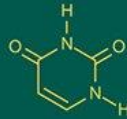


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
 ISSN Online: 2617-4707
 IJABR 2024; 8(8): 01-03
www.biochemjournal.com
 Received: 01-05-2024
 Accepted: 06-06-2024

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Utilization pattern of cold storage units among farmers in Coimbatore district of Tamil Nadu

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DOI: <https://doi.org/10.33545/26174693.2024.v8.i8a.1686>

Abstract

This study examines the utilization patterns of cold storage units among farmers in Coimbatore district, Tamil Nadu, focusing on their impact on reducing postharvest losses, stabilizing prices, and enhancing market opportunities. Data collected from 125 farmers across seven cold storage units and different parameters ranging from source of enrolment to market access and linkage between buyers were analyzed using utilization index. The overall utilization of cold storage units among farmers were medium and indicating a need for more information on effective cold storage usage to enhance utilization. Furthermore, cold storage supports value-added processes such as grading, sorting, and packaging, which enhance the marketability and nutritional quality of the produce and eventually contributes to better food availability and accessibility for the population.

Keywords: Cold storage, utilization, price fluctuation, market information

Introduction

Fruits and vegetables are fundamental to a balanced and healthy diet. With India's horticulture production reaching approximately 334.6 million metric tons in 2020-2021, an increase of 4.4% from the previous year ensuring need of proper storage for these perishable items is crucial (Jha *et al.*, 2016) [4]. Due to high post-harvest losses of 5.8-18.1 per cent for fruits and 6.9-13.0 per cent for vegetables, per capita availability is relatively low in India. This is because fruits and vegetables, especially those grown in tropical countries like India, possess a high moisture content that makes them highly susceptible to major postharvest losses (Agarwal *et al.*, 2021) [1]. The cold chain industry's ability to reduce wastage of perishable commodities directly translates to more remunerative prices for growers (Gay *et al.*, 2013) [3]. By minimizing the losses due to spoilage, farmers can sell a higher proportion of their produce, thereby increasing their income (Carson *et al.*, 2017) [2]. Cold storage is an integral component of postharvest management. It extends the shelf life and storability of horticultural produce, thereby reducing postharvest losses. In India, the cold chain industry helps maintain a continuous supply of raw materials for both direct consumption and processing purposes (Lin *et al.*, 2022) [5]. This continuous supply is essential not only for stabilizing prices but also for ensuring proper distribution and marketing of commodities (Ubabuiké, 2012) [8]. Cold storage facilities are indispensable for achieving food and nutritional security in India. By extending the shelf life of fruits and vegetables, these facilities ensure a regular and continuous supply of nutritious food throughout the year only through its proper utilization (Paul *et al.*, 2018) [6].

Materials and Methods

The study on utilization pattern on cold storage units among farmers were performed at Coimbatore district of Tamil Nadu and the seven potential cold storage units *viz* annur, annaimalai, chikkadasam palayam, karamadai, senjeri, thondamuthur and vadakipalayam were selected for the survey and collected the primary data through personnel interview method. Totally, 125 farmers were selected for the study based on the register maintained in the units, the most frequent users were sampled to get appropriate results. Farmers' usage patterns include the source of enrollment, regularity of using cold storage units, preferred produce to be stored, how long to be stored, frequency of usage, purpose, transport, weighing

facility, insurance for the produce, grading and sorting access, value-added produce opportunities, access to market information, and linkage between buyers, as well as the satisfaction level of farmers in terms of usage and benefits acquired through cold storage. The utilization trend was detected for numerous parameters through percentage analysis and the Utilization Index were carried out.

$$UI = \frac{O_i}{S} \times 100$$

where,

UI = utilization Index

O_i = Sum of farmers' utility scores for each information source

S = the total possible score

Results and Discussion

The utilization pattern of farmers on cold storage units were analyzed through various parameters and the findings are given in the Table 1 using percentage analysis.

Table 1: Utilization pattern of cold storage units among farmers (n=125)

