Archives of Current Research International

Volume 25, Issue 9, Page 366-373, 2025; Article no.ACRI.143979
ISSN: 2454-7077

Bottlenecks Affecting Cold Storage Entrepreneurs and Capacity Utilization of Cold Storage Facilities

Devarashetti Uma Mahesh [a++*] and Anoop. M [a]

[a] *Institute of Agricultural Sciences, BHU, Varanasi, Uttar Pradesh Pin Code-221005, India.*

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: https://doi.org/10.9734/acri/2025/v25i91502

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://pr.sdiarticle5.com/review-history/143979

Original Research Article

Received: 08/07/2025
Published: 15/09/2025

ABSTRACT

This study is significant as it highlights the major problems faced by cold storage entrepreneurs in a key chilli-producing region of Telangana. The cold storage entrepreneurs experience challenges such as the high cost of investment, interest, maintenance, and electricity, along with issues of heavy competition and fire risk. By analysing capacity utilization patterns across large, medium, and small cold storages, the study provides valuable insights into the efficiency and sustainability of cold storage operations. These findings are important for policymakers, entrepreneurs, and stakeholders in designing strategies to reduce losses, optimize storage capacity, and improve the profitability of cold storage enterprises in agricultural regions.

Khammam, one of the largest chilli-producing districts in Telangana, hosts a considerable number of cold storages that face financial and operational challenges. To assess these issues, 39 cold storage units were studied, including 13 large (130,000 bags), 17 medium (100,000 bags), and 9 small (80,000 bags) units. Data collected over the last five years were analysed using the Likert

[++] *https://orcid.org/0009-0009-4086-7083;*
**Corresponding author: Email: umamaheshdevarashetty@gmail.com, umamaheshdevarashetti@gmail.com;*

Cite as: *Devarashetti Uma Mahesh, and Anoop. M. 2025. "Bottlenecks Affecting Cold Storage Entrepreneurs and Capacity Utilization of Cold Storage Facilities". Archives of Current Research International 25 (9):366–373. https://doi.org/10.9734/acri/2025/v25i91502.*

scale technique. The study revealed that high investment cost, interest rates, electricity charges, and maintenance expenses were the major financial problems, while heavy competition and fire risk were general concerns. Despite these constraints, large, medium, and small units recorded average capacity utilization of 90.5%, 88%, and 96% respectively. The findings indicate that although capacity utilization remains high, addressing financial and infrastructural issues is essential to improve the long-term sustainability of cold storage enterprises in the region.

Keywords: Bottlenecks affecting; cold storage; entrepreneurs; capacity utilization; cold storage facilities.

1. INTRODUCTION

"The total capacity of refrigerated storage around the world was 719 million cubic meters in 2020, which is 16.7% more than capacity detailed in 2018" (Global cold storage capacity report) North America and China accounted for most of the increment in detailed capacity since 2018. "The USA was the single biggest nation having a capacity of 156 million cubic meters, followed by India at 150 million cubic meters and China at 131 million cubic meters. Canada, Brazil and, Netherlands together had normal cold storage capacity estimates of more than 100,000 cubic meters" (Kart and Demircan 2014).

According to the data given by India stats, the number of cold storages is highest in Uttar Pradesh with a capacity of 14545618 MT followed by Gujarat with 3790311 MT and Punjab with a capacity of 2282626 MT. The lowest number of cold storages is in Lakshadweep with a capacity of 15 MT followed by Sikkim with capacity of 2100 MT and Arunachal Pradesh with 6000 MT (Kart and Demircan 2014).

In 2019-20, Telangana ranked second in chilli area, production and productivity i.e., 0.85 lakh hectares (2.10 lakh acres), production 3.28 lakh tonnes and productivity 3859 Kg/ha (1561 Kg per acre) respectively. Chilli area and production in Telangana accounts for 11.59% and 17% of all India area and production respectively. The major chilli growing districts are Khammam, Mahabubabad, Gadwal, Suryapet and Warangal (Rural). There is good demand for chilli hybrid varieties like 334 and Teja in international market. Presently, in Andhra Pradesh and Telangana, around 5.40 lakh tonnes chilli was in cold storages. There is a good demand for cold storages in Khammam as it has a highest area and production in Telangana state. The study was conducted in the Khammam district of Telangana state. The study mainly concentrated on "economic analysis, investment pattern, costs and returns, business analysis of different cold storages which were divided into three groups based on the capacity of the cold storage i.e., small medium and large" (Lavanya et al. 2020).

