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Economic evaluation of onion storage structures and strategic marketing approaches for price risk mitigation

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Abstract

India is the second-largest producer of fruits and vegetables in the world, and onions (*Allium cepa* L.) are an important crop because of their widespread domestic use and high foreign exchange revenues. India produced over 26.74 million tonnes of onions in 2019-20, with Maharashtra accounting for the largest share at 28.32%. Onion farmers must deal with unstable market prices that range from ₹10 to ₹205 per kg, even with significant production. As a result, storing is an essential tactic to maintain revenue. In order to evaluate the economics, profitability, and limitations related to the storage of onions in Western Maharashtra, this study was conducted. Multistage random selection was used to gather primary data from 120 onion growers via a structured interview schedule. The cost-effectiveness of seven different types of storage buildings—from modified ventilated double-row structures to inexpensive thatched roof units—was examined. The findings showed that storage losses under conventional methods often range from 30 to 50 percent, mostly as a result of inadequate infrastructure and a lack of scientific storage understanding. Even while contemporary constructions greatly increase profitability and decrease losses, excessive construction costs continue to be a significant obstacle. According to the data, storage produces a profit after August. Because of seasonal market constraints, the highest returns were recorded in November (182.66%). But just 36.09% was the average profit over a six-month storage period, suggesting limited but possible feasibility. The study comes to the conclusion that while scientific storage techniques can reduce price risk and increase farmer income, wider implementation would require funding, technical assistance, and public awareness. Reducing post-harvest losses and ensuring sustainable onion production require investments in low-cost scientific storage methods and capacity building.

Keywords: Onion storage, post-harvest losses, price volatility, storage structures, marketing

Introduction

India is the world's second-largest producer of fruits and vegetables, with an anticipated 290.84 million tonnes produced in 2020, of which 99.07 million were fruits and 191.77 million were vegetables (NHB, GOI, 2019-20) [15]. Onions (Allium cepa L.) are one of the most important vegetables, with a production output of about 26.74 million tonnes. India is the world's second-largest producer of onions, highlighting its importance in both local and international trade. In addition to being an essential part of the Indian diet and a common ingredient in everyday cooking, onions are the horticulture product that generates the most foreign exchange earnings. 2.18 million metric tons of fresh onions worth ₹3467.06 crores were exported by India in the 2018-19 fiscal year (APEDA) [1].

Maharashtra alone accounts for 28.32% of the nation's onion production, with Karnataka, Madhya Pradesh, Gujarat, Bihar, Andhra Pradesh, Rajasthan, Haryana, and Telangana being the main producers. Onion cultivation is marked by significant price volatility despite its economic significance; within a year, market prices can range sharply from ₹10 to ₹205 per kilogram. Due to agronomic limitations, farmers frequently cannot react quickly enough to change cultivation area or production, making this price volatility a major burden for them.

Farmers may use storage as a tactic to reduce losses and profit from price spikes during months with low supply when prices are low. Effective storage procedures are not widely adopted, nevertheless, due to a lack of scientific understanding, high storage costs, and poor infrastructure. As a result, many farmers are forced to sell their produce right after harvest in order to make ends meet, frequently at prices that are not competitive.

Given these difficulties, the current study was conducted with the following particular goals in mind: (i) to evaluate the economics of the current structures for storing onions; (ii) to calculate the expenses, profits, and returns related to storing onions; and (iii) to pinpoint storage practice limitations and suggest suitable corrective actions.

Research Methodology

The current study was carried out in Maharashtra's western region, which is one of India's leading onion-producing regions. Using the personal interview approach and a structured interview schedule, primary data was gathered in order to meet the goals of the study. The purpose of the data gathering tool was to get specific information from onion growers about storage procedures, expenses, profits, and related limitations.

The respondents were chosen using a multistage sampling process. The tehsils that produced the most onions within the identified districts were purposefully picked for the first stage. To guarantee representativeness, communities within these tehsils were chosen at random for the second stage. In cooperation with local village informants, a thorough list of onion growers and their operational landholdings was created in the third stage. Respondents were chosen at random from these lists to make up the final sample. In all, 120 onion farmers from the chosen villages in Western Maharashtra were polled.

