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Impact of Farmers' Marketing Decisions on Profitability in Wheat: A Case Study of Kailali District

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ABSTRACT

Wheat is one of the most important crops of Nepal in terms of area under cultivation, production and consumption with a benefit-cost ratio of 1.38, representing a highly profitable enterprise. There has been very limited study regarding the marketing aspect of wheat and almost no study regarding the best marketing decision which leads to significant losses. This study aims to assess the impact of farmers' marketing decisions concerning time, place and quantity of wheat sales on profitability along with the factors affecting them. For this research, purposive sampling was done with 100 wheat-growing households. Data were collected using a pre-tested semi- structured questionnaire in Kobo toolbox and the descriptive and inferential data analysis was carried out using Ms-excel and STATA version 14.2. The main problem in cultivation was found to be irrigation and its associated cost. 3 probit regression models related to selling time (immediately after harvest or later), place of sale (home or distant market) and quantity sold (in installments or whole) were run. Annual wheat production was found to be significant in all conditions, indicating that larger producers have greater flexibility in their marketing decisions. Farmers with higher production are more likely to delay sales, sell privately from home, and sell in installments, likely due to their ability to manage storage, transport, and market risks better than smaller producers. The research recommends the authorities to assist farmers through a subsidy in irrigation costs and storage costs, along with providing market decision information to increase the economic efficiency and profitability of wheat growers.

INTRODUCTION

Background Information

Agriculture is a source of food security, income generation, and a way of livelihood for the majority of people of Nepal. Nepal has about 28% of agricultural land including both cultivated and uncultivated land where agriculture sector along with forestry and fishing contributes 23.95% to national GDP and provides employment to 65.6% of its population (Statistical Information on Nepalese Agriculture, 2021-22; Nepal Rastra Bank Current Macroeconomic and Financial Situation of Nepal, 2021/22)).

Wheat (Triticum spp.) is a cereal grain, originated from Southwest Asia, but now cultivated worldwide. It is cultivated in a variety of climates, from irrigated to dry and high-rainfall places, as well as warm, humid to dry, frigid climates. Wheat is grown for its nutritious grains which is an important source of carbohydrate, vegetarian protein, minerals, dietary fibre, and B group vitamins. The by-products like straw and bran are also important for humans as well as livestock. Results show that there is a positive relationship between profit and price of wheat, quantity of wheat, price of by-product, quantity of by-product and also show a negative relationship of profit with the total cost (Iqbal *et al.*, 2014).

Wheat is the third most crop after rice and maize in Nepal in terms of area under cultivation and production but in terms of human consumption, it ranks second. The area under cultivation, production and productivity of wheat is 716,978 ha., 2,144,568 metric tons and 2.99 Mt/Ha respectively (Statistical Information on Nepalese Agriculture, 2021-22). Dhungana (2013) found the benefit-cost ratio of 1.38 while Dhital (2017) found it to be 1.22 in wheat production in Nepal. Wheat production has grown significantly since the introduction of semi-dwarf varieties; nonetheless, it is still significantly behind that of China and India which have the ratio at 3.37 and 5.48 tons/ha, respectively (Poudel *et al.*, 2021). Population growth and agricultural development initiatives have increased demand for wheat; however, ongoing obstacles impede the expansion of wheat production and its profitability. The main obstacles are labor shortages, seasonal variations, insufficient agricultural machinery, improper and secure irrigation sources, delayed fertilizer delivery, trouble obtaining loans and subsidies, pest and disease outbreaks, and ineffective marketing strategies.

According to the Prime Minister Agricultural Modernization Project (PMAMP), a minimum of 10 hectares of land is required to designate a "pocket area," 100 hectares for a "block," 500 hectares for a "zone," and 1,000 hectares for a "super zone." Kailali is one of the super zones that were created in 2017 A.D. to specialize and market wheat in the area. With its professionals and specialists, Wheat Superzone helps with commercialization and automation, while also offering farmers a range of technical support (Devkota *et al.*, 2020). It also aims to enhance the livelihood and economy of the region through a transformation in

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wheat cultivation and production technology.

The area, production and yield of wheat in Kailali district in the Fiscal Year 2078/79 is 34,944 ha., 125,252 Mt., and 3.58 MtHa-1 respectively (Statistical Information on Nepalese Agriculture, 2021-22). The benefit cost ratio of wheat in Kailali district was found to be 1.43 and 1.492 according to Kumar Yadav *et al.*(2022) and (Mahara *et al.*(2023).

