Potatoes Storage, Price Spread through Various Channels and Marketing Efficiency in Parwan Province, Afghanistan

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ABSTRACT

This research paper examined the factors influenced farmers' immediate selling of potatoes after harvest and their storage practices, various factors and limitations affected their selling and storage capacity has been identified and the ground conditions as realistic discussed as well as the price spread and marketing efficiency in the three districts Siyagard, Ghorband, and Shinwari of Parwan province, Afghanistan. The study conducted revealed that farmers primarily sold potatoes to pay for household expenses 57.50 percent and finance agricultural inputs 55.00 percent. Moreover, sold for loan repayment 45.00 percent and limited storage space 52.50 percent play significant roles in immediate selling decisions. The study also showed that farmers stored potatoes for various reasons, such as personal consumption 23.3 percent, anticipating higher prices 24.20 percent, meeting off-season demand 23.3 percent, and exploiting competitive prices 23.3 percent. The study provide insights into the price spread in different market channels, indicating varying profit margins for farmers and intermediaries. Finally, the study highlighted the marketing efficiency under different channels, with Channel III showed the highest efficiency 47 percent in direct distribution, followed by Channel II 32 percent and Channel I 29 percent. These findings highlight the complexities of potato marketing in the Parwan province, Afghanistan which can help policymakers to develop a sustainable approach to inform strategies to improve farmers' income and market efficiency.

Keywords- Selling, Storage, price spread, marketing channels and Potatoes.

I. INTRODUCTION

Storage was one of the important aspects for post-harvest handling of potatoes. Seasonal agricultural products require storage to meet demand during non-harvest seasons, stabilize prices, and establish a strategic reserve in case of crop failure (Yagoh, 2013)). Understanding the factors influencing farmers' decisions to store potatoes during specific periods can aid in designing programs that effectively manage supply to meet consumer demand. Due to the enhancement of living standards, rapid urbanization, and an increasing focus on health consciousness, the demand for high-value crops, particularly vegetables, has witnessed a substantial surge in recent times. According to (Meena and Singh, 2014), this trend is predicted to persist,

leading to further escalation in the demand for vegetables. According to (Singh et al. 2017), there has been a significant increase in vegetable productivity through both open field and protected cultivation methods. However, it is important to highlight that this progress has been by an escalation in the use of fertilizers and pesticides, as noted by (Noopur et al. 2021). (Noopur et al. 2023) emphasized the importance of vegetables as they are rich sources of essential vitamins, minerals, and fiber. The selection of marketing channels is a crucial aspect of promoting agricultural products. It ranks among the most vital decisions for individuals and organizations alike, as the chosen channels significantly impact all other marketing decisions (Berry, 2010). Farmers' decisions on marketing channels are primarily influenced by the potential profit they can achieve from selling their products (Muthini et al., 2015). Therefore, the pursuit of profit often guides their choice of marketing channels. However, this is not always the case in Afghanistan, where factors driving farmers' decisions on marketing channels remain unclear. Various studies conducted in developing countries, such as (Xaba and Masuka 2012) in Swaziland, (Bezabih Emana 2015) on potato producers in Ethiopia, have identified institutional, technical, and socio-economic factors as key determinants of channel choice decisions. Regrettably, there has been rare case study conducted in Afghanistan to explore these factors in the context of marketing channel decisions. Afghanistan's current potato planting area is 32,116 hectares and 513,194 tons (FAO, 2018).

II. METHODOLOGY

Sampling Technique: Utilized a stratified random sampling technique selected a representative sample of farmers from the three districts of Siyagard, Ghorband, and Shinwari, of Parwan Province, Afghanistan.

Survey Questionnaires: Developed structured survey questionnaires that include both closed-ended and open-ended questions. The questionnaires covered the following aspects: Demographic information of farmers (e.g., age, gender, education, farm size).

Pre-testing: Before the actual data collection, pre-test the surveyed questionnaires with a small group of farmers to identify any ambiguities or issues with the questions. Revise the questionnaires based on feedback.

Data Collection: Conduct face-to-face interviewed with selected farmers using the structured survey questionnaires. The interviewed carried out sensitively to ensure accurate and honest responses from the farmers.

Analytical tools used: After data collected, cleaned and organize the data. Perform quantitative data analyzed through SPSS statistical software to calculate the frequency and percentage of farmers agreed with each reason for selling immediately after harvest and their storage preferences.