Analyzing the financial feasibility of various onion storage configurations was the main goal of the study. Seven different kinds of storage structures that farmers frequently employ were chosen for assessment: Traditional double-row storage, modified bottom-ventilated storage, top-and-bottom ventilated storage with mud-plastered walls, modified bottom-ventilated storage with chain-linked side walls, modified bottom-ventilated storage with chain-linked side walls, traditional single-row storage, modified bottom-ventilated single-row storage, and bottom-ventilated single-row low-cost thatched roof storage are the options available. To evaluate the cost, returns, profitability, and storage losses associated with each form of structure, the obtained data was subjected to tabular analysis using the proper statistical methods. The investigation shed light on the viability and efficiency of farm-level adoption of onion storage systems.

Results and Discussion

Economics of onion storage structures

Even though onions have been farmed in India since ancient times, large-scale onion storage from a commerce perspective was not a key idea. But when exports and domestic sales grew, storage became crucial. Losses are minimal in two different temperature ranges. There is a high temperature regime, where the storage temperature ranges from 25 to 300 degrees Celsius, and a low temperature regime, where the temperature is kept between 0 and 20 degrees Celsius. Keeping humidity between 65 and 70 percent yields the best outcomes under both temperature regimes. Although storage costs are modest, storage losses are considerable (30-35%) at high temperatures (25-300C). In contrast, losses are negligible (less than 0.5%) and the storage term is extended under cold storage or low temperature circumstances (0-20C). But storage is expensive. While lower temperatures (less than 100C) increase sprouting losses, higher temperatures (over 300C) in ambient storage structures result in more weight loss. While lower humidity promotes weight loss, higher humidity (over 70%) combined with higher temperatures exacerbates storage illnesses. In the past, each farmer kept these goods in modest quantities for personal use. In the past, larger cities and villages held weekly bazaars where anything extra was sold. Farmers and traders may have been forced to store the stock for a while until prices increased as a result of slowly holding onions throughout the monsoon season and selling them during the country's lean period or exporting them to trading partners in the Gulf. At first, the constructions and storage conditions were largely unscientific and extremely archaic. On-farm storage faces a lack of marketing knowledge, a lot of technical help, and financial support. These buildings were built by a number of farmers with flaws that not only raise losses but also harm the commodities that are stored. In light of this, seven storage structures have been selected for a thorough analysis of their characteristics. Tables 1 show the storage capacity and cost of storage in several kinds of onion storage structures that were planned and built.

Table 1: Storage capacity and cost in several kinds of onion storage structures

Sr. No.	Particulars	Traditional double row storage structure (N=28)	Modified bottom ventilated double row storage structure (N=18)	Top and bottom ventilated storage structure with mud plastered walls (N=8)	Modified Bottom ventilated storage structure chain linked side walls (N=20)	Traditional single row storage structure (N=22)	Bottom Ventilated single row storage structure (N=14)	Bottom ventilated single row low-cost thatched roof storage structure (N=10)
1	Cost of construction (₹)	95000	225000	145000	115000	65000	42000	25000
2	Length (ft)	40	40	40	40	40	40	40
3	Width (ft)	18	22	18	18	8	8	8
4	Storage capacity (tones)	25	25	25	25	12	12	12
5	Expected life (years)	10	15	12	10	8	7	4
6	Cost of storage (₹ / Kg / year)	0.38	0.60	0.48	0.46	0.68	0.50	0.52

According to the table, the most expensive storage structure to build is the modified bottom ventilated double row storage structure (₹225000), which is followed by the top and bottom ventilated storage structure with mud plastered walls (₹145000), the modified bottom ventilated storage structure chain linked side walls (₹115000), the traditional double row storage structure (₹95000), the traditional single row storage structure (₹65000), the bottom ventilated single row storage structure (₹42000), and the bottom ventilated single row low cost thatched roof storage structure (₹25000). All of the store houses were built with a 25-ton storage capacity, with the exception of the traditional single-row storage structure, the bottom-ventilated single-row storage structure, and the low-cost thatched roof storage structure with a 12-ton storage capacity. But the storage costs (₹/kg/year) for the following storage structures are roughly 0.60, 0.48, 0.46, 0.38, 0.68, 0.50, and 0.52 respectively: Modified double row storage structure with bottom ventilation, top and bottom ventilated storage structure with mud plastered walls, modified bottom ventilated storage structure with chain-linked side walls, traditional double row storage structure, traditional single row storage structure, and bottom ventilated single row low cost thatched roof storage structure, which is found to be the least expensive in traditional double row storage structure and the most expensive in traditional single row storage structure.

