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Analysis of Cold Storage Capacity Utilization in Jharkhand: Special Reference to Agriculture Finance

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Abstract

Agriculture is the leading occupation for the people of the Jharkhand. State has potential to produce horticulture product and this type of product like fruits and vegetables need cold storage industry because It plays a significant role for the agricultural sector where various items such as Vegetables, fruits and meat etc.is stored where temperature is maintained, so as to protect them from getting spoiled and there by extend their preservation period with the help of precision instruments. Cold storages are an acute technology to keep perishable items safe.
It is also an industry to increase revenue by protecting and reducing the wastage of fruits & vegetables. Cold storage is a place where an item is needed can be taken anytime and can be made available to consumers very easily. Due to non-availability of space in the existing cold storage units, farmers are facing hardships to store their produced. The purpose of the study to analyze the current scenario of cold storage capacity in Jharkhand. It has been seen that there is a wide gap in availability of cold storages and agriculture produce to the markets. There are only 25 storage which has 80625MT capacity in Jharkhand. So, the urgent need for affordable, reliable, and sustainable expansion of cold storage infrastructure is crucial to boost agriculture's economic contribution. Farmers need the right financing and storage for the right price, enabling them to directly connect with multiple markets and maximize socio-economic impact.

Keywords: Cold storage, Precision instrument, Sustainable.

Introduction

The 80% rural population in Jharkhand relies on agriculture as their primary source of livelihood. (Petare *et al.*, 2016). The state has good potential for higher production of horticultural and forestry products (Deogharia, 2018). The forest provides enough biomass to feed its dirt. But the entire thing remains inefficient if production of farmers waste due to shortage of cold storage (Singh and Singh, 2017). Currently, in Jharkhand, there are a significant number of farmers involved in the cultivation of vegetables, fruits, and other crops. However, preserving products becomes a challenge for them due to the absence of cold rooms and cold storage facilities. (news desk, 2021). Product damage is a direct result of any delay in bringing their product to market. Farmers experience significant losses due to this.so there is an urgent need of more cold storage in Jharkhand to protect the wastage of horticultural products. It has been seen that there is a wide gap in availability of cold storages and agriculture produce to the markets. There are only 25 running cold storage which has 80625MT capacity in Jharkhand (Agmarknet, 2021).

Jharkhand, known as "the land of forests," is a state located in eastern India. It was established on November 15, 2000, including the southern portion of the former state of Bihar. The state is adjacent to Bihar in the north, Uttar Pradesh in the northwest, Chhattisgarh in the west, Odisha in the south, and West Bengal in the east. The total size of the region is 79,714 square kilometers (30,778 square miles) (*Government of Jharkhand*, 2023**).** Geographically, it ranks fifteenth in terms of territory and fourteenth in terms of population. The official language of the province is Hindi. The capital of the state is Ranchi, while Dumka serves as its sub-capital. The state is renowned for its hills, waterfalls, and holy sites, including the main religious sites of Baidya Nath Dham, Parasnath, and Rajrappa. Based on the 2011 census data, the population of Jharkhand is approximately 32 million, positioning it as the thirteenth most populous state in India. Approximately 3.5% of the nation's populace resides in the state, up from 3% according to the most recent census in 2001**(**EIACP HUB, 2020**)**.

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The population density per square kilometre is approximately 414, which is nearly 30 points higher than the national average. The growth rate of the state is approximately 22%, surpassing the national growth rate of approximately 17% by a small margin. Statewide population growth is accelerating significantly due to ignorance and a lack of education regarding family planning. The current literacy rate in the state stands at approximately 67% (EIACP HUB, 2020). This figure necessitates immediate attention, and immediate action must be taken to rectify the situation. In Jharkhand, the sex ratio is approximately 940 (EIACP HUB, 2020).

Review of Literature

The review of literature has been done for the knowledge and better understanding of cold storage utilization in Jharkhand. The scope of this study is to review the current scenario of storage capacity utilization which will help to analyze all aspects.

Lavanya et al., (2020)

The study examines the utilisation of cold storage units in the farmers market of Anna Nagar, Madurai, over the course of the last five years. The findings indicate a lack of optimal utilisation of these units, highlighting the need for additional interventions to enhance usage. Direct marketing concepts such as Uzahavar Sandhai and Rythu Bazar have the potential to assist farmers in achieving improved prices. The study emphasises the importance of implementing efficient cold storage solutions.