Despite the economic importance of wheat farming, there is a lack of comprehensive research on the impact of farmers' marketing decisions on profitability in wheat. Though Kailali district is categorized as a super zone, there has been very limited studies regarding the marketing aspect of wheat for maximizing profitability and almost no study regarding the best marketing decision which would ensure maximum profit to the farmers of Kailali district. Nepalese wheat farmers, particularly in Kailali District, often struggle to maximize their wheat's selling price and subsequently their profit. This challenge arises from a lack of understanding of optimal marketing strategies, including the timing of sales, the selling place, and the quantity sold. There is a lack of research on the impact of these decisions on profitability.

The objective of the research lies in analyzing the influence of the time of sale and impact of selling place on profitability, storage losses, opportunity cost of storage, and post-harvest management. Cumulatively, it aims at identifying factors influencing farmers' marketing decisions concerning time, place, and quantity of wheat sales in Kailali District.

LITERATURE REVIEW

National Status of Wheat in Nepal

Wheat is the third most important crop after rice and maize in Nepal, in terms of area under cultivation and production whereas second in terms of human consumption. The production of wheat is constrained by lack of agricultural machinery, inadequate irrigation, poor availability of fertilizers, disease and insect-pest prevalence, and scanty quality improved seeds (Poudel *et al.*, 2021). Cost of wheat production can be reduced by substituting human labor with farm machinery like a combine harvester, using the recommended seed rate, and application of sustainable nutrient management techniques. Cooperative farming can be a promising step towards farm mechanization (Bist *et al.*, 2017a).

Table 1: Area, production and productivity of wheat in recent years

Year	Area (in ha)	Production (in Mt)	Productivity (Mt/ha)
2013/14	754474	1883147	2.41
2014/15	762373	1975625	2.29
2015/16	753470	1811889	2.50
2016/17	740150	1856191	2.50
2017/18	706543	1949001	2.75
2018/19	703992	2005665	2.84
2019/20	707,505	2,185,289	3.09
2020/21	711,067	2,127,276	2.99
2021/22	716,978	2,144,568	2.99

Wheat cultivation status in Kailali district

Kailali district has been selected as a wheat production super zone to be established under the Prime Minister Agricultural Modernization Project (PMAMP). The area, production and yield of Kailali district in the Fiscal Year 2078/79 is 34,944 Ha., 125,252 Mt., and 3.58 MtHa-1 respectively (Statistical Information on Nepalese Agriculture, 2021-22).

The benefit cost ratio of wheat in Kailali district was found to be 1.43 (Kumar Yadav *et al.*, 2022) and 1.492 (Mahara *et al.*, 2023) in their respective study in comparison to BC ratio of 1.79 in Kanchanpur district (Bist *et al.*, 2017b).

Factors affecting Marketing and marketing decisions

Amongst many others, the market for farm goods is an important component of agricultural growth. One of the key strategies for increasing farmers' incomes and advancing the nation's economic growth is to implement an effective marketing system. Additionally, it also serves as an important indicator for farmers to use when allocating resources (Bhandari P., 1993).

Studies on behavioral finance reveals that when making marketing decisions, people are susceptible to psychological biases such as overconfidence in their ability to foresee the market and a tendency to recall victories and forget mistakes. When making marketing decisions, producers might rely on technical information like price trends, or fundamental information like changes in futures pricing (Klumpp *et al.*, n.d.). In addition to probability weighting and loss aversion, producers tend to overestimate price and underestimate risk. There is also evidence of a habit effect in current marketing decisions (Stefanie, 2011). In their research, Zulauf and Irwin (1998) discovered that the most effective marketing decisions were those that drew information from the futures market, as few manufacturers were likely to employ hedging in their choices. They advise using hedging to improve the likelihood of obtaining the projected return and considering whether the present futures-cash basis (expected return to storage) outweighs the expected cost

of storing when making storage decisions.

When making decisions, a decision-makers' characteristics, age, education, socioeconomic status, values, and ambitions, as well as his level of knowledge and thought processes and biases, all come into play. The decision-making behavior of farmers can reveal a variety of objectives related to security and profit, ranging from market orientation to complete self-sufficiency. A farmer must make judgments and accept responsibility for the results in an area where many elements, including labor availability, technology advancements, and mechanical failure, are unexpected. While there is uncertainty for all farmers, the actual judgments chosen in these scenarios will differ because farmers have various objectives, differing levels of expertise, and differing degrees of risk aversion (Ilbery, n.d.).

