihood	-5.66	.

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' estimation using field survey data

*The analysis is restricted to the 97 households that sold milk exclusively through either the organized or unorganized channel. Of the 102 sampled milch cattle-rearing households, two did not sell milk through any organized or unorganized channels, as they produced milk cakes at home for sale. Additionally, three households sold milk through both organized and unorganized channels.

channels discourages the cow milk sellers from selling milk through the such channels, and instead these sellers choose the unorganized marketing channels as an alternative that follows a volume-based pricing method.

Further, the regression results indicate that milk production fluctuations also influence marketing channel choice. A positive and significant coefficient of 'challenges due to milk production fluctuations' in unorganized marketing channels suggests that producers are more likely to opt for organized channels in the event of wider fluctuations in milk production. The marginal analysis suggests that an increase in perceived challenges due to production fluctuations by one point increases the probability of choosing an organized milk marketing channel by about 9 percentage points, keeping other factors constant. This preference is rational, as organized channels are better equipped to handle larger volumes and fluctuations in production, offering producers a stable and dependable market regardless of changing production levels. In contrast, unorganized channels lack the flexibility and reliability needed to accommodate such fluctuations, making them less appealing to producers facing uncertainties in production.

The findings from the exploratory and the regression analyses, explain the coexistence of organized and unorganized milk marketing channels. This coexistence exhibits distinct advantages each channel provides in meeting specific producer needs and circumstances. Organized channels, for instance, offer substantial logistical support by establishing milk collection centers even in remote areas, thereby facilitating the transportation of milk to urban factories. This logistical infrastructure alleviates the burden on producers who might otherwise struggle to get their product to market, particularly in regions with poor infrastructure. Additionally, organized channels excel at managing production fluctuations, providing a stable and reliable market outlet. In contrast, unorganized channels offer simpler and more appealing pricing structures for certain producers, particularly those who sell lower-fat content milk. The volume-based pricing in these channels eliminates the penalties associated with the fat-percentage-based system in organized channels, making them an attractive option for producers selling lower-fat milk. 'Thus, depending upon the identified non pecuniary transaction costs associated with either the organized or unorganized channels, both marketing channels coexist.

Besides the transaction cost variables, the regression analysis identifies several socio-economic factors that play a pivotal role in determining the choice of milk marketing channels. Specifically, the 'education level of the household head', 'number of adult members in the household', and 'access to extension services' play crucial roles. A positive and significant coefficient of the education level of the household head suggests that households with head having higher education levels tend to favor organized marketing channels over unorganized ones. Educated household heads may have a better understanding of market dynamics, pricing structures, and hence have higher trust in organized processes. However, the magnitude of the effect of education

on the choice of marketing channels is modest as indicated by the estimated marginal effect. If the household head's education increases by one year, the probability of choosing organized channels increases by only 1 percentage point. Further, a positive and significant coefficient of the variable 'number of adult members in the household' indicates that larger families are more inclined to choose organized channels. In this case also, the marginal effect is relatively small. The estimated marginal effect shows that one-unit increase in the number of adult members in the household increases the probability of choosing organized channels by approximately 2 percentage points. This preference could be attributed to the greater volume of milk produced by such families with more available labour, and the consequent need for reliable marketing outlets that organized channels typically offer. Lastly, a positive and significant coefficient of the variable 'access to livestock extension services' suggests that households benefiting from these services are more likely to choose organized marketing channels. The estimated marginal effect suggests that the access to extension services increases the probability of choosing an organized marketing channel by about 7 percentage points. Access to extension services helps in clarifying the technical aspects of milk quality testing and pricing methods in organized marketing channels, making these channels more attractive to producers.

IV

CONCLUSIONS AND POLICY IMPLICATIONS

Despite the Government of Nepal's initiative to incentivize milk farmers to sell their produce through organized channels, a substantial proportion of respondents sell milk through unorganized channels. This paper explains the co-existence of organized and unorganized milk marketing channels through an exploration of the out-of-pocket expenses and non-pecuniary transaction costs associated with both types of marketing channels.