Satpathy & Lenka, (2020)

The study analyzed the socio-economic attributes of 120 vegetable growers in East Singhbhum district of Jharkhand. The majority were middle-aged, had primary school education, and had small land holdings. Most had medium farming experience and no organization membership. Mass media sources, particularly TV, ranked first in information use. The respondents had medium risk-bearing ability and innovativeness.

Singh, (2020)

This Study reveals that Jharkhand's agriculture sector is a significant contributor to the Indian economy, providing employment, income, and food security. The sector has grown by 110% from 2011-12 to 2017-18, reaching Rs. 4690481 lacs in 2017-18. However, the sector has experienced fluctuations, with Kharif and Rabi crop production declining. To address these issues, the government must implement input and output-rated programs, diversify the sector, and promote sustainable agriculture.

Shankar et al., (2017)

The study reveals that India's green revolution has led to self-sufficiency in food grain output, despite food security and hunger issues. However, challenges like low crop productivity, limited irrigation facilities, and underdeveloped infrastructure persist, impacting post-harvest and handling losses.

Singh and Singh, (2017)

This study explored that Sustainable food production is a major challenge in the 21st century, amidst global environmental issues like climate change, population growth, and natural resource degradation. The Green Revolution has increased agricultural production but also jeopardized ecological integrity and traditional practices. A climate-smart approach is needed, with traditional agriculture being increasingly recognized as a climate-smart solution.

k et al., (2014)

The study tells about Dumka district in Jharkhand, India, which has thermal and cold springs issuing through the Chotanagpur Gneissic Complex and Rajmahal trap. Thermal springs have surface temperatures ranging from 42° to 70°C and are near neutral to moderately alkaline. Cold springs are near neutral and fall in a Ca-HCO3 field, indicating sedimentary circulation. The thermal springs are suited for low-enthalpy geothermal systems, with estimated reservoir temperatures ranging from 92° to 138°C.

Objective of the study

- To analyze the current scenario of cold storage utilization in Jharkhand.
- To study the growth of cold storage.

Methodology

This study aims at analyzing the problems of farmers that is cold storage. The article is based on the secondary data compiled from diverse sources i.e. The Directorate of Agriculture, Government of Jharkhand: Jharkhand economic survey2021 and Agricultural Statistics at a Glance 2019, DES, MoAFW, GOI.

A Brief Profile of Jharkhand state

Natural Resources

Jharkhand is a land endowed with an abundance of natural resources, including mineral potential. The state of Jharkhand holds a prominent position on the national mineral map. The state encompasses an area of 79,714 square kilometres, of which 29.61% is forested, and possesses approximately 40% of India's total mineral resources. The primary producer of

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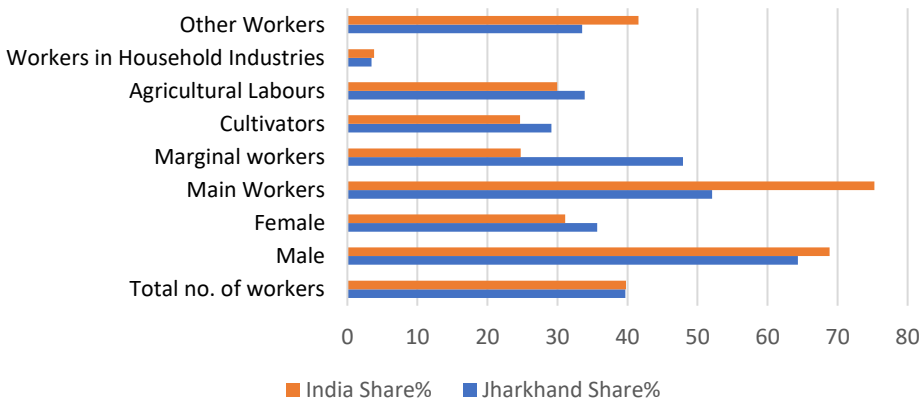
prime coking coal, the state occupies the first position in coal reserves, the second position in iron reserves, the third position in copper ore reserves, and the seventh position in bauxite reserves. Approximately 160 million metric tonnes of diverse minerals, valued at Rs 15,000 crore, are produced annually in the state of Jharkhand, generating mineral revenue of Rs 3,500 crore (Government of Jharkhand, 2023).