Time of sale

While considering the time of sale i.e. whether the farmer sells their produce immediately after harvest or after some time of harvesting, factors like time value of money, storage cost, opportunity cost of storage, storage loss, management cost etc. can come into play. Futures price spreads for corn, soybeans, and wheat exhibit a seasonal pattern. In general, mean spreads gradually decline from the start of the crop year and even go negative on average at the end of the crop year or just before the new harvest (Yoon & Brorsen, 2002). At national level, the price of wheat flour increased by 34.8 percent between May 2022 and May 2023. Similarly, % Change (May 2022 - May 2023) was found to be 58.85% and % Change (April 2023 - May 2023) was found to be 1.22% for wheat flour in case of Sudurpashchim province (Situation Report on Nepal's Agrifood Systems July 2023 | Bulletin Number 8, n.d.). Each 10% increase in annual wheat production is associated with a 0.6% decrease in the annual price. A 1% increase in the real price of rice or wheat is associated with price increases of 0.90% and 0.87% in the subsequent month (Shively & Thapa, 2017).

Future value techniques are designed to determine the value of an amount, or series of amounts of money as of some fixed point in time in the future. The future value of a present sum is calculated using equation (1): FV =PV(1+i)n Where: FV = Value in period n (n periods in the future) PV = Value in period 0 (now) =Interest rate per conversion period n =Number of conversion periods. If each period is a year, n is the number of years into the future on which the value is to be calculated, and i is the annual interest rate(Ladue, n.d.). However, the future price isn't a simple sum of the harvest price and the carry-over of costs over time. It also depends on many other factors, e.g. the size of inventories, transport costs, fluctuating prices of other goods, prices on foreign markets, the exchange rate, as well as non-economic factors, such as the government's economic policy (Przekota & Szczepańska-Przekota, 2020).

The FAO reports that the loss during farm storage during a three- to four-month period is 15% based on its analysis of a survey of post-harvest losses in developing nations (Boxall & Gillett, 1982). In Nepal, rats, mold, and insect pests cause 15 to 30 percent of grain storage losses. More than 90% of Nepal's yearly rainfall falls during the rainy and humid May through October wheat seed storage season. For small-holder farmers in the lowlands and hills, minimizing post-harvest losses while preserving seed quality is also a significant issue (M. Devkota *et al.*, 2018). Also, the effect of storage materials is found to be significant on seed moisture content and seed germination of wheat (Khatri *et al.*, 2019). To minimize storage losses, farmers employ a variety of strategies, including artificial insecticides and conventional techniques. Research has demonstrated the effectiveness of insecticides in reducing storage losses caused by insects. Farmers employ pesticides to avoid storage losses when available since they are often less expensive (Kandel *et al.*, 2021).

Selling place

While considering the selling place i.e. whether the farmer sells their produce directly from their house or through market or some intermediaries, factors like transportation cost, marketing costs and marketing margins can come into play.

Farmers decide where and for whom to sell after selecting outlets based on their comparative bargaining advantage and the availability of outlets for their farm products. The probability of selecting the wholesalers market outlet is heavily impacted by the number of extension contacts, the distance from the market, the commodity's price, and cooperative membership. With every unit increase in the distance from the market place, the probability of reaching a wholesaler market outlet falls by 0.4% (Haji & Brachi, 2017).

The selling of produce by the producer himself directly to the consumer is found to be most profitable (PARSHURAMKAR *et al.*, 2014). Similarly, it was discovered that the farm-wholesale marketing margins were lower (15.78%) and the farm-retail marketing margin was the largest (31.42%). With a total gross margin of 56.36, the producers' share of the consumer price was 68.5% (Kharel *et al.*, 2021).

Under producer-consumer channel, the producer's share in consumer's rupee was 98.99% whereas, marketing cost was 1.00%. The producers received the high price of wheat as sold through this channel. In producer-village trader-consumer channel, the producer's share in consumer's rupee estimated was 90.07 per cent. Whereas, marketing costs and margins of the village trader were 3.60 per cent and 6.13 per cent. In producer-village trader-wholesaler- retailer-consumer channel, the producer's share in consumer's rupee was 73.89%. Trader,

wholesaler and retailer earn the margin having 4.27%, 2.43% and 3.60%, respectively (Kumar Tripathi *et al.*, 2018). Similarly, among estimated average total marketing costs, transport has the largest share of 40 percent, commission and taxes make up 25 percent, and wastage another 15 percent (Gandhi & Koshy, 2006).

In Nepal's rice and wheat markets, roads and bridges have a significant role in regulating price levels and price volatility, which accounts for around half of the geographic and temporal variance in price markups between regional and local markets. Food prices and fuel expenses have a positive correlation, whereas prices and the density of roads and bridges have a negative correlation (Shively & Thapa, 2017).

Quantity sold

Increasing sales can lead to economies of scale, potentially lowering production costs per unit. However, careful consideration of market dynamics, resource constraints, and quality maintenance is crucial to avoid diminishing returns and optimize overall profitability. Efficient marketing strategies play a key role in managing this relationship effectively.