Marketing Efficiency

Marketing efficiency was calculated using Shepherd's approach. It can be given as-

$$M.E. = Cp/(Pc + C + Ami)$$

Where, M.E. = Market efficiency
Cp = Consumer's purchase price
Pc = Marketing cost of producer
C = Marketing cost of all the intermediaries involved in the channel
A_{mi} = Market margin of the intermediaries involved in the channel

Marketing Efficiency

Marketing efficiency of any activity or process was defined as the ratio of output and input.

III. RESULT AND DISCUSSION

Table 1: Reason for selling the potato by farmers immediately after harvest (N=120)

S. No.	Farmers sell potatoes right away after harvest due to the reason	SA	A	N	D	SD
1	To pay for household expenses	57.50	31.70	8.30	0.80	0.80
2	Purchase agricultural inputs during the upcoming season	55.00	33.30	8.30	0.80	0.80
3	To repay loans	45.00	30.00	18.30	3.30	1.70
4	Not enough storage space	52.50	31.70	10.00	0.80	2.50

(Note: SA-Strongly Agree; A-Agree; N-Neutral; da- Dis-Agree; SDA- Strongly Dis-Agree)
Source: Field survey (2023)

Table 1 represent the Reason for selling the potato by farmers immediately after harvest: The primary reason for farmers selling potatoes immediately after harvest was to pay for household expenses, with 57.50 percent of farmers strongly agreeing with this motivation. Additionally, a significant number of farmers 55.00 percent strongly agreed that they sell their potatoes to finance the purchase of agricultural inputs for

the upcoming season. Furthermore, 45.00 percent of farmers strongly agreed that they sold their potatoes to repay loans, indicating the role of immediate selling in managing their financial obligations. Moreover, more than half of the farmers 52.50 percent strongly agreed that insufficient storage space was a significant constraint that compels them to sell their potatoes right after harvest instead of stored them for later sales.

Table 2: Reasons for storage of potato by the farmers   (N=120)

S. No.	Reasons for storage of potato by the farmers	SA	A	N	D	SD
1	Home consumption preserve	23.30	11.70	44.20	10.00	10.00
2	Better prices in the future	24.20	17.50	33.30	15.00	9.20
3	Low price to potato at harvest time in local market	22.50	12.50	33.30	20.00	10.00
4	High demand during the off-season	23.30	20.00	27.50	15.80	11.70
5	Competitive prices/to earn a good income	23.30	12.50	32.50	20.00	8.30
6	A higher net profit allows us to sell our products later and avoid paying for transportation.	23.30	13.30	34.20	18.30	10.00

(Note: SA-Strongly Agree; A-Agree; N-Neutral; da- Dis-Agree; SDA- Strongly Dis-Agree)
Source: Field survey (2023)

Table 2 represents the storage of potatoes by the farmers: Approximately 23.30 percent of farmers stored potatoes for personal home consumption, preserving a portion of their harvest for future use. Around 24.20 percent of farmers store potatoes in anticipation of higher prices in the future, aimed to maximize profits strategically. Additionally, 22.50 percent of farmers stored potatoes when local market prices were low at harvest time, planning to sell when prices become more favorable. Another 23.30 percent of farmers store potatoes to meet off-season demand, ensuring a steady supply and potentially earning higher profits. Similarly, 23.30 percent of farmers store potatoes to take advantage of competitive prices and earn a good income. Lastly, another 23.30 percent of farmers stored potatoes to benefit from higher net profits and avoid transportation costs by selling their products later.

Price spread, marketing channels, and net return

In the Parwan Province, potato marketing was mostly conducted through the three channels listed below.
1.   Channel I: Farmer – Wholesaler – Retailer - Consumer
2.   Channel II: Farmer - Retailer - Consumer
3.   Channel III: Farmer - Consumer

The most effective and lucrative alternative for farmers relies on a number of variables, including the distance between producers and customers as well as the accessibility of infrastructure and transportation facilities. Overall, the three channels each have strengths and limitations. The results emphasize the need of examining the various potato supply chain routes to determine the most feasible and beneficial option for farmers in Afghanistan's Parwan Province.