Employment

The main economic activity in which about 63% of the rural population of the state is engaged is agriculture. It serves as their job and main source of income. Here is a summary of the employment information, as shown in the table:

Table-1: Employment by different categories in Jharkhand



Source: Census of India 2011

Horticulture

The state may not be a leading producer of horticultural crops but the agro-climatic conditions provide ample scope for the production of horticultural crops, the full potential of which is yet to be realized. Since the shelf-life of horticultural crops is short, infrastructural facilities need to be developed to minimize wastage. At the same time facilities for value-addition in the form of food processing and the like can help the horticultural sector contribute a larger share in the state's GSDP. The output of fruit-crops has increased persistently over the years registering a CAGR of around 5 per cent rising from around 961 thousand metric tonnes in 2015-16 to 1153 thousand metric tonnes in 2019-20. The output of vegetables has grown in the state at a CAGR of around 1.26 per cent between 2015-16 and 2019-20 rising from around 3374 thousand tonnes in 2015-16 to 3592 thousand tonnes in 2019-20 (Priya, 2021).

Table-2: Trends in Area, Production and Yield of Fruit-Crops in Jharkhand
Area-000' hectares, Production in thousand metric tonnes, Yield in Kg/Hectare

Year	Area	Total Production of Fruits Crops	Yield
2015-16	**96.53**	**961.18**	**9033.13**
2016-17	**100.78**	**1047.96**	**9433.36**
2017-18	**104.30**	**1081.69**	**9408.37**
2018-19	**104.08**	**1118.36**	**9747.90**
2019-20	**105.317**	**1153.47**	**9935.81**

Source: The Directorate of Agriculture, Government of Jharkhand

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Table-3: Area and Production of different Varieties of Vegetables (2015-16 to 2020-21)
Area-000' hectares, Production in thousand metric tonnes, Yield in Kg/Hectare

Year	Area	Total Production of vegetables Crops	Yield
2015-16	**264.21**	**3373.82**	**11584.27**
2016-17	**293.53**	**3370.00**	**10415.34**
2017-18	**289.20**	**3475.20**	**10901.28**
2018-19	**293.88**	**3507.31**	**10826.80**
2019-20	**302.56**	**3592.03**	**10770.21**

Source: **The Directorate of Agriculture, Government of Jharkhand**

Livestock

Livestock-wealth is considered an important source of livelihood and employment. It also serves as a shock absorber in case of failure of crops. The livestock-wealth in the state has declined over the years between 2007 and 2012. The total population of livestock in the state has declined from 18100 thousand in 2007 to around 18053 thousand in 2012 registering a decline of 26 per cent. While the population of cattle, buffaloes and goats in the state has fallen, the population of sheep, pigs, horses and ponies has risen. Of the total livestock-population. around 92 per cent constitute milch animals comprising 48.35 per cent cows, 7 per cent buffaloes, 36.45 per cent goats. The population of poultry has increased from 11231 thousand in 2007 to 13560 thousand in 2012 registering a growth of 21 per cent (Ministry of Agriculture Department of Animal Husbandry, Dairying & Fisheries, 2014).

Table-4 Total Livestock in 2007 and 2012 (in thousands)

Livestock and Poultry	Livestock Census 2007	Livestock Census 2012	% Share in total Livestock (2012	%Change from 2007
Cattle	**8781.07**	**8730.08**	**48.35**	**-0.58**
Buffalo	**1505.54**	**1185.94**	**6.56**	**-21.23**
Sheep	**483.34**	**582.93**	**3.22**	**20.60**
Goats	**6591.59**	**6581.45**	**36.45**	**-0.15**
Pigs	**732.48**	**962.37**	**5.33**	**31.38**
Horses and ponies	**5.35**	**5.71**	**.031**	**6.72**
Others	**.83**	**4.27**	**.023**	**414.45**
Livestock	**18100.20**	**18052.75**	**100**	**-0.26**
Poultry	**11231**	**13559.53**	**-**	**20.73**

Source: Livestock Census 2007, 2012

Agriculture finance

Considering that a significant number of farmers in the state are characterised as small and marginal, it is crucial to provide agricultural finance in a timely manner and at a reasonable cost in order to facilitate the growth of the agricultural sector. An important advantage of agricultural credit is its provision of institutional finance for the acquisition of agricultural equipment and seeds and the implementation of technology aimed at enhancing production and productivity. Banks prioritise providing credit to the agriculture sector. The loan allocation to this industry has shown a consistent yearly growth rate of approximately 7 percent from 2014–15 to 2019–20. In the fiscal year 2014–15, the aggregate credit extended to this particular sector amounted to Rs. 11,746 crores. The amount has increased to 16,230 crores in the fiscal year 2019–20(*Government of Jharkhand*, 2023).