2. METHODOLOGY

The current study is based on the primary data collected from cold storage entrepreneurs in Khammam district of Telangana. The Khammam area lies between 16°45" and 18°35" north scope and 79°47" and 80°47" east longitude. The total topographical region of the Khammam area is around 16029 sq. km. The soils are red gravel (24 %), black cotton (70 %) and sandy alluvial (6 %) (Veena 1996). Khammam area in Telangana state is purposively chosen for the study as it has abundant resources and favourable entrepreneurial development. The area is popular for red chillies and has the greatest number of cold storage units, particularly for red chilli. The Khammam district has 39 cold storages which are the highest in number in Telangana. There were distinctive sizes of cold storage units like large, medium and small cold storage capacity units in Khammam district based on the capacity. Among the 39 cold storages, 13 were large units, 17 medium units and 9 small units totalling 39 units were selected randomly for this study (Ashwini et al. 2007).

1, Small scale cold storage unit: Cold storage units with a capacity of less than 80000 bags.
2, Medium-scale cold storage unit: Cold storage units with a capacity of 80001- 100000 bags.
3, Large scale cold storage unit: Cold storage units with a capacity of more than 100000 bags and more.

2.1 Analytical Techniques Employed

The information collected were displayed in tabular form to encourage easy comparison. The simple tabular analysis was employed for analysis of the capital investment, cost and return structure, commodities stored in the cold storage units and constraints in a cold storage operation. Likert scaling technique was used to identify the problems of cold storage

entrepreneurs during establishment of cold storage units, financial problems and general problems. Likert-type scale assumes that the strength/intensity of experience/response is linear, i.e., on a continuum from strongly agree to strongly disagree and makes the assumption that attitudes can be measured. Respondents may be offered as a choice of five to seven or even nine pre-coded responses with the neutral point being neither agree nor disagree. In its final form, the Likert scale was used in a five-point scale to allow the cold storage entrepreneurs to express how much they agree or disagree with a particular problem. Strongly disagree, disagree, neither agree nor disagree, agree, strongly agree. An average is a single number taken as representative of a non-empty list of numbers. The average was used to indicate the capacity utilisation by different sized cold storage units.

3. RESULTS AND DISCUSSION

The problems faced by cold storage entrepreneurs were classified as problems during establishment, financial problems and general problems. The problems were discussed here under (Maheshwar and Chanakwa 2006; Chourasia and Goswami 2009).

3.1 Problems During Establishment

The problems during establishment include land selection for establishment of cold storage units, land cost, capital, subsidy allotment by state or central government schemes and equipment availability. To know the perception of cold storage entrepreneurs towards the problems during establishment the questionnaire was prepared with the list of five problems and a sample of 39 entrepreneurs were taken, according to their perception 38.46 percent people strongly disagreed that land selection as a constraint, 20.51 percent people disagreed that land selection is a constraint, 25.64 percent entrepreneurs were neutral about land selection as constraint, 15.39 percent entrepreneurs agreed that land selection as a constraint and no entrepreneur strongly agreed with land selection as a constraint (Chibber 1982).

The second problem listed was the land cost for establishment of the cold storage unit, no cold storage entrepreneurs strongly disagreed, none of them disagreed, 12.82 percent of entrepreneurs were neutral about the problem, 53.85 percent of entrepreneurs agreed that land cost as a problem during the establishment of a cold storage unit, 33.33 percent entrepreneurs strongly agreed that land cost as a major problem during the establishment of the cold storage unit.

The third problem listed was capital for the establishment of the cold storage unit, no cold storage entrepreneurs strongly disagreed, none of entrepreneurs disagree, none of them were neutral, 38.46 percent of the cold storage entrepreneurs were agreed that capital as a problem during the establishment of the cold storage unit, 61.54 percent of the entrepreneurs were strongly agreed that capital as the major problem during the establishment of the cold storage unit.