Table 3: Price spread of Potato in Parwan Market (Channel I: Producer-Wholesaler-Retailer-consumer)

S. No.	Particulars	Price per Kg	Percentage Share in consumer Price
1	**Producer Sale Price (Wholesaler Purchase Price)**	15.80	83.28
2	**Expense occurred by the farmers**	3.35	17.65
	a) Cost of gunny bags	0.83	4.41
	b) Cost of filling, stitching, loading	1.17	6.18
	c) Cost of transportation	1.34	7.06
3	**Net Price Received by the farmer**	12.45	65.62
4	**Expense occurred by the Wholesaler**	1.00	5.27
	a. Cost of unloading & loading	0.10	0.52
	b. Cost of grading	0.20	1.054
	c. Cost of storage	0.70	3.68
5	**Margin of the Wholesaler**	1.81	9.54
6	**Wholesaler Price /Retailer Purchase Price**	15.54	81.93
7	**Expense occurred by the Retailer**	0.79	4.19
	a. Transportation cost	0.19	1.04
	b. Cost of unloading and Packaging	0.11	0.62
	c. Rent of the shop	0.47	2.51

| 8 | **Margin of the retailer** | 2.00 | 10.55 |
| 9 | **Retailers Sales Price (Consumer Purchase Price)** | **18.97** | **100** |

Source: Field survey (2023)

Table 3 represented the Price spread of Potato in Parwan Market (Channel I: Producer-Wholesaler-Retailer-consumer): In the potato supply chain, producers sold potatoes to wholesalers at 15.80 per kg, which accounts for 83.28 percent of the consumer price. Farmers incurred expenses of 3.35 per kg, constituting 17.65 percent of the consumer price, resulting in a net price of 12.45 per kg received by the farmers representing 65.62 percent of the consumer price. Wholesalers incur expenses of 1 per kg, representing 5.27 percent of the consumer price, and have a margin of 1.81 per kg 9.54 percent of the consumer price. Retailers purchase potatoes from wholesalers at 15.54 per kg 81.93 percent of the consumer price and incur expenses of 0.79 per kg 4.19 percent of the consumer price with a margin of 2.00 per kg 10.55 percent of the consumer price. The final consumer purchase price of potatoes is 18.97 per kg.

Table 4: Price spread of Potato in Parwan Market (Channel II: Producer-Retailer-consumer)

S. No.	Particulars	Price per Kg	Percentage Share in consumer Price
1	Net Price Received by the Producer	4.66	0.86
2	Expense occurred by the producer	0.22	0.19
	a. Cost of gunny bags	0.08	0.31
	b. Cost of filling, stitching, loading	0.09	0.35
	c. Cost of transportation	0.69	2.73
3	Producer Sale Price (Retailers Purchase Price)	10.53	58.17
4	Expense occurred by the Retailer	1.46	5.77
	a. Transportation cost	0.40	1.57
	b. Cost of unloading	0.35	1.38
	c. Packaging cost	0.25	0.98
	d. Rent of the shop	0.46	1.83
5	The Margin of the retailer	4.75	26.24
6	Retailers Sale Price (Consumer Purchased Price)	**18.1**	**100**

Source: Field survey (2023)

Table 4 represents the Price spread of Potato in Parwan Market (Channel II: Producer-Retailer-consumer): Net Price Received by the Producer: The producer receives 4.66 per kg, which was only 0.86 percent of the consumer price. Expense Incurred by the Producer: The producer's expenses amount to less 0.22 per kg, including various costs, representing 0.19 percent of the consumer price. Producer Sale Price: The producer sells potatoes to retailers at 10.53 per kg, accounting for 58.17 percent of the consumer price. Expense Incurred by the Retailer: The retailer incurs expenses of 1.46 per kg for transportation, unloading, packaging, and shop rent, amounting to 5.77 percent of the consumer price. The Margin of the Retailer: The retailer's margin was 4.75 per kg, representing 26.24 percent of the consumer price. Retailers Sale Price: The final consumer purchase price of potatoes was 18.10 per kg.