Problem faced by Farmers

Vegetable producers in Jharkhand face three significant challenges. Irrigation is the main contributing factor, then marketing, and finally a lack of facilities for food processing and storage. There is a shortage of both cold storage facilities

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and food processing facilities in this region. Excessive vegetable production throughout the growing season leads to the destruction of crops in the field. Given the exorbitant expense of seeds, farmers frequently resort to obtaining loans in order to get top-notch seeds. The farmer incurs a cost of 3000 rupees per kilogramme for vegetable seeds with additional nutritional value, whereas a quintal of tomatoes is sold for 300 rupees.
Modern agricultural equipment is utilised to minimise labour and costs for farmers while maximising profits. However, there are limitations to the utilisation of technology. Its application is limited. The farmers residing in the plateau region of Chotanagpur are encountering comparable difficulties. These places have a significant population of indigenous farmers. They possess a tiny plot of land. Indigenous communities have been engaging in traditional agriculture in this region for hundreds of years. The indigenous society consistently relied on domestic bovines, such as bulls and buffaloes, for agricultural labour. Only the excrement of the animal was placed on the field, from which the cultivation was carried out.
An obstacle of great importance is the distribution system and intermediaries. Due to the significance of this matter, numerous small-scale farmers engage in both cultivating vegetables and marketing them by transporting the produce to urban areas. The issue becomes very severe when vegetable prices decrease. As a result of excessive production, prices decrease, and intermediaries and wholesalers decrease their purchases. Despite the persistent demand for additional storage and processing facilities for vegetables in the region, minimal progress has been made thus far. A pair of enterprising individuals have initiated the online sale of vegetables in select regions of Jharkhand. However, the transportation of vegetables continued to pose significant challenges. In addition, the likelihood of contracting a COVID-19 infection was also significantly elevated. Customers expressed their disapproval of ordering vegetables and gourmet food items through internet platforms. The sale of vegetables and fruits poses significant challenges for farmers in Jharkhand.
Several areas in Jharkhand possess significant potential for vegetable and fruit cultivation. Moreover, farmers in these districts employ advanced irrigation techniques to enhance their productivity. The state government frequently dispatches farmers to Israel and other wealthy nations to acquire knowledge on advanced agricultural methods. Upon their return, these farmers provide training to other farmers (NDTV, 2018). Currently, farmers are achieving unprecedented levels of per-acre yield for crops such as tomato, lady finger, pumpkin, sweet gourd, cauliflower, cabbage, carrot, and radish. The vegetables have reached maturity in the field. However, farmers are becoming increasingly discouraged as a result of the absence of refrigerated storage facilities in the region. If the government had developed a few cold storage facilities and food processing units in the area, tomatoes, papaya, green chilies, and other produce might have been processed and preserved.

Storage related issues and challenge

The storage of food and other agricultural products is critical to ensuring a steady supply to consumers and to sustaining the economy at large. In India, thousands of tonnes of food cereals are wasted annually due to inadequate infrastructure and storage facilities. According to a study on global food waste conducted by the Institution of Mechanical Researchers in London, India discards approximately 21 million metric tonnes of wheat annually, and fifty percent of all food produced worldwide suffers the same fate and never reaches those in need. The numbers speak for themselves. We waste the quantity that is equivalent to the annual production of Australia. (Kaur, 2013). Food Corporation of India (FCI) is the premier agency for food storage in India. There is a shortage of grain silos and covered warehouses with adequate storage capacity. That's the reason why grain is commonly stored outdoors using CAP (cover and pedestal) storage across the country. This makes the grain vulnerable to rodents, moisture, birds, and pests. Unforeseen storms and inclement weather exacerbate the situation. There is a significant amount of grain that goes to waste annually because of insufficient storage facilities and infrastructure.

Storage
State storage capacity has increased gradually over time. As of March 2019, the province possessed a storage capacity of 5.51 lakh metric tonnes. As of March 2019, the storage capacity authorised under the Agricultural Marketing Scheme is 157316 metric tonnes, representing an approximate 11% increase compared to the previous year, 2018. From 2017 to 2019, the number of go-down initiatives authorised under the programme has risen steadily. It peaked at 24 in 2017. The enhancement of storage capacity will aid in the regulation of agricultural capacity waste, thereby minimising losses and increasing the profitability of agriculture (*Government of Jharkhand*, 2023).

