Consumers Preference for Safe and Quality Milk in Nepal: Evidence from a Discrete Choice Experiment

Australian Conference of Economists (ACE2025)
6-9 July 2025, Sydney

Authors:

Sujan Dhungel

Dr. Ammar Abdul Aziz

Dr. Uttam Khanal

Dr. Rajendra Adhikari

Outline

Introduction

Literature review

Methodology

Results and discussions

Conclusion

Introduction

- Consumers' preference for food is shifting rapidly towards high value products (Liguori et al., 2022)

- This shift is particularly evident in the consumption of animal-based protein sources, such as milk - a staple source of protein worldwide (Adesogan & Dahl, 2020).

- The dairy industry, particularly in developed countries, has responded to this trend by aligning milk attributes with evolving demand patterns.

Introduction (Contd..)

- In Nepal, concerns about milk quality and safety are growing (Thapa et al., 2020).
- Government's dairy sector development policy focusing on quality and safety of milk and milk-based products
- Adopting food safety practices by milk value chain members is a challenge, especially due to cost involved (Kumar et al., 2017)
- Lack of empirical research examining underlying milk quality and safety attributes that shape Nepalese consumers' preferences and willingness to pay for quality attributes

Research Question

How do safety and quality attributes influence consumers' preferences for milk in Nepal?

Specific objectives

- Examine which of the safety and quality attributes of fresh milk do consumers prefer when making purchasing decisions
- Analyse whether consumers are willing to pay price premium for their preferred attributes
- Explore whether distinct market segments exist based on consumer preferences

Literature Review

Past studies examined:

- Different attributes focusing on taste, quality, price, product origin, sustainability, ethics, animal welfare (Tempesta & Vecchiato, 2013, Xu & yang, 2020, Akaichi et al., 2012, Getter et al., 2014, Nam et al., 2020)

- Mostly on developed country context (Fasakin & von Massow, 2024, (Tempesta & Vecchiato, 2013)

Research gap

- Limited understanding of consumer preference on quality and safety attributes in developing countries like Nepal

Methodology

Choice experiment :

- A Discrete Choice Experiment (DCE) model was employed

  - DCE provides real-world decision making in hypothetical scenarios

  - Presents respondents with a series of choices between different options, each described by different attributes

Methodology (Contd..)

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

Theoretical framework for Discrete choice experiment:

- Based on two basic theories related to consumer choice:
  - Theory of choice: commodity's utility derived from their attributes of goods rather than goods itself (Lancaster, 1966).
  - Random utility theory: assumes that choice is made based on relative utilities from available alternatives (McFadden, 1974).
- Thus, an individual consumer would choose an option k over j if and only if:

$$U_{ij} > U_{ik} \; for \; all \; j \neq k$$

Where: U is the utility for a given milk alternative.

Methodology (Contd..)

Design of choice experiment

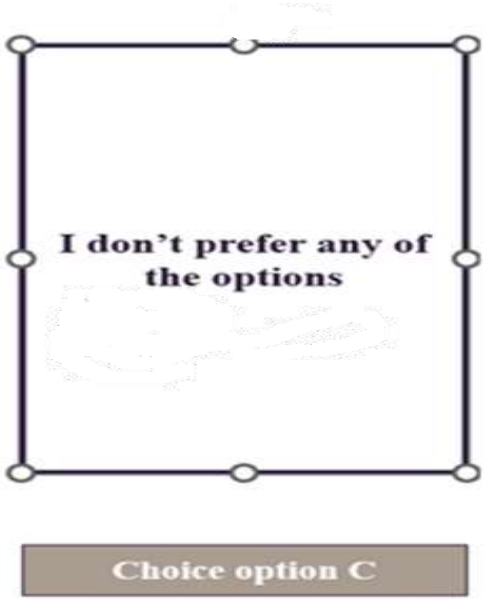
Attributes	Levels	Description
Price	NRs 125 per litre NRs 150 per litre NRs 175 per litre	
Fat content	Whole Reduced Skimmed	➢ 3.25% fat ➢ 2% fat ➢ 0.5% fat
Location of production	Local Domestic Imported	➢ Produced at the same municipality ➢ Produced outside the municipality but within the country's territory ➢ Produced abroad
Good Manufacturing Practices (GMP) labelling	Yes No	➢ Product claims that a set of guidelines and procedures that dairy actors must follow to minimize contamination, ensure hygiene, and maintain product integrity.
Packaging	Plastic pouch Plastic jar Paper cardboard	➢ Packed in plastic pouch ➢ Plastic container were used for packing ➢ Packed in paper cardboard