The fourth problem listed was subsidy for cold storage unit establishment, no cold storage entrepreneurs strongly disagree, none of the cold storage entrepreneurs disagreed, 23.07 percent of cold storage entrepreneurs were neutral, 41.03 percent of cold storage entrepreneurs agreed that subsidy getting during the establishment of the cold storage unit as a problem, 35.9 percent of cold storage entrepreneurs strongly agreed that subsidy getting during the establishment of the cold storage unit as a major problem.

The fifth problem listed was equipment for the cold storage unit, 30.7 percent of cold storage entrepreneurs strongly disagreed that getting machinery for cold storage as a problem, 41.1 percent of cold storage entrepreneurs disagreed that getting machinery for a cold storage unit is a problem, 12.83 percent were neutral about the getting machinery as the problem, 10.25 percent of cold storage entrepreneurs agreed that machinery getting as a problem, 5.12 percent of cold storage entrepreneurs strongly agreed that machinery getting as a major problem during the establishment of the cold storage unit (Singh, et al, 2014).

3.2 Financial Problems

The financial problems faced by cold storage entrepreneurs include high rate of interest, high cost of electricity, heavy capital investment and high cost of storage for cold storage entrepreneurs. To know the perception of cold storage entrepreneurs towards the financial problems questionnaire was prepared with the list of four problems and a sample of 39 entrepreneurs were taken. According to their perception 12.8 percent of cold storage entrepreneurs strongly disagreed that high rate of interest as a constraint, 20.51 percent cold

Table 1. Analysis of Problems during the establishment

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Land selection	15(38.46%)	8(20.51%)	10(25.64%)	6(15.39%)	0(0%)
Land cost	0(0%)	0(0%)	5(12.82%)	21(53.85%)	13(33.33%)
Capital	0(0%)	0(0%)	0(0%)	15(38.46%)	24(61.54%)
Subsidy	0(0%)	0(0%)	9(23.07%)	16(41.03%)	14(35.9%)
Equipment	12(30.7%)	16(41.1%)	5(12.83%)	4(10.25%)	2(5.12%)

storage entrepreneurs disagreed that high rate of interest as constraint, 17.94 percent cold storage entrepreneurs were neutral, 20.51 percent cold storage entrepreneurs agreed that high rate of interest as a constraint, 28.2 percent cold storage entrepreneurs strongly agreed that high rate of interest as a major problem (Dev and Rao 2004).

The second problem listed was the high cost of electricity for maintenance of cold storage unit, 10.23 percent of cold storage entrepreneurs were strongly disagreed that the high cost of electricity as a problem, 17.94 percent of cold storage entrepreneurs disagreed with that cost of electricity as a problem, 38.45 percent were neutral regarding the problem, 20.51 percent of cold storage entrepreneurs agreed that high cost of electricity as a problem, 12.8 percent cold storage entrepreneurs strongly agreed that high cost of electricity as a major problem.

The third problem was heavy capital investment for the cold storage units, no cold storage entrepreneurs disagreed with this problem, 7.7 percent of cold storage entrepreneurs were neutral for this problem, 38.45 percent of cold storage entrepreneurs were agreed that heavy capital investment as a problem,53.85 percent of cold storage entrepreneurs strongly agreed that heavy capital investment as a major problem (Singh et al. 2014).

The fourth problem listed was the high cost of storage in cold storage units, 20.51 percent of cold storage entrepreneurs strongly disagreed that the high cost of storage as a problem, 20.51 percent were disagreed, 35.9 percent were neutral for the listed problem, 15.38 percent were agreed to the listed problem, 7.7 percent of cold storage entrepreneurs were strongly agreed that high cost of storage as a major problem (Chourasia and Goswami 2009; Maheshwar and Chanakwa 2006).