Onion storage losses in various storage setups

Two types of storage losses are noted when onions are stored: quantitative losses, such as physiological loss of weight (PLW), rotting, and scale loss; and qualitative losses, such as sprouting and black mold losses. Therefore, it is crucial to estimate the quantitative and qualitative losses according to storage structure, which have been done and are shown in Table 2.

Quantitative losses

Table 2: Quantitative losses in onions stored in various storage setups

Sr. No.	Storage structures	PLW (%)	Rot (%)	Scale (%)	Total Loss (%)
1	Traditional double row storage structure	23.65	17.85	0.25	41.75
2	Modified bottom ventilated double row storage structure	24.32	15.85	0.15	40.32
3	Top and bottom ventilated storage structure with mud plastered walls	14.85	11.90	0.38	27.13
4	Modified Bottom ventilated storage structure chain linked side walls	17.85	14.20	0.30	32.35
5	Traditional single row storage structure	19.65	16.20	0.33	36.18
6	Bottom ventilated single row storage structure	22.10	14.10	0.38	36.58
7	Bottom ventilated single row low-cost thatched roof storage structure	16.95	8.85	0.28	26.08

Physiological loss of weight (PLW)

The ventilated structure with mud plaster walls at the top and bottom had the lowest physiological loss of weight (PLW) at 14.85%. The bottom ventilated single row inexpensive thatched roof storage structure (16.95%) came in second. These were inferior to the traditional double row storage structure (23.65%), the modified bottom ventilated structure with chain-linked sidewalls (17.85%), and the traditional single row structure (19.65%). More aeration may have contributed to the Modified Bottom Ventilated Double Row Storage Structure's higher losses by allowing more hot, dry air to enter during the first several months of storage. It's possible that the higher losses in traditional double row constructions are caused by increased decaying, which speeds up the loss of physiological weight. The rainfall and humidity during the storage months are responsible for the fluctuation in the physiological weight loss in different years. In years with more drought, there was a greater physiological loss of weight. The variations in physiological weight loss from year to year may be caused by the humidity and temperature of that year (Brice *et al*., 1997; Shinde *et al*., 2001; Warade *et al*., 1997) [2, 17, 25]. It was discovered that the structure's ventilation and row count had a significant impact on storage losses. Low-cost thatched roof storage buildings with a single row and bottom ventilation experienced a lower physiological weight loss (16.95%).

Rotting

All of the traditional buildings without bottom ventilation had more decay than those with bottom ventilation. The Traditional without bottom ventilated double row structure had the highest decaying rate (17.85%), while the low-cost thatched roof storage structure with a bottom vented single row had the lowest losses (8.85%). This suggests that the bottom and side aeration play vital role in the rotting during storage. The top and bottom ventilated storage structures had the lowest rotting rates because of their superior horizontal and vertical aeration. Further it is observed that, the rotting was due to the injury to onions caused by wires of chain, which reveals that the use of wire is not good for construction of the sidewalls. Onion rotting during storage has been linked to earlier irrigation or rainfall after maturity (Brice *et al*., 1997) [2]. Rotting has been influenced by the structure's airflow and row count. This implies that rotting in onion storage is significantly influenced by aeration and the removal of excess moisture. There were extremely few losses as a result of scale removal, and there were no appreciable differences between the different storage configurations. The bottom ventilated single row low-cost thatched roof storage structure had the lowest overall quantitative losses (26.08 percent), followed by the top and bottom ventilated storage structure (27.13 percent). The reduced PLW and decaying are to blame for this. The traditional double row storage construction had the largest quantitative losses (41.75%). The buildup of moisture and heat generated by the onions' respiration may be the cause of the greater PLW and rotting in non-ventilated structures. The heat and moisture could not be eliminated by the insufficient aeration. Better aeration in ventilated structures was able to eliminate the heat and moisture that the onions created, which reduced losses. As it is well establishing fact that proper aeration and optimum humidity level reduces storage losses in onion (Brice *et al*., 1997; Mondal and Pramanik, 1992; Skultab and Thompson, 1992; Maini *et al* 2000; Naik *et al*, 2008) [2, 12, 19, 9, 14].