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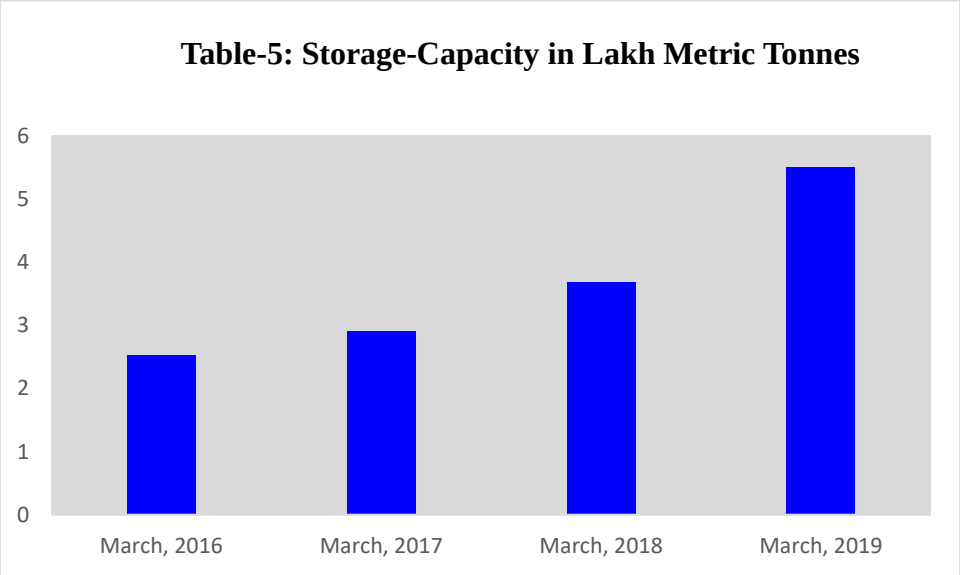

Source: Agricultural Statistics at a Glance 2019, DES, MoAFW, GOI

Cold storage facility

Cold storage is the focal point of the present agricultural revolution, which seeks to minimise post-harvest losses along the entire supply chain. It is apparent that fruits and other food items can be preserved at reduced temperatures in order to avert the growth of microbial pathogens that could induce spoilage. India ranks among the leading producers of fruits and vegetables; however, an estimated 30% of this output is disposed of as waste in landfills. The government has authorised the construction of refrigerated storage facilities at every farmer's market, considering the manifold benefits that such facilities offer. This will allow the producers to preserve the freshness of their produce during storage and resell it at the market a few days later. The utilisation of the farmers market's cold storage facilities enabled farmers to stock their products that might have otherwise been deemed unsuitable for sale. The plethora of federal and state programmes and subsidies that are accessible effectively incentivize business proprietors to venture into the cold chain sector. This has significantly decreased fruit and vegetable waste. The cold storage facility in Jharkhand is progressively advancing. As of March 2019, the province possessed a cold storage capacity exceeding 2 lakh metric tonnes (*Government of Jharkhand*,2023).

Table-6: Cold Storage-Capacity (as on 31.3.2019)

No. of Projects	**Capacity (Metric Tonnes)**
58	236680

Source: Agricultural Statistics at a Glance 2019, DES, MoAFW, GOI

Table-7 Cold Storage In Jharkhand

SI NO	**Name & Address**	**cap MT**	**Sector**	**Commodity**	**Remarks**
BOKARO					
1	Peterwar cold storage, peterwar	7000	Pvt	Potato	Running
2	BISCOMAUN Cold Storage Ltd, Bokaro	4000	Co-op	Potato	Incomplete
	Bokaro Total	11000			
DUMKA					
1	BISCOMAUN Cold Storage Ltd., Sariyahat	4000	Co-op	Potato	Running
DHANBAD					
1	Dhanbad Cold Storage, Kalyanpur, Dhanbad	3150	Pvt	Multipurpose	Running
	Dhanbad Total	3150			