3.3 General Problems

The general problems listed include lack of maintenance providers, heavy competition, high cost of maintenance, lack of demand leading to unused capacity, lack of awareness among farmers, price risk, fire risk, power shortage, labour shortage, non-lifting of produce by farmers in time, lack of timely payment. To know the perception of cold storage entrepreneurs towards the general problems the questionnaire was prepared with the list of eleven problems and a sample of 39 entrepreneurs (Table 3) were taken, according to their perception 46.1 percent of cold storage entrepreneurs strongly disagreed that lack of maintenance providers as a constraint, 20.51 percent cold storage entrepreneurs disagreed that lack of maintenance providers as a constraint,18 percent cold storage entrepreneurs were neutral, 10.2 percent cold storage entrepreneurs agreed that lack of maintenance providers as a constraint, 5.1 percent cold storage entrepreneurs strongly agreed that lack of maintenance providers as a major problem (Ashwini et al. 2007).

The second problem listed was heavy competition for maintenance of cold storage units,7.69 percent of cold storage entrepreneurs were strongly disagreed that heavy competition as a problem,5.12 percent of cold storage entrepreneurs disagreed that heavy competition as a problem, 18 percent were neutral regarding the problem, 20.51 percent of cold storage entrepreneurs agreed that heavy competition as a problem, 48.7 percent cold storage entrepreneurs strongly agreed that heavy competition as a major problem.

The third problem listed was the high cost of maintenance of cold storage unit, 8.3 percent of cold storage entrepreneurs were strongly disagreed that the high cost of maintenance as a problem, 12.82 percent of cold storage entrepreneurs disagreed that high cost of maintenance as a problem, 41 percent were neutral regarding the problem, 15.3 percent of cold storage entrepreneurs agreed that high cost of maintenance as a problem, 23 percent cold storage entrepreneurs strongly agreed that high cost of maintenance as a major problem.

Table 2. Analysis of financial problems

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
High rate of interest	5(12.8%)	8(20.51%)	7(17.94%)	8(20.51%)	11(28.2%)
High cost of electricity	4(10.23%)	7(17.94%)	15(38.45%)	8(20.51%)	5(12.8%)
Heavy capital investment	0(0%)	0(0%)	3(7.7%)	15(38.45%)	21(53.85%)
High cost of storage	8(20.51%)	8(20.51%)	14(35.9%)	6(15.38%)	3(7.7%)

The fourth problem listed was lack of demand leading to the unused capacity of the cold storage unit,30.78 percent of cold storage entrepreneurs were strongly disagreed that lack of demand leading to unused capacity as a problem, 25.7 percent of cold storage entrepreneurs disagreed that lack of demand leading to unused capacity as a problem, 23 percent were neutral regarding the problem, 12.82 percent of cold storage entrepreneurs agreed that lack of demand leading to unused capacity as a problem, 7.7 percent cold storage entrepreneurs strongly agreed that lack of demand leading to unused capacity as a major problem (Lavanyaet al. 2020).

The fifth problem listed was lack of awareness among farmers regarding the cold storage unit, 56.4 percent of cold storage entrepreneurs were strongly disagreed that lack of awareness among farmers as a problem, 20.5 percent of cold storage entrepreneurs disagreed that lack of awareness among farmers as a problem, 23 percent were neutral regarding the problem, no cold storage entrepreneurs agreed that lack of awareness among farmers as a problem, none of the cold storage entrepreneurs strongly agreed that lack of awareness among farmers as a major problem (Reddy 2012).

The sixth problem listed was price risk for produce stored in the cold storage unit, 20.5 percent of cold storage entrepreneurs were strongly disagreed that price risk as a problem, 12.8 percent of cold storage entrepreneurs disagreed that price risk as a problem, 46.15 percent were neutral regarding the problem, 18 percent of cold storage entrepreneurs agreed that price risk as a problem, 2.56 percent cold storage entrepreneurs strongly agreed that price risk as a major problem.

The seventh problem listed was fire risk during the maintenance of cold storage unit, no cold storage entrepreneurs strongly disagreed that fire risk as a problem, 12.82 percent of cold storage entrepreneurs disagreed that fire risk as a problem, 30.78 percent were neutral regarding the problem, 25.7 percent of cold storage entrepreneurs agreed that fire risk as a problem, 30.7 percent cold storage entrepreneurs strongly agreed that fire risk as a major problem.