Qualitative losses

Table 3: Qualitative losses in onions stored in various storage setups

Sr. No.	Storage structures	Sprouting (%)	Black mould (%)	Total (%)
1	Traditional double row storage structure	0.85	3.80	4.65
2	Modified bottom ventilated double row storage structure	2.75	7.58	10.33
3	Top and bottom ventilated storage structure with mud plastered walls	2.40	9.22	11.62
4	Modified Bottom ventilated storage structure chain linked side walls	3.75	4.55	8.30
5	Traditional single row storage structure	1.85	5.8	7.65
6	Bottom ventilated single row storage structure	2.65	6.75	9.40
7	Bottom ventilated single row low-cost thatched roof storage structure	1.20	1.60	2.80

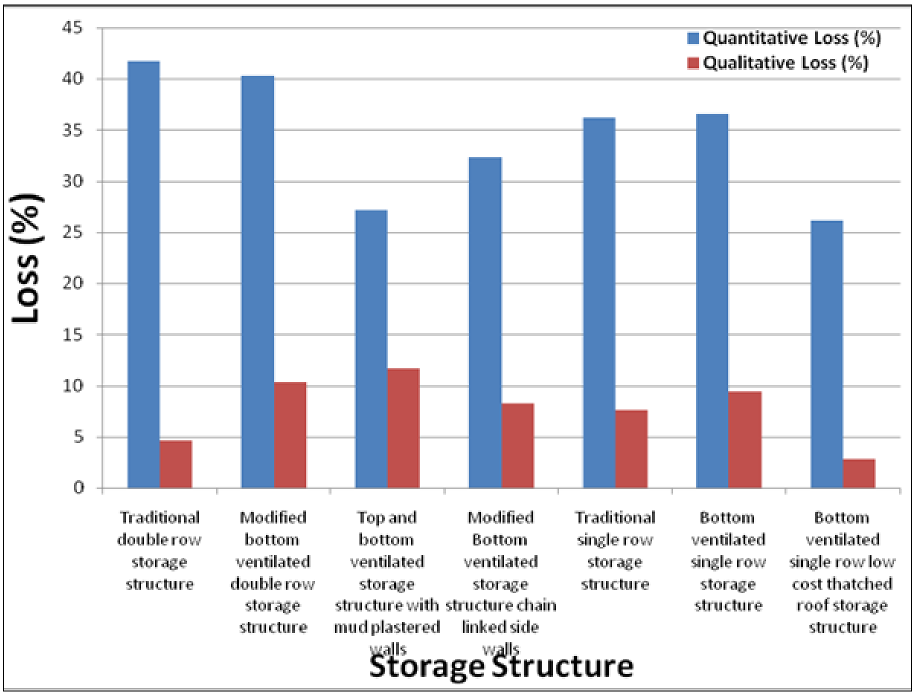

Fig 1: Average qunatitative and qualitative losses in different storage structures

Sprouting

The modified bottom ventilated storage structure with chain-linked sidewalls had the highest sprouting rate (3.75%). Next in line was a modified bottom ventilated storage structure with a 2.75 percent asbestos roof. Traditional double row storage structures (0.85 percent) and low-cost thatched roof storage structures with bottom ventilated single rows (1.2 percent) showed the lowest sprouting. This might most likely be the result of onions being exposed to cooler winds for longer periods of time during storage. Low temperatures have been shown to stimulate sprouting (Brice *et al*., 1997; Tripathi and Lawande, 2007) [2, 24].

Black mould infection

The modified bottom ventilated double row storage structure (7.58 percent) and the top and bottom ventilated structure with mud plastered walls (9.22 percent) had a higher percentage of bulbs damaged by black mold. The bottom ventilated single row inexpensive thatched roof storage structure has the lowest black mold infection rate (1.6%) (Table 4). The bottom ventilated single row inexpensive thatched roof storage building had the lowest overall qualitative losses (2.8%), followed by the traditional double row storage structure (4.65%). The top and bottom ventilated storage structure with mud plastered walls had the highest qualitative losses (11.62%), followed by the modified bottom ventilated double row storage structure (10.33%).