Methodology (Contd..)

Choice set design

- Combination gives (3*3*3*3*2) = 162 choice profiles
- An orthogonal fractional factorial design
- SPSS (IBM SPSS 29.0.0.0) to generate the 16 product alternatives (or profiles),
- 8 choice sets prepared randomly having 2 milk alternatives and third opt out option

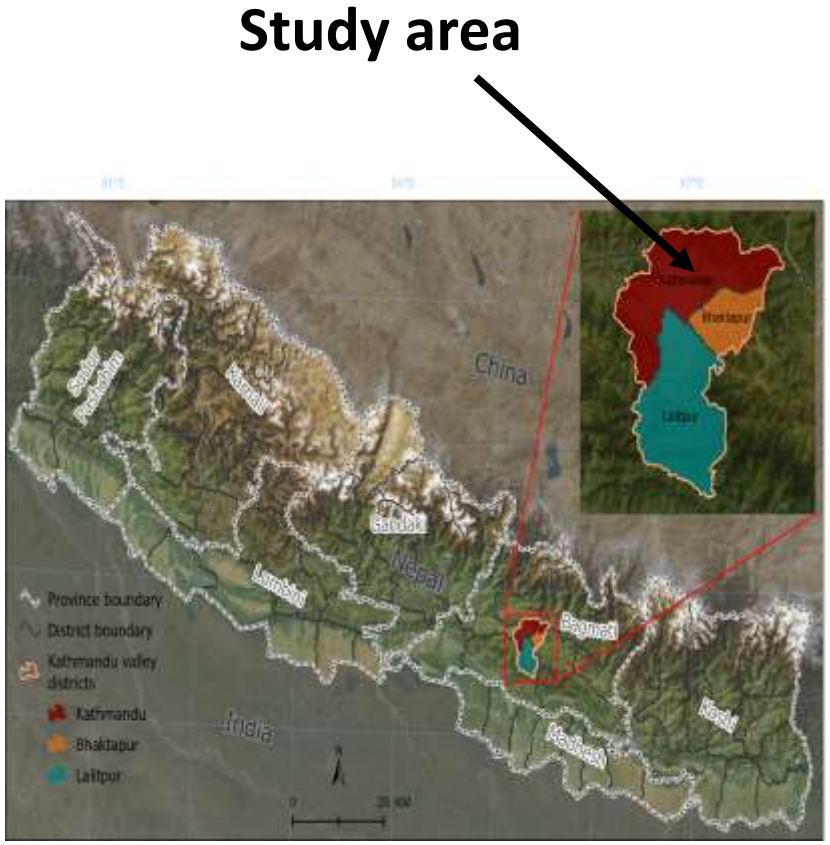
A sample choice set



Methodology (Contd..)

Study area

- Kathmandu, the capital city
- Major consumption hub for milk produced in the upstream of value chain under study
- Most urbanised city
- Diverse consumer base



Methodology (Contd..)