The eighth problem listed was power shortage during maintenance of cold storage unit, 64.2 percent of cold storage entrepreneurs were strongly disagreed that power shortage as a problem, 15.3 percent of cold storage entrepreneurs disagreed that power shortage was a problem, 20.5 percent were neutral regarding the problem, no cold storage entrepreneurs agreed that power shortage as a problem, none of the cold storage entrepreneurs strongly agreed that power shortage as a major problem (Veena 1996).

The ninth problem listed was labour shortage for maintenance of cold storage units, 51.33 percent of cold storage entrepreneurs were strongly disagreed that labour shortage as a problem, 23 percent of cold storage entrepreneurs disagreed that labour shortage as a problem, 15.4 percent were neutral regarding the problem, 10.2 percent of cold storage entrepreneurs agreed that labour shortage as a problem, no cold storage entrepreneurs strongly agreed that labour shortage as a major problem.

The tenth problem listed was the non lifting of produce by farmers on time in the cold storage unit, 58.97 percent of cold storage entrepreneurs were strongly disagreed that non lifting of produce by farmers in time was a problem, 23 percent of cold storage entrepreneurs disagreed that non lifting of produce by farmers in time as a problem, 12.82 percent were neutral regarding the problem, 5.18 percent of cold storage entrepreneurs agreed that non lifting of produce by farmers in time as a problem, no one of the cold storage entrepreneurs strongly agreed that non lifting of produce by farmers in time as a major problem.

The eleventh problem listed was lack of timely payment for maintenance of cold storage unit, 66.7 percent of cold storage entrepreneurs were strongly disagreed that lack of timely payment as a problem, 25.6 percent of cold storage entrepreneurs disagreed that lack of timely payment as a problem, 7.7 percent were neutral

Table 3. Analysis of general problems

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Lack of maintenance providers	18(46.1%)	8(20.5%)	7(18%)	4(10.2%)	2(5.1%)
Heavy competition	3(7.69%)	2(5.12%)	7(18%)	8(20.5%)	19(48.7%)
High cost of maintenance	3(8.3%)	5(12.82%)	16(41%)	6(15.3%)	9(23%)
Lack of demand leading to unused capacity	12(30.78%)	10(25.7%)	9(23%)	5(12.82%)	3(7.7%)
Lack of awareness among farmers	22(56.4%)	8(20.5%)	9(23%)	0(0%)	0(0%)
Price risk	8(20.5%)	5(12.8%)	18(46.15%)	7(18%)	1(2.56%)
Fire risk	0(0%)	5(12.82%)	12(30.78%)	10(25.7%)	12(30.7%)
Power shortage	25(64.2%)	6(15.3%)	8(20.5%)	0(0%)	0(0%)
Labour shortage	20(51.33%)	9(23%)	6(15.4%)	4(10.2%)	0(0%)
Non lifting of produce by farmers on time	23(58.97%)	9(23%)	5(12.82%)	2(5.18%)	0(0%)
Lack of timely payment	26(66.7%)	10(25.6%)	3(7.7%)	0(0%)	0(0%)

Table 4. Analysis of cold storage capacity utilisation

Type of cold storage unit	2020-2019 (%)	2019-2018 (%)	2018-2017 (%)	2017-2016(%)	2016-2015(%))	Average
Large	88.16%	86.5%	84.2%	90.02%	91.12%	88%
Medium	90.31%	89%	91.5%	90.27%	91.79%	90.574%
Small	96.9%	95.66%	97.25%	94.08%	96.12%	96%