Our analysis finds that there are no out-of-pocket marketing expenses in either channel. However, an exploration of the non-pecuniary transaction costs reveals that transporting milk to the point of sale is a major concern in unorganized channel. The fat-based pricing system in organized channels is perceived as a concern by more than thirty per cent of farmers. About 79 per cent producers reported challenges in handling fluctuations in milk production due to seasonal variations while selling through unorganized channels. Other transaction costs associated with price discovery, price uncertainty, delayed payments, account mismanagement, and relationship maintenance appear to have been negligible in both types of milk marketing channels.

The Probit regression analysis confirms that transportation difficulties in unorganized channels, challenges with the fat-based pricing system in organized channels, and difficulty in dealing with fluctuations in milk production when selling through the unorganized channels significantly influence producers' choice of marketing channels. The probability of preferring organized channels increases when producers face transportation challenges (4 percentage point) and production

fluctuations (9 percentage point). The probability of opting for organized marketing channel reduces by 7 percentage point due to following of fat-based pricing system in it. These results explain that the coexistence of organized and unorganized milk marketing channels is driven by the distinct benefits each channel offers in addressing specific producer needs and challenges. Among socio-economic and institutional factors, the ‘access to livestock extension services’, is the major determinant for the producer’s choice of milk marketing channels.

From a policy perspective, our findings suggest that monetary incentives alone are insufficient to encourage a sustained shift from unorganized to organized milk marketing channels. A key issue relates to the pricing system followed in the organized channels, where the government recommended ‘two-axis pricing system’ has not been properly implemented creating disadvantages for the producers of low-fat milk and undermines the original objective of the two-axis pricing policy. Ensuring proper implementation of the two-axis pricing system in organized channels would help correct these pricing distortions and make organized marketing channels inclusive and attractive to all producers.

Furthermore, our study underscores the critical importance of logistical support and transportation infrastructure for the efficient functioning of marketing channels. Policies should prioritize improving transportation networks, particularly in remote areas, to facilitate the smooth movement of agricultural outputs to urban consumers and processing facilities. Enhanced infrastructure would not only reduce transaction costs but also strengthen the overall reliability and efficiency of marketing systems.

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REFERENCES

- Amentie, T., Eshetu, M., Mekasha, Y., & Kebede, A. (2016). Milk postharvest handling practices across the supply chain in Eastern Ethiopia. *Journal of Advanced Veterinary and Animal Research*, 3(2), 112. <https://doi.org/10.5455/javar.2016.c139>
- Badshah, J., & Kumar, S. (2019). Dairy Arithmetic of milk and milk products for sustainable Dairy Entrepreneurship. *Journal of AgriSearch*, 6, 146–149. <https://www.jsure.org.in/journal/index.php/jas/article/view/590/468>
- Birthal, P. S., Jha, A. K., Tiongco, M. M., & Narrod, C. (2009). Farm-Level Impacts of Vertical Coordination of the Food Supply Chain: Evidence from Contract Farming of Milk in India. *Indian Journal of Agricultural Economics*, 64(3), 481–496. <https://doi.org/10.22004/ag.econ.204647>
- Brar, R. S., Kaur, I., Singh, V. P., & Chopra, S. (2018). Analysis of factors influencing choice of milk marketing channel among small and medium dairy farmers in Punjab. *Indian Journal of Dairy Science*, 71(3), 299–305. <https://epubs.icar.org.in/index.php/IJDS/article/view/75912>
- Chaboud, G., & Moustier, P. (2021). The role of diverse distribution channels in reducing food loss and waste: The case of the Cali tomato supply chain in Colombia. *Food Policy*, 98, 101881.