The costs, returns and profitability of onion storage

Price surge of onion in western Maharashtra

Indian onion growers are in a terrible situation and barely make any money from selling onions, even though there is a tremendous demand for and consumption of them. On sometimes, you might not even receive the cost of producing onions. On the other hand, the situation is different; customers are paying far more for onions than the farmer sells them for. The price difference is enormous, reaching up to seven or eight times during the busiest time of year. The price levels from June to November are uncertain. Farmers cannot determine the anticipated price trend or the price levels that might be established for non-harvesting months on their own. Since December Kharif crops will be plentiful with nice and appropriate weather, there will be uncertainty regarding the price levels of the non-harvesting season, particularly in the final two months of October and November. The prices of the stored harvest in October, November, and December may be lowered by the anticipation of a big Kharif crop. Therefore, for the obvious reason of storage costs, the prices of stored harvest in November and December continue to be higher than those of fresh arrivals. In this case, there is still less demand for the preserved onions than there is for the new ones.

Table 4 shows the increase in onion prices in western Maharashtra.

Table 4: Price surge of Onion for AY 2020-21 (₹/Qtl))

Month/Year	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
2020-21	4461	3164	2488	1263	1168	1254	1421	1800	2081	3468	5150	4700

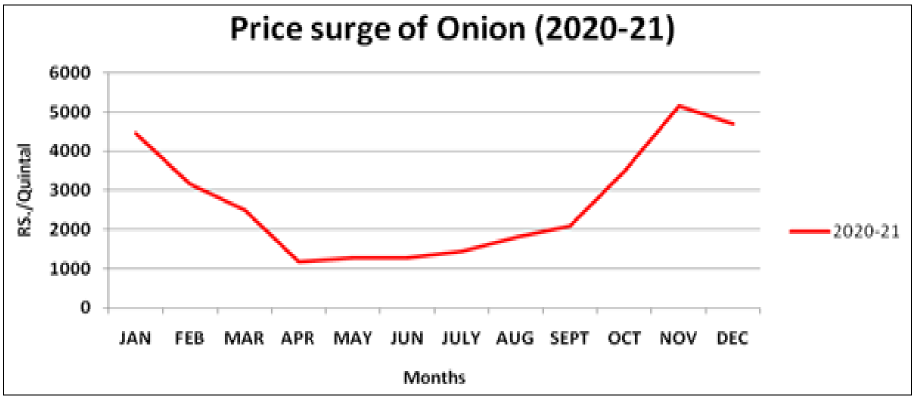

Fig 2: Graphical presentation of price surge in Onion

The table indicates that from October to February, the onion harvest commanded the highest price. Actually, the primary Kharif crop failed during AY 2020-21, which is why stored produce was so expensive. However, because of the potential for waste, keeping produce until December is seen as a high risk. The second week of November marks the beginning of the big Kharif arrivals in the marketplaces. Consequently, most stocks are cleared through the end of October. All of these variables are making it economically and practically impossible for farmers to store onions.

Cost, return and profitability of onion storage

Based on the data that the farmers provided throughout the survey, an economic analysis of the cost and return of storing onions per quintal was conducted. The data and cost and return estimations based on onion storage per quintal were computed and displayed in Table 5.

Table 5: Cost of storage and storage structure

Sr. No.	Particulars	(₹ / Kg)
I.	**Storage cost item**	
1	Cost from harvest to pack house	1.00 - 2.00
2	Cost of packing (Nylon bag 50 kg capacity cost ₹ 10 per bag)	0.15 - 0.20
3	Weighing charges	0.03 - 0.05
4	Cost of loading and unloading	0.02 - 0.05
5	Local transportation	0.15 - 0.20
6	Other charges	0.50 - 1.00
7	Total cost (₹ /kg)	1.75 - 3.50
8	Average Cost (Rs/kg)	2.625
9	Storage Cost (₹ / Qtl)	262.50
II.	**Storage structure cost item**	
1	Storage structure cost estimate for 50 MT capacity (₹)	225000
2	Subsidy	87500
3	Required investment	137500
4	Repayment period (yr)	6
5	Interest @ 12% for 6 year	16500
6	Total investment (₹)	154000
7	Storage shed life (yr)	15
8	Storage structure cost (₹ /Qtl)	41.06

The figure shows that, on average, between ₹ 1.75 and ₹ 3.5 per kg must be invested in onion storage in order to benefit from price increases during the lean period. However, producers are unsure of the potential price ranges for the product that is being kept. Onions preserved according to conventional methods suffer significant losses. Approximately 80% of farmers use on outdated and crude storage Chawls. Due to the large proportion of storage waste (almost 40 to 50 percent), farmers are reluctant to undertake storage because they find it difficult to pay for it.