The marketable surplus is influenced by several other institutional, technical, infrastructure, and socioeconomic variables. Of these, it was discovered that family size had a large negative influence on the marketable surplus of wheat, whereas price, farm size, amount produced, market access, awareness of the minimum support price, and access to institutional financing all had favorable effects (Sharma, n.d.). Likewise, economic theories argue that production costs and agricultural technologies affect the amount of wheat supplied to the market (Habte *et al.*, 2020).

Nevertheless, the retailers' choice to purchase is influenced by both the quantity needed (which is determined by the shop's storage capacity) and the variety (which is determined by its availability). Additionally, it depends on what the buyer wants. Other factors such as margins obtained, ease of transportation, and availability of credit from the seller are somewhat important (Gandhi & Koshy, 2006).

MATERIALS AND METHODS

Selection of study area

The study area for this study is Kailali district. Kailali District is located in the far-western region of Nepal. Positioned at approximately 28.8°N latitude and 80.9°E longitude, the district spans an area of about 3,235 square kilometers. The population of Kailali is about 911,000.

The district

is divided into 12 municipalities and 83 wards. Kailali is known for its vibrant culture and diverse landscapes, making it a significant part of Nepal's geographical and cultural mosaic.

Research Design

This research study will be carried out on the basis of exploratory and analytical research design incorporating both quantitative and qualitative methods. The study will be based mainly on primary data and information. This study focuses mainly upon how people make marketing decisions of their produced wheat and how it affects their overall profitability.

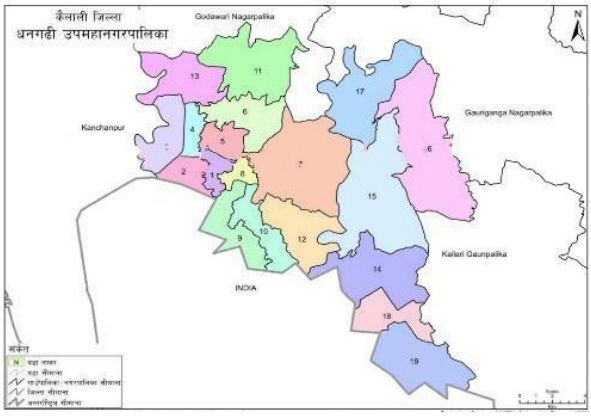

Figure 1: Map of Study area

Besides, the study attempts to explore various factors affecting farmers' marketing decisions and their impacts upon profitability.

Types of data and source

The study will use both primary and secondary data. Primary data will be obtained from:

a) Respondents by using semi-structured questionnaire
b) Inquiring professionals engaged in wheat marketing
c) Key Informant
d) Discussion and Observation

Secondary data will be collected from reports of the Ministry of Agriculture and Livestock Development (MoALD), market reports, news and relevant articles. Although, much emphasis will be given to the primary data.

Sample size

Purposive sampling was done to collect the data and information from the farmers involved in wheat cultivation in the area. The farmers involved in wheat farming were identified as the research area is the hometown of the researcher. A sample size of 100 farmers was taken. The sample size for study was calculated by the formula given by Yamane (1967) as:

n= N/(1=Ne^2) where n= sample size
N= number of recipients
e= error tolerance (0.1 for this result)

Data collection instruments and procedure

Quantitative-qualitative mixed methods approach is done for the study. It will be composed of following things:

- Interviews with stakeholder
- Survey Instrument
- Interview Guide
- Market Observations

Data analysis

Qualitative data

Qualitative data will undergo thematic analysis. Transcripts from in-depth interviews will be coded, and

emerging themes will be identified. Patterns and insights will be synthesized to provide a nuanced understanding of the qualitative aspects of marketing decisions.

Quantitative data

Quantitative data will be analyzed using statistical software like Stata. Descriptive statistics, such as mean, median, and standard deviation, will be computed. Inferential statistics, including regression analysis, will be employed to assess the relationship between marketing decisions and profitability.

Analytical Framework for Comparing Marketing Decisions

To evaluate the impact of Time of Sale, Place of Sale, and Quantity of Sale, we develop formulas based on relevant cost and benefit parameters.

Time of Sale

Comparison: Sell Immediately vs. Sell Later

Net Profit Formula:

$$Net\ Profittime = P_t \times Q - (C_s + L_s + OC_m) + FV_{gain/loss}$$

Where:

- P_t= Selling price at time t
- Q= Quantity sold
- C_s= Storage cost per unit
- L_s= Storage loss cost (quantity lost × price)
- OC_m= Opportunity cost of management (e.g. time, labor, land opportunity),
- $FV_{gain/loss}$= Future Value adjustment

Future Value Formula (for delayed sale adjustment):

$$FV = PV \times (1 + i)^n$$

$$Net\ Profit_{quantity} = \sum_{i=1}^{n} (P_i \times Q_i \times (1+i)) - \sum_{i=1}^{n} (C_{s,i} + L_{s,i})$$