- <https://doi.org/10.1016/j.foodpol.2020.101881>
- Chamberlin, J., & Jayne, T. S. (2013). Unpacking the Meaning of ‘Market Access’: Evidence from Rural Kenya. *World Development*, 41, 245–264. <https://doi.org/10.1016/j.worlddev.2012.06.004>
- Chand, R. (2012). Development Policies and Agricultural Markets. *Economic and Political Weekly*, 47(52), 53–63. <http://www.jstor.com/stable/41720551>
- Charlebois, S., & Haratifar, S. (2015). The perceived value of dairy product traceability in modern society: An exploratory study. *Journal of Dairy Science*, 98(5), 3514–3525. <https://doi.org/10.3168/jds.2014-9247>
- Damodaran, H. (2023, April 18). A big fat problem in milk: What’s driving up prices? *The Indian Express*. <https://indianexpress.com/article/explained/explained-economics/a-big-fat-problem-in-milk-8559975/>
- Dsouza, A., Mishra, A. K., & Webster, S. (2023). Vertical coordination and post-harvest losses: Implications on food loss. *Applied Economic Perspectives and Policy*, 45(1), 460–486. <https://doi.org/10.1002/aep.13210>
- Ghosh, N. (2013). *India’s Agricultural Marketing*. Springer India. <https://doi.org/10.1007/978-81-322-1572-1>
- Government of Nepal Ministry of Agriculture and Livestock Development [MoALD]. (2022). *National Dairy Development Policy 2078*. <https://www.moald.gov.np/wp-content/uploads/2022/04/National-Dairy-Development-Policy-2078.pdf>
- Jitmun, T., & Kuwornu, J. K. M. (2019). Factors influencing the choice of marketing channels: evidence from dairy farmers in Thailand. *International Journal of Value Chain Management*, 10(2), 123. <https://doi.org/10.1504/IJVC.2019.099102>
- Kumar, A., Mishra, A. K., Parappurathu, S., & Jha, G. K. (2018). Farmers’ Choice of Milk-marketing Channels in India. *Review of Rural Affairs*, 53(51), 58–67. <https://www.epw.in/journal/2018/51/review-rural-affairs/farmers-choice-milk-marketing-channels.html>
- Kumar, A., Staal, S. J., & Singh, D. K. (2011). Smallholder Dairy Farmers’ Access to Modern Milk Marketing Chains in India. *Agricultural Economics Research Review*, 24(2), 243–254. <https://doi.org/10.22004/AG.ECON.118232>
- Lalitpur District Administration Office. (2024). *District Profile*. <https://daolalitpur.moha.gov.np/page/ja-l-l-para-caya-11>
- Mu, L., Dawande, M., Geng, X., & Mookerjee, V. (2016). Milking the Quality Test: Improving the Milk Supply Chain Under Competing Collection Intermediaries. *Management Science*, 62(5), 1259–1277. <https://doi.org/10.1287/mnsc.2015.2171>
- Prakash, G. (2022). Resilience in food processing supply chain networks: empirical evidence from the Indian dairy operations. *Journal of Advances in Management Research*, 19(4), 578–603. <https://doi.org/10.1108/JAMR-12-2021-0376>
- Reardon, T., & Berdegue, J. A. (2002). The Rapid Rise of Supermarkets in Latin America: Challenges and Opportunities for Development. *Development Policy Review*, 20(4), 371–388. <https://doi.org/10.1111/1467-7679.00178>
- Satashia, Maitri, and R S Pundir. 2021. “Marketing Efficiency of Milk Marketing Channels in Middle Gujarat and Scope for Its Improvement.” *Indian Journal of Agricultural Economics* 76 (4): 594–604. <https://isaeindia.org/wp-content/uploads/2022/02/02-Article-Maitri-Patel.pdf>
- Soe, W. P. P., Moritaka, M., & Fukuda, S. (2015). An Analysis of the Factors Influencing Marketing Channel Choice by Paddy Rice Farmers in Myanmar. *Journal of the Faculty of Agriculture, Kyushu University*, 60(2), 535–542. <https://doi.org/10.5109/1543425>
- Srivastava, G. (2018). Effect of marketing channel on perishable goods. *Journal of Global Information and Business Strategy*, 10(1), 84–89. <https://gitarratan.edu.in/wp-content/uploads/2019/03/J-GIBS-2018.pdf>
- Tavener, K., & Crane, T. A. (2018). Gender power in Kenyan dairy: cows, commodities, and commercialization. *Agriculture and Human Values*, 35(3), 701–715. <https://doi.org/10.1007/s10460-018-9867-3>
- Team Pashudhan Praharee. (2023). *Strategies to increase fat and SNF% of cow milk in India*. Pashudhan Praharee.

<https://www.pashudhanpraharee.com/strategies-to-increase-fat-snf-of-cow-milk-in-india/>

Thapa, G., Teli, N.S. and Mangalasseri, A. (2025). Value chain analysis of milk in Kathmandu valley-Nepal. *Asian Journal of Dairy and Food Research*, 1-9. doi: 10.18805/ajdfr.DR-2309.