Sampling method

Two steps

Retail outlets selection

Major retail outlet
- ❖ **Supermarkets/ marts**
- ❖ **Dairy shops**
- ❖ **Milk booths**

Samples
Supermarkets/marts
Dairy shops
Milk booths

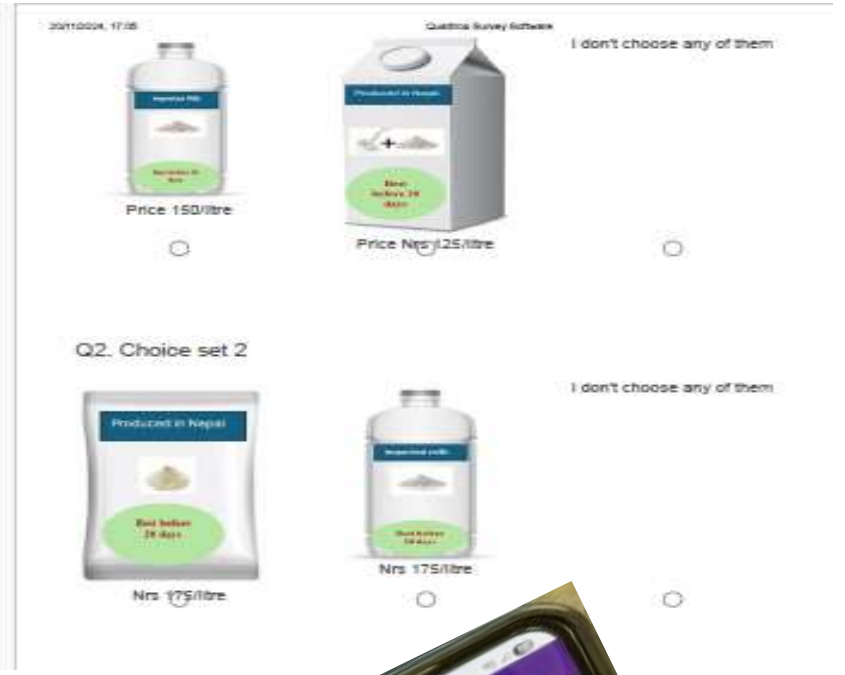
Respondents' selection

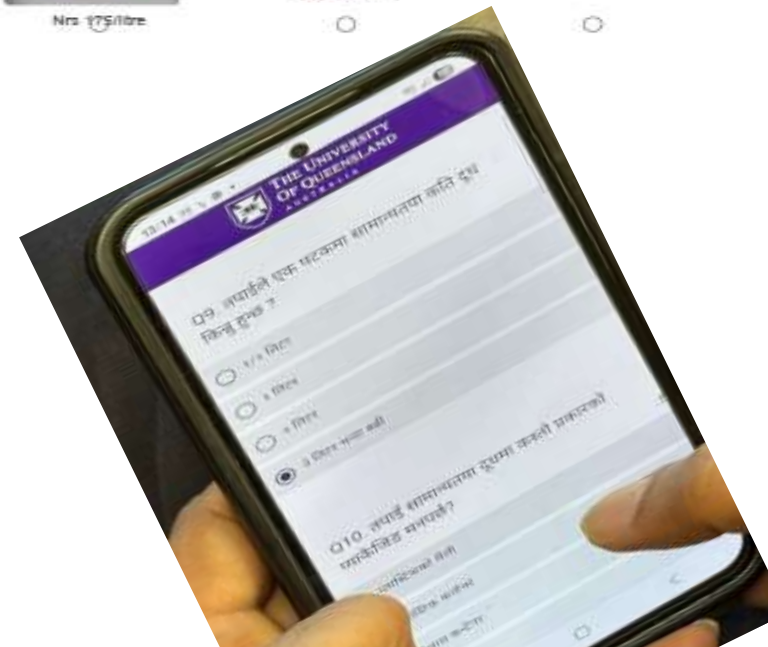
Randomly intercepted
- 18 years above
- Frequently involved in milk purchasing
- Willing to participate

Total 410 respondents

Methodology (Contd..)

- Face-to-face interviews was conducted using a structured questionnaire
- NLOGIT6.0 software
- Multinomial logit (MNL), Random parameter logit (RPL) models and latent class models analysis





Results and discussions

Respondents' demographic characteristics

Demographic characteristics	Total (N =401)
Gender	
Male	**305 (76.06)**
Female	96 (23.94)
Mean age in years	**38.10**
Mean years of education	**10.99**
Average family size	**5.32**

Results and discussions (contd..)