Where:

- FV= Future Value
- PV= Price received if sold immediately
- i= Interest rate (e.g., 10% annually)
- n= Time stored in years or months (converted appropriately)

Place of Sale

Comparison: Sell at Home vs. Distant Market

Net Profit Formula:

$$Net\ Profit_{place} = P_s \times Q - (C_t + C_m)$$

Where:

- P_s= Selling price at location s
- Q= Quantity sold
- C_t= Transportation cost (to market, per quintal)
- C_m= Marketing cost (loading/unloading, commissions, taxes)

Quantity of Sale

Comparison: Sell All at Once vs. Sell in Installments

Net Profit Formula:

Where:

- P_i= Selling price in installment i
- Q_i= Quantity sold in installment i
- t= Time value adjustment for delayed sales
- $C_{s,i,}$ $L_{s,i}$= Storage cost and loss for that installment If sold all at once

$$Net\ Profit_{wholesale} = P_0 \times Q - (C_s + L_s)$$

Where:

- P_0= Single selling price immediately
- Q= Total quantity sold

RESULTS AND DISCUSSIONS

Demographic Information

Following information can be obtained from the table:

- Age: The mean age of the respondents is 45.15 years, with a minimum of 30 years and a maximum of 70 years.
- Number of family members: The average family size is 7.39, with a minimum of 4 members and a maximum of 12 members.

Table 2: Demographic Information

Particulars	Mean	Minimum	Maximum
Age	45.15	30	70
Number of family members	7.39	4	12
Years of Education	4.22	0	12
Farming experience (in			
years)	13.89	2	40
Area of cultivation (in kattha)	20.85	10	50

- Years of education: On average, respondents have 4.22 years of education, with a minimum of 0 years and a maximum of 12 years.
- Farming experience: The mean farming experience is 13.89 years, with a range from 2 to 40 years.
- Area of cultivation: On average, respondents cultivate 20.85 kattha of land, with a minimum of 10 kattha and a maximum of 50 kattha.

Among the respondents, 27% were female and 73% were male.

Problems faced during wheat cultivation

Wheat farmers face several key challenges, with water scarcity being the most common, affecting 27% of them.

Table 3: Problems faced during wheat cultivation

Problems	Frequency	Percentage
Water Scarcity	68	26.880
Pest infestation	34	13.440
Soil fertility issues	20	7.910
Lack of modern farming equipment	48	18.970
Market related challenges	36	14.230
Loose Cattles	47	18.580
Total	253	100.000

Nearly half of the farmers also struggle with the lack of modern farming equipment and loose cattle damaging crops. Additionally, market-related issues hinder 14% of farmers, making it difficult for them to sell their wheat. Pest infestations affect 13% of farmers, while soil fertility problems impact 8%. These challenges highlight the need for better water management, access to equipment, improved pest control, and market support to enhance wheat farming productivity.

Table 4: Reasons for selling soon after harvest

Reasons for selling soon after harvest	Frequency	Percentage
Market price	45	18.990
Storage availability, loss and it's opportunity cost	70	29.540
Transportation availability	8	3.380
Immediate credit needs	70	29.540
Land preparation for next season	24	10.130
Post Harvest Management	20	8.440
Total	237	100.000

Reasons for selling soon after harvest

Many of the farmers sell their produce soon after harvest. The most significant reason, cited by 29.54% of respondents, is the need to address immediate credit needs. Similarly, storage availability and associated losses, along with their opportunity costs, also account for 29.54% of responses, suggesting that inadequate storage facilities compel farmers to sell promptly to avoid spoilage. Market price considerations follow closely, with 18.99% of respondents indicating that favorable market conditions drive early sales. Other factors include land preparation for the next season (10.13%), transportation availability (3.38%), and post-harvest management issues (8.44%).

Choice of selling place

Farmers choose different places to sell their wheat, with the most popular option being to sell to private buyers, selected by 30% of respondents. The selling of produce by the producer himself directly to the consumer is found to be most profitable (PARSHURAMKAR *et al.*, 2014). Local markets are also a common choice, with 29% of farmers opting to sell their produce there. With every unit increase in the distance from the market place, the probability of reaching a wholesaler market outlet falls by 0.4%(Haji & Brachi, 2017).

Neighbors are the buyers for 21.5% of farmers, while wholesale markets attract 11.5% of sellers. A smaller percentage, 8%, prefer selling in a neighboring village market. These choices reflect a mix of convenience, pricing, and access to different market channels depending on the farmer's situation and location.