Xia, T., & Sexton, R. J. (2009). Retail Prices for Milk by Fat Content: A New Theory and Empirical Test of Retailer Pricing Behavior. *Journal of Agricultural and Resource Economics*, 34(2), 256–275. <https://www.jstor.org/stable/pdf/41548413>

APPENDICES

TABLE 1A. DESCRIPTIVE STATISTICS OF VARIABLES USED IN REGRESSION ANALYSIS

Explanatory Variables	Overall households		Unorganized marketing channels		Organized marketing Channels	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Age of the household's head	57.75	13.57	60.77	13.99	57.47	13.31
Education level of the head of household	4.47	4.82	4.50	5.01	4.35	4.91
Dairy experience (years of experience in cattle farming)	35.48	14.08	35.77	16.09	35.61	13.44
Number of adult members in the household	3.52	1.30	3.64	1.29	3.52	1.32
Dummy: 1=HH is a member of a cooperative	0.93	0.25	0.93	0.25	0.91	0.29
Dummy: 1=HH has accessed extension services	0.83	0.37	0.77	0.43	0.84	0.37
Dummy: 1=HH is a rural household	0.64	0.48	0.82	0.38	0.09	0.29

Source: Authors' estimation using field survey data

TABLE 2A. RESULTS OF FACTOR ANALYSIS (FACTOR LOADINGS (PATTERN MATRIX) AND UNIQUE VARIANCES)

Variables	Factor1 (Eigen value=3.16)	Factor 2 (Eigen value=2.18)	Factor 3 (Eigen value=1.99)	Factor 4 (Eigen value=1.73)	Factor 5 (Eigen value=1.38)	Uniqueness
Challenges to know the revised ongoing price while selling through organized channels	0.46	-0.12	0.11	-0.16	0.59	0.39
Challenges to know the revised ongoing price while selling through unorganized channels	0.59	-0.06	-0.03	0.32	0.35	0.43
Challenges due to the uncertainty about the milk price while selling through organized channels	-0.15	-0.45	0.84	0.22	-0.11	0.01
Challenges due to the uncertainty about the milk price while selling through unorganized channels	-0.42	0.42	0.14	0.36	0.34	0.17
Challenges due to the difficulties in transporting milk to the point of sale in organized channels	0.65 [#]	-0.31	-0.06	0.00	0.01	0.62
Challenges due to the difficulties in transporting milk to the point of sale in unorganized channels	-0.66 [#]	-0.16	-0.02	-0.13	0.13	0.50
Challenges due to milk production fluctuations in organized marketing channels	-0.15	-0.45	0.84	0.22	-0.11	0.01
Challenges due to milk production fluctuations in unorganized marketing channels	-0.67 [#]	0.43	0.11	0.28	0.38	0.13
Challenges because of the fat-percentage-based pricing in organized marketing channels	0.71 [#]	0.28	0.16	0.20	-0.04	0.35
Challenges as a result of delayed payments while selling through organized marketing channels	-0.03	0.21	0.15	-0.26	0.50	0.62
Challenges as a result of delayed payments while selling through unorganized marketing channels	0.44	-0.26	0.21	-0.14	0.53	0.40
Challenges of accounting mischief while selling through organized marketing channels	0.24	0.76	0.46	-0.23	-0.14	0.09
Challenges of accounting mischief while selling through unorganized marketing channels	0.34	0.70	0.43	-0.21	-0.18	0.13
Challenges to maintain cordial relations with the buyers in organized marketing channels	0.11	0.12	-0.15	0.78	0.11	0.33
Challenges to maintain cordial relations with the buyers in unorganized marketing channels	0.34	0.15	-0.12	0.67	-0.18	0.36

Note: Since Factor 1 has the highest eigenvalue (3.16), we focus on the factor loading values within it. Given the general guideline of using variables with factor loading values of 0.65 or higher, we shortlisted these variables for further analysis.

[#] These variables have a factor loading value of 0.65 and above, so have been shortlisted for analysis in the **Pooled** regression model (equation 1)

Source: Authors' estimation using field survey data