According to MSAMB's recommended scientific storage structures, keeping onions can lower their price risk. However, because of the high cost of building, most farmers were unable to benefit from the improved storage structure. The biggest obstacle to farmers' ability to increase their storage capacity is the cost of construction. Investment is required for well-constructed, scientific storage. The entire amount required for 25 tons of "Kanda Chal" (storage structure) is ₹2,25,000. A subsidy of up to ₹ 3500/-per MT of storage capacity will be provided in accordance with the MSAMB plan. However, this subsidy seems quite small in comparison to the financing cost. The farmer receives a ₹87500 subsidy for the construction of a 25-ton storage facility, which requires a total investment of ₹225000. It is found that ₹ 22917 per year is the principal and ₹ 2750 per year is the interest if a bank loan of the remaining ₹ 137500 is raised at a 12 percent interest rate with a 6-year repayment period. Thus, ₹ 25667 p.a. is the entire cost of storage. As a result, the estimated cost of a 15-year life cycle storage structure for one quintal of onion storage is around ₹41.06.

Table 6: Return from per quintal storage of onion

Sr. No.	Period of Storage	Store cost (₹ /Qtl)			Storage losses (%)	Net Sale quantity (Qtl)	Sale Price (₹ /Qtl)	Gross Income (₹)	Profit (₹)	Net Profit realized (%)
		Store charges (from harvest to marketing)	Storage house structural charges	Total cost						
1	April	0	0	0	0	1.00	1168	1168.00	0.00	0.00
2	April-May	262.50	41.06	303.60	5	0.95	1263	1199.85	-271.71	-23.26
3	April-June	262.50	41.06	303.60	8	0.92	1254	1153.68	-317.88	-27.22
4	April-July	262.50	41.06	303.60	12	0.88	1421	1250.48	-221.08	-18.93
5	April-August	262.50	41.06	303.60	18	0.82	1800	1476.00	4.44	0.38
6	April-September	262.50	41.06	303.60	22	0.78	2081	1623.18	151.62	12.98
7	April-October	262.50	41.06	303.60	27	0.73	3468	2531.64	1060.08	90.76
8	April-November	262.50	41.06	303.60	30	0.70	5150	3605.00	2133.44	182.66
9	April-December	262.50	41.06	303.60	42	0.58	4700	2726.00	1254.44	107.40

The results showed that the cost of storing onions, including labour costs for sorting and grading, storage depreciation, and annual simple interest on basic value, is ₹ 303.6 per quintal when the return from per quintal storage of onions is taken into account. Additionally, the economic study of onion storage based on quintal storage revealed that, following two months of storage (April-May), the net profit from onion marketing was ₹ -271.71 (-23.26%) per quintal.
In contrast, net profit for the following months was ₹ -317.88 (-27.22 percent), ₹ -221.08 (-18.93 percent), ₹ 4.44 (0.38 percent), ₹ 151.62 (12.98 percent), ₹ 1060.08 (90.76 percent), ₹ 2133.44 (182.66 percent), and ₹ 1254.44 (107.40 percent) in June, July, August, October, November, November, and December (Table 7). The findings indicated that November had the highest return on onion marketing (182.66%). This was because there was a big imbalance between supply and demand for onions in the market due to the lack of onions arriving from both inside and outside of the states. As a result, the maximum return was obtained during this time from the marketing of stored onions from the onion growers.

Constraints in storage of onion and suggest the measures
This study has identified the problems faced by the farmers in storing the produce.

Constraints and reasons for onion storage
The constraints and reasons for storage of onion have been examined through direct contact with sample farmers and the results have been depicted in Table 7.