Table 5: Choice of selling place

Choice of selling place	Frequency	Percentage
Local market	58	29.000
Neighbour	43	21.500
Neighbour village market	16	8.000
Wholesale Market	23	11.500
Private buyer	60	30.000
Total	200	100.000
Total	237	100.000

Table 6: Reasons for choosing respective selling place

Reasons for choosing respective selling place	Frequency	Percentage
Closest market (transportation costs)	28	13.930
Highest price offered	65	32.340
Best payment terms	51	25.370
Most reliable buyer	26	12.940
convenience	31	15.420
Total	201	100.000
Total	237	100.000

Reasons for choosing respective selling place

Farmers choose their selling place based on several key factors. The highest price offered is the most important reason, with 65.7% of farmers selecting their market based on price. The selling of produce by producer himself directly to the consumer is found to be most profitable (PARSHURAMKAR *et al.*, 2014). Best payment terms, such as immediate or favorable payments, influence 51.5% of sellers. Convenience affects 31.3%, while transportation costs and having the closest market motivate 28.3% of farmers. Additionally, 26.3% of farmers prioritize reliable buyers, reflecting the importance of trust and consistent business relationships. These factors show that price and payment conditions are the most influential in market choice.

Reasons for selling in installments

The pie chart illustrates the reasons why farmers choose to sell their produce in installments. The most common reason, cited by 29% of respondents, is to respond to changing market conditions, indicating that farmers

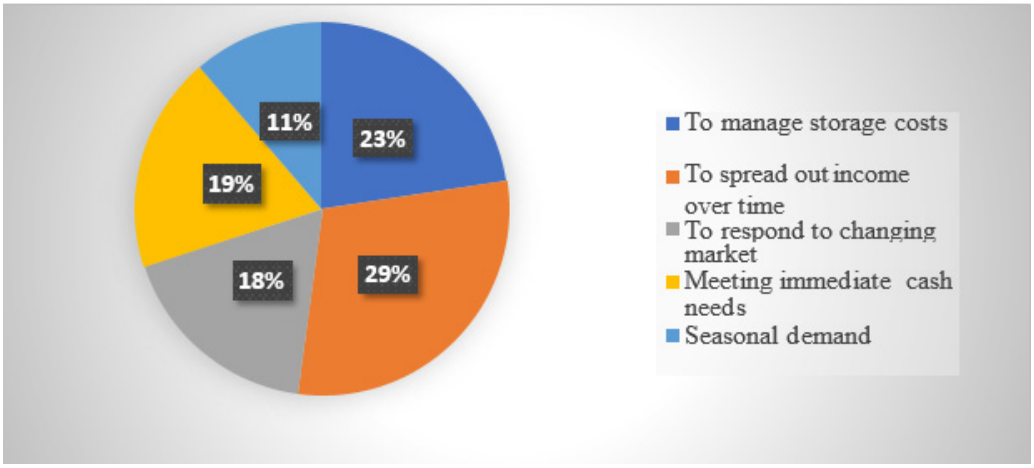

Figure 2: Reasons for selling in installments

prefer to spread their sales to take advantage of better prices over time. Managing storage costs motivates 23% of farmers, highlighting the financial burden of storing produce. Meeting immediate cash needs is a factor for 19%, while 18% of farmers sell in installments to spread out income over time. Lastly, seasonal demand drives 11% of farmers to sell in phases, aiming to capitalize on higher prices during peak demand periods. factors such as margins obtained, ease of transportation, and availability of credit from the seller are somewhat important for buyer's demand (Gandhi & Koshy, 2006).It will eventually affect the supply by producer.

Probit regression for selling time (soon after harvest or after some time)

The probit regression analysis investigates the factors influencing farmers' decisions to sell their produce soon after harvest as opposed to delaying the sale. Among the variables examined, annual production stands out as the most significant factor, with a positive coefficient of 0.11 and a p-value of 0.000. This indicates that higher annual production is strongly associated with an increased likelihood of selling soon after harvest, with an average marginal effect suggesting that for each quintal increase in production, the probability of selling soon rises by