Consumers' preference for attributes

Attributes	Coefficient	Standard error
Constant	4.66***	0.56
Place of production		
Locally produced	0.20*	0.12
Domestically produced	0.36***	0.08
Fat content		
Reduced fat content	-0.14*	0.08
Skimmed milk	0.03	0.07
Type of Packaging		
Plastic jar	0.14**	0.06
Paper cardboard	-0.26***	0.06
Labelling		
Good manufacturing practices (GMP)	1.08***	0.13
Price	-0.02***	0.03
Number of observations	3208	
Pseudo-R^2	0.19	
Log likelihood	-2425.65	

****, **, * Significant at 1%, 5% and 10% level. Values in parentheses are standard errors.*

Imported milk, whole fat, plastic pouch packaging, and no claim of good manufacturing practices - base attribute levels.

Results and discussions (contd..)

Preference heterogeneity for milk attributes

Attribute	Mean	Standard deviation
Constant	6.42*** (1.04)	0.31
Place of product (Local)	0.21 (0.18)	0.86***
Place of product (Domestic)	0.65*** (0.16)	0.31
Fat content (Reduced)	0.27 (0.15)	0.10
Fat content (Skimmed milk)	- 0.04 (0.11)	0.63**
Packaging (Plastic jar)	0.51**(0.11)	0.12
Packaging (Paper cardboard)	-0.25***(0.09)	1.01***
Labelling (Good manufacturing practices)	1.72*** (0.32)	1.297***
Price	-0.03***(0.01)	0.01
Number of observations	3208	
Pseudo-R^2	0.31	
Log likelihood	-2411.38	

****; **; * Significant at 1%, 5% and 10% level. Values in parentheses are standard errors.*

Results and discussions cont..

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

Determination of classes for Latent class analysis

Number of classes	Number of parameter (k)	Akaike Information Criterion (AIC)	Bayesian Information Criterion (BIC)	Loglikelihood (LL)
2	13	3862.90	3914.82	-1918.45
3	49	3890	4085.704	-1896
4	67	3904.7	4172.29	-1885.35
5	85	3912	4251.487	-1871

Results and discussions (contd..)

Causes of heterogeneity based on classes

Attributes	Class 1 Coefficient	Class 2 Coefficient
Average class probabilities	38.4	61.6
Utility function		
Constant	6.91***	6.84***
Product origin (Local)	-1.07***	0.36*
Product origin (Domestic)	1.04***	0.57***
Fat content (Skimmed milk)	0.65***	-0.15
Labeling (Good manufacturing practices)	2.10***	0.13
Price	-0.031***	-0.01***
Class membership function		
Sex	-0.13	-0.46
Age	0.01	- 0.01
Education	0.01	-0.01
Income	0.25	-0.29*

Results and discussions (contd..)

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

Willingness to pay for milk attributes (NRs./L)

Attributes	MNL	LCM	
		Class 1	Class 2
Product origin (Local)	9.08	-34.51	22.34
Product origin (Domestic)	16.07***	33.54	57.00
Fat content (Reduced)	-6.37*	-8.3	1.00
Fat content (Skimmed milk)	1.41	20.97	-15.00
Packaging (Plastic jar)	6.30*	-7.7	-9.00
Packaging (Paper cardboard)	-11.57***	-6.12	-14.00
Labelling (Good manufacturing practices)	47.06***	67.74	13.00

Findings and conclusions

- Milk attributes: the place of production, fat content, packaging type, GMP labelling and price have a significant effect on consumers' choice
- GMP labelling and place of production are important purchase driver
- Product differentiation focussing on distinct consumer classes i.e food safety conscious and conventional consumers
- The findings suggest that the adoption of food safety measures, coupled with effective consumer communication through appropriate labelling, increase consumers' willingness to pay.

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

THANK YOU

Questions, Feedback & suggestions