S. No.	Parameters of utilization	Category	Frequency	Per cent
1.	Membership enrollment	Within six months	33	26.40
		Within 6 months to 1 year	68	54.40
		2 to 4 years ago	21	16.80
		More than 4 years ago	3	2.40
2.	Duration of storage	Less than 1 month	45	36.00
		1 - 3 months	60	48.00
		3 - 6 months	19	15.20
		More than 6 months	1	0.80
3.	Produce stored in cold storage units	Fruits	32	25.60
		Vegetables	33	26.40
		Spices and condiments	23	18.40
		Cereals	17	13.60
		Pulses	16	12.80
		Others	4	3.20
4.	Frequency of visit to cold storage units	Daily	43	34.40
		Bi-weekly	37	29.60
		Weekly	42	33.60
		Monthly	3	2.40
5.	Purpose of storage	For personal consumption	20	16.00
		For marketing purpose	44	35.20
		For processing purpose	2	1.60
		For personal + marketing purpose	40	32.00
		For marketing + processing purpose	2	1.60
6.	Transportation services provided by cold storage units	For personal + marketing + processing purpose	17	13.60
		Yes	36	28.80
7.	Preference for usage of weighing balance	No	89	71.20
		Yes	125	100.00
8.	Preference for grading and sorting the produce	Yes	33	26.40
		No	92	73.60
9.	Availability of value-added opportunities in cold storage unit	Yes	96	76.80
		No	29	23.20
10.	Insurance facilities accessible by farmers for the storage of produce	Yes	125	100.00
11.	Affordability of the insurance premium for the produce at storage	Highly affordable	24	19.20
		Affordable	52	41.60
		Neutral	32	25.60
		Unaffordable	14	11.20
		Highly unaffordable	3	2.40
12.	Access to market information from cold storage units relating to price fluctuations	High accessibility	75	60.00
		Moderate accessibility	42	33.60
		Limited accessibility	8	6.40
13.	Access to market information from cold storage units relating to product demand	High accessibility	44	35.20
		Moderate accessibility	56	44.80
		Limited accessibility	25	20.00
14.	Opportunities to have linkage with buyers	Low opportunity	40	32.00
		Moderate opportunity	64	51.20
		High opportunity	21	16.80

From the Table 1 it can be seen that more than half (54.40%) of the farmers started using the cold storage units within 6 months to 1 year and this recent increase in usage highlights the growing awareness and perceived benefits of cold storage. Nearly half (48.00%) of the farmers store their

produce for a medium term duration of about 1 to 3 months and this duration is beneficial for moderate shelf life such as root vegetables and certain fruits. From the total produce stored in the cold storages about 26.40 per cent were vegetables followed by 25.60 per cent of fruits, which

constitutes more than 50 per cent of the produce as a whole. High frequency of visit to cold storage units were seen in one-third (34.40%) of the farmers who daily visits the unit. More than one-third (35.20%) of the farmers store their produce especially for the marketing purpose alone to potentially meet the demand and stabilize the market prices. Grading and sorting facilities provided by the cold storage units were utilized by more than one-fourth (26.40%) of the farmers while remaining 73.60 per cent of farmers had limited preference for grading and sorting the produce.

More than three-fourths (76.80%) of the farmers had access to value added opportunities from the cold storage units and enhance the value of their agricultural produce. All the respondents (100%) sampled were availed with insurance facilities provided by the cold storage units and indicates a complete penetration of insurance services among the farmers. About 41.60 per cent of farmers considered that insurance premium on stored produce were affordable and manageable within their budgets to enhance their overall accessibility.

Cold storage units provides various marketing information exactly three-fifths (60.00%) of the farmers highly accessing the information related to price fluctuations of the produce and more than two-fifths (44.80%) of the farmers had moderate accessibility towards the information related to product demand in the market. More than half (51.20%) of the farmers had utilized moderate level of opportunities to have linkage between the buyers through cold storage facilities and allowing them to benefit significantly for market trends and profitability.

The overall utilization pattern was calculated from different parameters of utilization given in the Table 1. Utilization index were performed using the formula with the maximum possible score of 42 from all the parameters and overall usage pattern was calculated for individual farmers. Based on their overall usage pattern, the farmers were divided into three categories: low, medium and high. The farmers were distributed in accordance with the overall utilization pattern and their findings are interpreted in the Table 2.

Table 2: Distribution of the farmers according to their Overall utilization pattern of cold storage units (n=125)

S. No.	Category	Frequency	Per cent
1.	Low utilization	27	21.60
2.	Medium utilization	82	65.60
3.	High utilization	16	12.80
Total		125	100.00

From the Table 2 it could be observed that nearly two-thirds (65.60%) of the farmers (65.60%) fall into the medium utilization category. About more than one-fifth (21.60%) of the farmers reported low utilization of cold storage units and that might be due to barriers such as high costs, lack of access, or limited awareness of the benefits of cold storage. Higher utilization of cold storage facilities were seen in farmers of 12.80 per cent. The findings indicates that most farmers were using cold storage but only on needed basis rather than as a core part of their post-harvest strategy. Providing more information on the benefits and strategies for effective cold storage use could help these farmers increase their utilization.

Conclusion

The findings indicate that farmers were becoming more aware of and use cold storage units, with 54.40 per cent using these facilities in the last year, indicating a greater understanding of their benefits. The medium-term preservation of root vegetables and fruits, numerous daily visits and extensive use for marketing purposes (35.20%) underline their value. Despite underutilization of grading and sorting facilities (26.40%), more than three-fourths (76.80%) profit from value-added choices, and insurance coverage is widely available and reasonably priced (41.60%). Frequent access to marketing information (60.00%) and modest access to demand information (44.80%), as well as buyer relations opportunities (51.20%), highlight cold storage's importance in improving market trends and profitability.

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