Table 7: Probit regression for selling time

Sell soon or later	**Coef.**	**St.Err.**	**t-value**	**p-value**	**95% Conf**	**Interval**	**Sig**
Age of HHH	-.008	.024	-0.32	.747	-.054	.039	
Gender	.596	.345	1.73	.084	-.08	1.273	*
Education	.021	.052	0.41	.683	-.081	.124	
Family size	-.008	.074	-0.11	.915	-.153	.137	
Annual production	.11	.023	4.77	0	.065	.156	***
Constant	-1.949	1.327	-1.47	.142	-4.549	.652	
Mean dependent var	0.330	SD dependent var	0.473				
Pseudo r-squared	0.208	Number of obs	100				
Chi-square	26.399	Prob > chi2	0.000				
Akaike crit. (AIC)	112.437	Bayesian crit. (BIC)	128.068				
*** $p<.01$, ** $p<.05$, * $p<.1$							
Average marginal effects Number of obs = 100 Model VCE : OIM Expression : Pr(sellsoonlater), predict() dy/dx w.r.t. : AgeofHHH Gender Education familysize annualproduction							
Delta-method							
	dy/dx	Std.Err.	z	[95%Con f.	P>z	[95%Con	
Age of HHH	f.	Interval]	-0.320	0.748	-0.015	0.011	
Gender	0.170	0.094	1.810	0.071	-0.014	0.355	
Education	0.006	0.015	0.410	0.682	-0.023	0.035	
Family size	-0.002	0.021	-0.110	0.915	-0.044	0.039	
Annual production	0.032	0.005	6.850	0.000	0.023	0.041	

approximately 3.2%. Gender also plays a notable role; the coefficient for gender is 0.596, implying that male farmers are more likely to sell soon, although this finding is only marginally significant at the 10% level, as indicated by a p-value of 0.084. The average marginal effect further suggests a 17% increase in the probability of early sales for males compared to females. In contrast, the variables for age of the household head, education, and family size show no significant impact on selling. The model itself has a pseudo R-squared value of 0.208, suggesting that approximately 20.8% of the variation in selling behavior can be explained by the included variables. Additionally, the overall significance of the model is confirmed by a chi- square statistic of 26.399 with a p-value of 0.000.

In summary, this analysis reveals that annual production and gender are key determinants in farmers' selling decisions shortly after harvest, while other factors like age, education, and family size appear to have little effect. The findings underscore the importance of production levels and gender dynamics in understanding agricultural selling behaviors.

Probit regression for selling place (private sell or distant market)

The probit regression analysis examines the factors influencing farmers' decisions to sell their produce in private markets versus distant markets. The results indicate that none of the variables—age of the household head (HHH), gender, education, family size, or annual production—have a statistically significant impact on the choice of selling place. The overall model fit is quite low, with a pseudo R-squared value of 0.014, indicating that only 1.4% of the variation in selling behavior can be explained by the included variables. The chi-square statistic is 1.927 with a p-value of 0.859, suggesting that the model is not statistically significant overall. In summary, this analysis reveals that factors such as age, gender, education, family size, and annual production do not significantly influence farmers' decisions to sell in private markets versus distant markets, highlighting a lack of strong determinants in this context and suggesting that other unmeasured factors may play a more critical role in influencing selling behavior.

Table 8: Probit regression for selling place

Private market sell	**Coef.**	**St.Err.**	**t-value**	**p-value**	**95% Conf**	**Interval**	**Sig**
Age of HHH	-.008	.021	-0.38	.701	-.048	.032	
Gender	.058	.305	0.19	.849	-.54	.656	
Education	-.047	.046	-1.02	.308	-.138	.043	
Family size	.058	.067	0.87	.386	-.073	.189	
Annual production	-.001	.021	-0.04	.964	-.041	.039	
Constant	-.135	1.162	-0.12	.908	-2.412	2.142	
Mean dependent var	0.400	SD dependent var	0.492				
Pseudo r-squared	0.014	Number of obs	100				
Chi-square	1.927	Prob > chi2	0.859				
Akaike crit. (AIC)	144.675	Bayesian crit. (BIC)	160.306				
*** p<.01, ** p<.05, * p<.1							
Average marginal effects Number of obs = 100 Model VCE : OIM Expression : Pr(Privateordistanttsell), predict() dy/dx w.r.t. : AgeofHHH Gender Education familysize annualproduction							
Delta-method							
	dy/dx	Std.Err.	z	[95%Con f.	P>z	[95%Con	
AgeofHHH	-0.003	0.008	-0.380	0.700	-0.018	0.012	
Gender	0.022	0.116	0.190	0.849	-0.205	0.249	
Education	-0.018	0.017	-1.040	0.299	-0.052	0.016	
Family size	0.022	0.025	0.880	0.381	-0.027	0.071	
Annual production	-0.000	0.008	-0.040	0.964	-0.016	0.015	

Probit regression for selling quantity (selling all at once or selling in installments)

The probit regression analysis assesses the factors influencing farmers' decisions regarding the quantity of wheat sold, specifically whether they sell all at once or in installments. Among the variables analyzed, annual production emerges as a significant factor, with a coefficient of 0.095 and a p-value of 0.000. This indicates that higher annual production is associated with an increased likelihood of selling all at once, with an average marginal effect suggesting that for each quintal increase in production, the probability of selling all at once rises