Table 5: Price spread of Potato in Parwan Market (Channel III: Producer-consumer)

Sr. No.	Particulars	Price per Kg	Percentage Share in consumer Price
1	Net Price received by producer	30.40	119.92
2	Expense occurred by the producer	0.22	0.86
	A. Cost of Gunny Bags	0.04	0.15
	B. Cost of Filling, stitching & Loading	0.15	0.59
	C. Cost of Transportation	0.03	0.11
3	Consumer's purchase price	**25.35**	**100**

Source: Field survey (2023)

Table 5 represented the Price spread of Potato in Parwan Market (Channel III: Producer-consumer): Net Price Received by the Producer: The producer receives 30.40 per kg. This indicates that the producer sold potatoes at a higher price than what the consumer paid. Expense Incurred by the Producer: The producer's expenses amount to 0.22 per kg, which was only 0.86 percent of the consumer price. These expenses included costs for gunny bags, filling, stitching, loading, and transportation. Consumer's Purchase Price: The final consumer purchase price of potatoes was 25.35 per kg, which represents 100 percent of the price paid by the consumer. According to Baba et al. (2010), producers receive comparatively higher net prices when their produce was sold directly to consumers or retailers through certain distribution channels.

Table 6: Marketing efficiency of potato under different channels in Parwan Province of Afghanistan

Sr. No.	Particulars	Channel I	Channel II	Channel III
1	Producer Sale Price	15.80	10.53	22.74
2	Consumer Purchase Price	18.97	18.10	25.35
3	Total Marketing Cost	0.22	0.22	0.00
4	Total Margins of intermediaries	5.42	3.42	9.55
5	Net Price Received by the farmers	12.45	4.66	30.40
Marketing Efficiency		0.29	0.32	0.47

Source: Field survey (2023)

Table 6 represented the Marketing efficiency of potato under different channels in Parwan Province of Afghanistan: Channel III showed the highest marketing efficiency at 47 percent, indicating that farmers received a significant portion of the consumer price in this direct distribution model. Channel III: Producer Sale Price: 22.74 Consumer Purchase Price: 25.35 Total Marketing Cost: 0 Total Margins of Intermediaries: 9.55 Net Price Received by the Farmers: 30.40 Marketing Efficiency: 0.47. Channel II has a marketing efficiency of 32 percent, which means the farmers received a relatively lower share of the consumer price compared to Channel III but higher than Channel I. Channel II: Producer Sale Price: 10.53 Consumer Purchase Price: 18.10 Total Marketing Cost: 0.22 Total Margins of Intermediaries: 3.42 Net Price Received by the Farmers: 4.66 Marketing Efficiency: 0.32. Channel I has the lowest marketing efficiency at 29 percent, indicated that the intermediaries in this channel retain a larger portion of the consumer price, resulting in a lower price received by the farmers. Channel I: Producer Sale Price: 15.8 Consumer Purchase Price: 18.97 Total Marketing Cost: 0.22 Total Margins of Intermediaries: 5.42 Net Price Received by the Farmers: 12.45 Marketing Efficiency: 0.29.

IV. CONCLUSION

This research study investigated the dynamics of potato selling and storage practices among farmers in the Parwan Market of Afghanistan, as well as the price spread and marketing efficiency under different market channels. The study revealed that farmers predominantly sold potatoes immediately after harvest to meet household expenses 57.50 percent, finance agricultural inputs 55.00 percent, and repay loans 45.00 percent. Insufficient storage space also plays a significant role in immediate selling decisions (52.50%). The study also showed that diverse reasons for potato storage, including personal home consumption 23.30 percent, anticipating higher prices 24.20 percent, and meeting off-season demand 23 percent. The study also presented the price spread of potatoes in various market channels, with varying margins for farmers and intermediaries. With the findings of the study it evaluated marketing efficiency, with Channel III 47 percent being the most efficient, followed by Channel II 32 percent and Channel I 29 percent. These findings provide valuable insights into the potato market dynamics, which can inform policies to enhance farmers' income and optimize market efficiency.

SUGGESTIONS

❖ **Financial Planning Support**: To address the primary reason for immediate selling (paying household expenses), farmers could receive financial planning support or access to microfinance options, enabling them to manage expenses while exploring storage or value-added opportunities.

❖ **Collective Storage Initiatives**: Considering the constraint of insufficient storage space, promoting collective storage initiatives or community-based storage facilities can help farmers store surplus potatoes and avoid rushed sales.

❖ **Training on Price Trends**: Training farmers on price trends and market dynamics could empower them to make informed decisions about storing potatoes when local market prices are low and selling during more favorable market conditions.

❖ **Facilitate Direct Sales**: Encouraging direct sales from producers to consumers (Channel III) could improve marketing efficiency and ensure that farmers receive a larger share of the consumer price.

❖ **Strengthen Producer-Retailer Linkages**: Strengthening linkages between producers and retailers

(Channel II) can help improve farmers' share of the consumer price and reduce reliance on intermediaries.

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