Table 7: Constraints and reasons for onion storage

S. No.	Particulars	Proportions of Sample Farmers (N=120) (%)
A.	**Constraints in storage**	
1	Lack of subsidy	47.80
2	Inadequate fund	57.20
3	Decaying in storage	30.40
4	Sprouting of onion bulbs	21.70
5	Inadequate space for storing of onion	23.50
6	High price risk	48.20
7	Lack of knowledge about proper scientific methods for storage of onion	91.30
8	Immediate need for money in April	88.20
B.	**Reasons for storing onion**	
1	To take benefits of higher prices	87.20
2	For home consumption	90.20
3	For seed production	35.20
4	Non-availability of time to dispose of produce after harvest	19.10
5	Protection against decline in prices	48.15

The table shows that the main obstacles to onion storage are ignorance of scientifically recommended methods of storing onions (91.3%), followed by the urgent need for funds for kharif crop operations in April (88.2%), insufficient funds (57.2%), high price risk (48.2%), lack of subsidies, deteriorating storage conditions, insufficient space for storing onions, and sprouting of onion bulbs (21.7%). However, when taking into account the reasons for storing onions, the most common ones were for home consumption (90.2%) and to benefit from higher prices (87.2%). These were followed by protection against price decline (48.15%), seed production (35.2%), and the lack of time to dispose of produce after harvest (19.1%).

Thus, the primary concern is the cost of storage, specifically the cost of constructing a scientific storage facility. Small and marginal farmers lack the financial resources to make investments. The MSAMB subsidy is extremely small and restricted for the construction of the storage structure. It is acknowledged that another obstacle to storage is the urgent requirement for funds in April. Distress sales are held to release the invested capital because farmers need the money for the upcoming growing season.

Suggestions to overcome the Limitations

Farmers will undoubtedly gain from systematic efforts to address the dangers and overcome the aforementioned constraints. When onions are scarce in the market, storage causes prices to climb. Even after a significant amount of waste, prices are still high enough to pay manufacturing and storage costs. Both the income from the stored onion and the income from the summer crop increase.

Farmers must work together to develop professional strategies for maximizing storage profits, including raising the quality of their goods and setting competitive prices for marketing and income estimations. Farmers must adopt a new strategy for growing and selling onions. Priority should be given to methodical and deliberate efforts to raise its price levels rather than viewing it as an instant cash crop. Producers of goods like grapes, mangoes, jowar, jaggery (gur), and Basmati rice, to mention a few, have brought about these modifications. Farmers have benefited from both group efforts and qualitative improvements in all of these goods. Even though onions are a perishable food, quality control and summer supply planning will undoubtedly increase sales and maintain price stability.

Conclusion

According to the study's findings, farmers who store onions at the farm level typically make 36.09 percent profit over the course of six months. The best returns can be achieved by storing until December. Additionally, growers mostly stored onions for domestic consumption and to profit from rising prices. However, one of the main issues causing significant losses at farm level storage is a lack of understanding of appropriate scientific methods for onion preservation. Therefore, if the region's vegetable supply is to be maintained profitably, it is imperative that growers receive instruction on scientific methods for keeping onions at the farm level. In order to minimize post-harvest losses, proper farm-level storage must be given careful consideration.

Policy implications

Farmers' Associations or Producers' Companies: At the village level, farmers may organize associations with a small membership. Together, farmers can take action to raise prices and enhance quality. Bank credit can be raised by associations. Credit can be used for exports, the building of storage facilities, and the acquisition of equipment and tools required to improve quality. The association has the option of employing someone or constructing its own storage facilities to handle all of the members' storage needs. The association has the authority to determine the ideal time to sell its members' produce, retain a set percentage of the proceeds for its own overhead, and give the farmers the remaining earnings. In addition to resolving the financial issue, this will assist farmers in getting the storage advantages. As opposed to a single producer with limited produce and financial resources, the group is better equipped to handle all of the costs. Price signals for non-harvesting seasons can be provided well in advance using the price forecasting approach. Farmers can therefore choose the storage policy. On the other hand, a producer's corporation is a business owned by farmers and is eligible for numerous financial and technical assistance programs. These businesses can concentrate on certain goals like processing or export promotion, among others.

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