Table 9: Probit regression for selling quantity

Selling quantity	Coef.	St.Err.	t-value	p-value	95%	Interval	Sig
Age of HHH	-.021	.024	-0.89	.372	-.067	.025	
Gender	0	.332	-0.00	.999	-.65	.65	
Education	.056	.05	1.12	.261	-.042	.154	
Family size	.106	.072	1.47	.142	-.035	.247	
Annual production	.095	.025	3.86	0	.047	.144	***
Constant	-1.918	1.277	-1.50	.133	-4.422	.585	
Mean dependent var	0.330	SD dependent var	0.473				
Pseudo r-squared	0.154	Number of obs	100				
Chi-square	19.493	Prob > chi2	0.002				
Akaike crit. (AIC)	119.343	Bayesian crit. (BIC)	134.974				
*** p<.01, ** p<.05, * p<.1							
Average marginal effects Number of obs = 100 Model VCE : OIM Expression : Pr(Sellsoonorlater), predict() dy/dx w.r.t. : AgeofHHH Gender Education familysize annualproduction							
Delta-method							
	dy/dx	Std.Err.	z	[95%Con f.	P>z	[95%Con	
AgeofHHH	-0.006	0.007	-0.900	0.367	-0.020	0.007	
Gender	-0.000	0.100	0.000	0.999	-0.196	0.196	
Education	0.017	0.015	1.140	0.253	-0.012	0.046	
Family size	0.032	0.021	1.520	0.129	-0.009	0.073	
Annual production	0.029	0.006	5.030	0.000	0.018	0.040	

by approximately
2.9%. In contrast, the other variables— age of the household head (HHH), gender, education, and family size—do not show statistically significant effects on the selling quantity. The overall model demonstrates moderate explanatory power, with a pseudo R- squared value of 0.154, indicating that about 15.4% of the variation in selling behavior can be explained by the included variables. The chi-square statistic is 19.493 with a p-value of 0.002, confirming that the model is statistically significant overall.

In summary, this analysis highlights that annual production significantly influences farmers' decisions to sell their wheat all at once rather than in installments, while other factors such as age, gender, education, and family size do not appear to have a substantial impact on this decision-making process.

Selling price of wheat per quintal for different marketing decisions

The table shows the average selling price per quintal of wheat obtained by farmers under different marketing

Table 10: Selling price per quintal for different marketing decisions

Decisions		Mean	Std.Dev.
Time of sell	Immediately after harvest	3823	113
	After some time	4076.76	143.72
Place of sell	From home	3847.54	129.76
	Far from home/market	3847.43	156.87
Quantity of sell	Sell at once	4022.5	113.44
	Sell in instalments	4012.5	126.86

decisions related to the time of sale, place of sale, and quantity sold.

1. Time of sale: Farmers who sell wheat immediately after harvest receive an average selling price of Rs. 3,823 per quintal, whereas those who sell after some time obtain a higher average price of Rs. 4,076.76 per quintal. This indicates that delaying sales allows farmers to benefit from higher prices, although with greater variability.

2. Place of sale: The average selling price for farmers who sell wheat from home is Rs. 3,847.54 per quintal, which is almost identical to the price received by farmers selling in far-from-home or distant markets (Rs. 3,847.43 per quintal). This suggests that higher prices in distant markets are largely offset by additional transportation and

marketing costs.

3. Quantity of sale: Farmers who sell wheat at once receive a slightly higher average selling price (Rs. 4,022.5 per quintal) compared to those who sell in installments (Rs. 4,012.5 per quintal). The small difference implies that the quantity of sale has a limited effect on the selling price per quintal.

In summary, selling wheat after some time and selling at once provides marginally higher selling prices, while the place of sale shows negligible influence on the average selling price per quintal.

CONCLUSIONS

This research titled "Impact of Farmers' Marketing Decisions on Profitability in Wheat: A Case Study of Kailali District" presents a comprehensive analysis of how marketing strategies affect the profitability of wheat farmers in Kailali district. The study identifies critical factors influencing marketing decisions, including the timing of sales, choice of selling locations, and the quantity sold. The study found that farmers with larger annual production have greater flexibility in their decisions, leading to more profitable outcomes. Selling in installments and from home proved to be the most lucrative strategies, as they allowed farmers to optimize their prices and reduce transportation costs. However, challenges like inadequate irrigation, storage issues, and limited market access were significant barriers. Addressing these obstacles through improved infrastructure, market information, and support services is essential to enhance wheat farmers' profitability in the district.

In conclusion, this research fills a critical gap in understanding the marketing dynamics of wheat production in Nepal. By elucidating the relationship between marketing decisions and profitability, it offers valuable insights for policymakers and stakeholders aiming to improve agricultural practices and economic outcomes for farmers in the region. The findings advocate for a holistic approach to agricultural development that integrates marketing education and infrastructure improvements to foster sustainable growth in wheat farming.

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