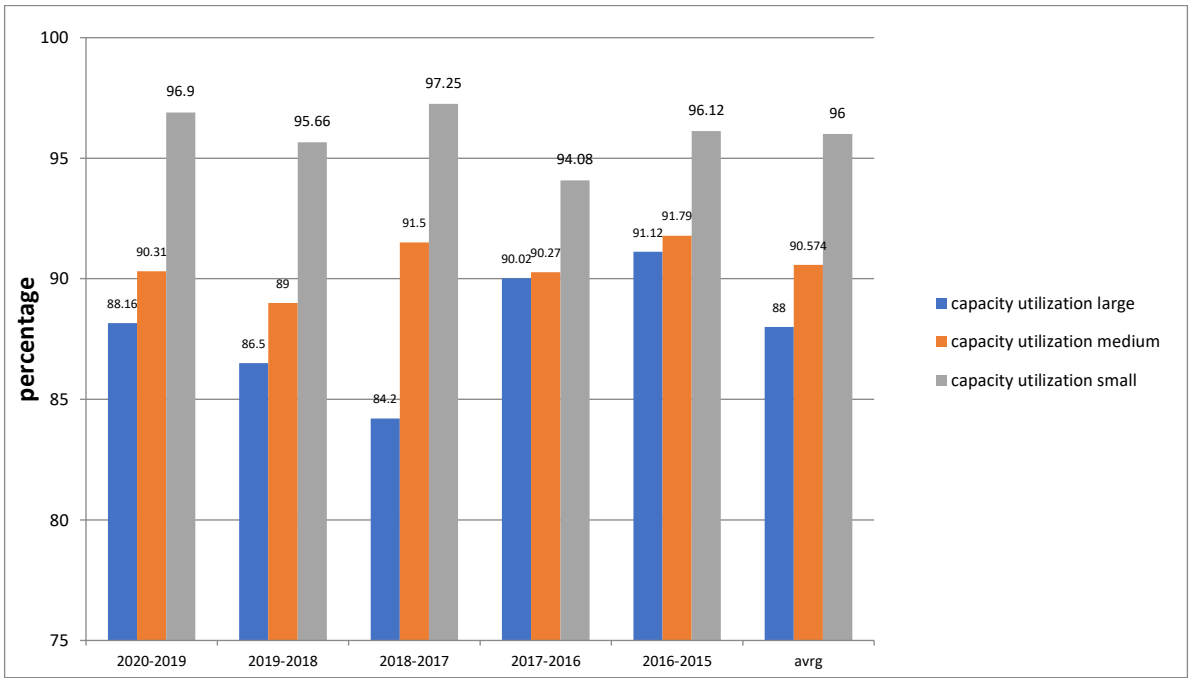

Fig. 1. Analysis of cold storage capacity utilisation

regarding the problem, no cold storage entrepreneurs agreed that lack of timely payment as a problem, no one of the cold storage entrepreneurs strongly agreed that lack of timely payment as a major problem.

3.4 Analysis of Cold Storage Capacity Utilisation

Under this objective, the data regarding the original capacity of the cold storage units and out of it, how much it was being occupied by the

produce for the last 5 years have been collected for the small, medium and large cold storage units.

The averages of capacity utilised were given in the above table 4., which shows the capacity utilisation by different types of cold storage units i.e., large, medium and small. The large scale cold storage units were having an average of 88 percent capacity utilisation, the medium cold storage units were having an average of 90.5 percent capacity utilisation and the small scale cold storage units were having an average of 96 percent capacity utilisation.

The capacity utilisation data shows that the small scale cold storage units were having a high capacity utilisation i.e., 96 percent followed by medium scale cold storage units with 90.5 percent and large scale cold storage units were having the lowest capacity utilisation i.e., 88 percent.

From the above graph, it was evident that the capacity utilisation of small scale cold storage units were high for the last five years when compared to medium and large scale storage units and after small scale storage units, the medium scale cold storage units were having the highest capacity utilisation then the large scale cold storage units and the large scale cold storage units were having the lowest utilisation capacity (Kart and Demircan 2014).

The storage capacity utilisation of the small cold storages was more among small, medium and large storage units. The large size cold storage units can improve their utilisation capacity by establishing forward and backward linkage with the chilli processing units or with the chilli exporting companies. It will help large size cold storage units to increase their capacity utilisation.

4. CONCLUSION

The bottlenecks to the cold storage units were divided into three categories, those were problems during the establishment, financial problems and general problems.

Among the problems during the establishment, the main problems were capital for the establishment of cold storage, land cost and subsidy were considered as main problems to the cold storage entrepreneurs and equipment and land selection were considered as moderate problems.