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EAST SINGHBHUM					
1	Tatanagar Cold Storage (P) Ltd., Jamshedpur	1000	Pvt	Multipurpose	Running
2	BISCOMAUN Cold Storage Ltd., Lohardaga	4000	Co-op	Multipurpose	Incomplete
	East Singhbhum Total	5000			
HAZARIBAGH					
1	Annapurna Cold Storage, Okni Road, Hazaribag	2000	Pvt	Multipurpose	Running
2	Nand & Samant, Kissan Himghar, Barhi	3500	Pvt	Potato	Running
3	Hazaribagh Co-op. Cold Storage Ltd. Hazaribag	3165	Co-op	Multipurpose	Running
4	Harihar Cold Storage, Gola	2000	Pvt	Potato	Running
5	Hazaribagh Cold Storage, Kolghata, Hazaribagh	3654	Pvt	Multipurpose	Running
6	BISCOUMAN Cold storage Ltd, Jhumra	2000	Co-op	Potato	Running
7	Patni Sheetgriha Pvt Ltd, Marar	5000	Pvt	Multipurpose	Constructed
8	Gola Cold Storage, Gola	3828	Pvt	Multipurpose	
	Hazaribagh Total	25147			
LOHARDAGA					
1	BISCOMAUN Cold Storage Ltd., Lohardaga	4000	Co-op	Multipurpose	Incomplete
	Lohardaga Total	4000			
RANCHI					
1	Modern Cold Storage and Ice Industries, Ranchi	4000	Pvt	Multipurpose	Running
2	Gangajali Cold Storage, Gadi, Ranchi	1850	Pvt	Multipurpose	Running
3	Himagar Cold Storage, Station Road, Ranchi	650	pvt	Multipurpose	Running
4	Sahu Cold Storage, Kamdey, Ranchi	4000	pvt	Multipurpose	Running
5	Ranchi Cold Storage, Chutia, Ranchi	2250	Pvt	Multipurpose	Running
6	Bardhan Cold Storage, Nagri, Ranchi	3828	Pvt	Multipurpose	Running
7	Sri Basant Cold Storage, HARMU, Ranchi	3500	Pvt	Multipurpose	Running
8	Jila Bikash Adhikaran, Ranchi	2250	Co-op	Multipurpose	Running
9	BISCOMAUN Cold Storage Ltd., Ratu, Ranchi	4000	C0-op	Multipurpose	Running
10	Chinmastika Coldstorage (P) Ltd, Ranchi	2000	Pvt	Multipurpose	Running
10	Ranchi Total	28328			
25	Grand Total - Jharkhand	80625			

Source: (Agmarknet https://agriexchange.apeda.gov.in/Ready%20Reckoner/Cold_Storage/EasternRegion/Jharkhand.asp)

The table above illustrates the existing cold storage facilities in Jharkhand. However, there is a need for additional cold storage facilities to safeguard horticultural products. The Jharkhand Department of Agriculture, Animal Husbandry, and Cooperation will build 92 cold storage facilities within the premises of Large Area Multi-Purpose Cooperative Societies (LAMPS) located throughout the districts of Jharkhand. The government has allocated Rs 300 crore for the construction of cold storage facilities. The department has obtained approval, and construction will commence shortly. Each cold store will have a capacity of 30 metric tonnes. The government has instructed the building division department to commence construction activities while also facilitating the provision of land. Each cold storage development necessitates a land area of five decimals. Each cold storage construction is projected to cost 32.43 lakh. The purpose of constructing cold storage facilities is to provide farmers with a facility to preserve and store their fruits, vegetables, and other crops. A favourable market will enable farmers to obtain a lucrative price for their agricultural yield. Cold storage facilities would be constructed in Jamtara, Lohardaga, Chaibasa, Koderma, Hazaribagh, Godda, Gumla, Palamu, Bokaro, Deoghar, Ranchi, and various other locations in the state of Jharkhand (2020).

Conclusion

Horticulture production is one of the main agricultural activity in Jharkhand from which farmers can increase their financial condition through irrigation but some major problems like Marketing & food storage and processing doesn't have much capacity utilization. Cold storage is one the major problem of farmers and Currently, a large number of farmers in Jharkhand are working to produce fruits, vegetables, and other items. But they frequently struggle to preserve items due to a lack of

cold rooms and cold storage. Any holdup in getting their product to market results in product harm. Farmers suffer significant losses as a result of this. Therefore, Jharkhand urgently requires extra cold storage to prevent the loss of horticultural products. It has been observed that there is a significant gap between the supply of cold storage and agricultural products to markets. This gap should be filled by government by increasing the cold storage facility where farmers can utilize their products. The Jharkhand Government is working in this direction with the objective of establishing cold storage facilities in all districts of Jharkhand, and storage facilities in all blocks. Construction of over 70 new cold storages is underway which may address the shortage issue to a substantial extent. This will help the farmers to improve their economic condition**.**

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