Among the financial problems, heavy capital investment was considered as the main problem along with the high rate of interest and high cost of electricity. High cost of storage was considered a moderate problem by cold storage entrepreneurs.

Among the general problems heavy competition, fire risk, high cost of maintenance, price risk and high cost of maintenance were the major problems of cold storage entrepreneurs and lack of maintenance providers, lack of demand leading to unused capacity, lack of awareness among farmers, power shortage, lack of timely payment, non lifting of produce by farmers in time were not considered as serious problems by the cold storage entrepreneurs.

4.1 Analysis of Cold Storage Capacity Utilisation

The large-scale cold storage unit was having an average of 88 percent capacity utilisation, the medium cold storage unit was having an average of 90.5 percent capacity utilisation, the small-scale cold storage unit was having an average of 96 percent capacity utilisation. The capacity utilisation data shows that the small-scale cold storage units were having a high-capacity utilisation i.e., 96 percent and after small scale, the medium scale cold storage unit was having a high percent i.e., 90.5, the large-scale cold storage unit was having the lowest capacity utilisation i.e., 88 percent.

4.2 Suggestions

- To diminish the fire risk and damage of the product, the cold storage units must be equipped with fire safety measures with automatic alarm systems and they must be insured.
- Small and medium farmers must be motivated and made aware of the utilisation of cold storage units to mitigate the price fluctuations and quality deteriorations.
- A proper market survey conducted before establishing the cold storage unit. That will help entrepreneurs to reduce the chances of failure and make it more viable. It will reduce the unused space in the cold storage unit.
- The cold storage units are helping the farmers to avoid distress sales so they are treated as agro-based industries and less tax to be imposed, it will encourage people to establish more cold storage units.

- The government may work in a direction to decrease the cost of storage of produce so the burden on the farmers will be reduced.
- Cold storage units must be linked with self-help groups, farmer producer organizations, joint liability groups, etc., so those cold storage units created near production areas that will reduce transportation costs.
- Market intelligence should be provided to the farmer on an everyday basis so that the price risk can be minimized.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

Ashwini, P., Vijayakumar, H. S., Banakar, B., Kirender, V.R., & Patil, R. V. (2007). Profile of different commodities stored and composition of users group in the selected cold storage units in Hyderabad. *Karnataka Journal of Agricultural Sciences, 20*(1), 173–175.

Chibber, C. N. (1982). *Ware Housing Corporation in India – A study silver jubilee celebration of central warehousing corporation, hauz khas. 110016* (pp. 62–64).

Chourasia, M. K., & Goswami, T. K. (2009). Efficient design, operation, maintenance and management of cold storage. *E Journal of Biological Sciences, 1*(1), 70–93.

Dev, S. M., & Rao, N. C. (2004). *Food processing in Andhra Pradesh: Opportunities and challenges*. Centre for Economic and Social Studies.

Kart, M. C. O., & Demircan, V. (2014). An economic comparison of conventional and modern coldstorage facilities Turkey. *Custos e@ gronegócio, 10*(1), 118–130.

Maheshwar, C., & Chanakwa, T. S. (2006, August). Postharvest losses due to gaps in cold chain in India-a solution. In *IV International Conference on Managing Quality in Chains-The Integrated View on Fruits and Vegetables Quality 712* (pp. 777–784).

Reddy, R. J. (2012). Problems of red chilli growers and cold storage units–A case study of Guntur district. *International Journal of Research in Social Sciences, 2*(4), 684–697.

Singh, R., Lazarus, I. J., & Singh, S. P. (2014). Impact of building and refrigeration system's parameters on energy consumption in the potato cold storage. *Energy and Environment Research.*

Lavanya, S. M., Mahendran, K., & Indumathi, S. H. V. (2020). Analysis of cold storage capacity utilization with specific reference to a farmers market in Tamil Nadu, India. *International Journal of Current Microbiology and Applied Sciences, 9*(7), 981–987.

Veena, U. M. (1996). *Growth dimensions of horticulture in Karnataka-An econometric analysis* (Doctoral dissertation, University of Agricultural Sciences, Bangalore).

Peer-review history:
The peer review history for this paper can be accessed here:
https://pr.sdiarticle5.com/review-history/143979