

**Cold Chain: Opportunities in India-
YES Bank- Dutch Embassy
Collaborative Study**

“Cold Chain is essential in qualitative post-harvest management and farm to fork food security and food quality by efficiently handling agricultural products upstream & downstream. There’s no gainsaying the crucial role of cold chain in reducing agricultural losses. This study, a joint effort of YES Bank and Agriculture Department of Embassy of the Kingdom of the Netherlands, New Delhi, compiles available and recent literature on developments in the cold chain sector in India with primary focus on Maharashtra, Andhra Pradesh, Gujarat & Delhi. This study will also help to achieve commercial success by collaborating on mutually identified development projects & will contribute to respective bilateral goals for both India & Netherlands.”



Wouter Verhey
Agricultural Counsellor
Netherlands Embassy in New
Delhi

“The Indian perishables market is generally characterized by fragmentation, low levels of processing, high potential for value addition, significant amounts of quality & quantity losses and high price volatility. In order to salvage the sector out of the above challenges as well as to leverage on the intrinsic strengths of the Indian perishable sector for incremental domestic & export opportunities, the cold chain sector offers tremendous potential to catapult India into the big league in food processing. We hope that the report shall be of great value to the Dutch Cold Chain industry to identify ground realities, specific opportunities, challenges and priorities for charting out their plans for the Indian market.”



Nitin Puri,
President & Country Head
Food and Agribusiness
Strategic Advisory &
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YES BANK Ltd.

The Indian Cold Chain Industry - An Overview

India has seen a phenomenal growth in production of horticulture produce, dairy and meat products over the last decade. Presently, India occupies a position amongst the top three in production of a host of commodities including spices, fisheries, poultry, milk, fruits and vegetables. But even with such large production volumes, India's present share in global farm trade is still very small. India is the second largest producer of fruits and vegetables in the world with production of 81.3 million MT and 162.2 million MT respectively but its share in global export of fruits and vegetables is around 1.4% only. Approximately 18% of fruits and vegetables get wasted in the country. This is mainly caused due to lack of cold chain infrastructure which includes both storage and transportation facilities.

The cold chain industry in India is still at a nascent stage and despite large production of perishables, the cold chain potential still remain untapped due to high share of single commodity cold storage, high initial investment (for refrigerator units and land), lack of enabling infrastructure like power & roads, lack of awareness for handling perishable produce and lapse of service either by the storage provider or the transporter leading to poor quality produce.

However, increasing urbanization and growth of organized retail, food servicing and food processing sector are boosting the growth of cold chain industry in India. The trend is shifting towards establishing multipurpose cold storages and providing end to end services to control parameters throughout the value chain.

- ✓ India's cold chain sector was estimated at INR 175-177 billion (~USD 2.9 billion) during 2013-14
- ✓ 88-90% of market share is with the Temperature Controlled Warehouses (INR 162 billion (USD 2.7 billion); 6500+ stores, 30.4 million MT Capacity)
- ✓ Remaining 10-12% comprises of Temperature Controlled Vehicles (INR 13-14 billion (~USD 0.2 billion); 8000+ vehicles).
- ✓ It is highly fragmented industry and unorganized sector accounts for an estimated 80-85% share of the total capacity.
- ✓ Wholesalers and organized retailers are the key user segments of cold chain services with a share of 70-75% and 10-15% respectively.
- ✓ Currently, about 68% of the total cold storage capacity is concentrated in the states of West Bengal, Uttar Pradesh and Bihar, wherein storage of potatoes accounts for 85-90% of the capacity.
- ✓ Potatoes accounted for 68% of total volumes handled followed by multipurpose storage which accounted for 30%. In value terms, multipurpose stores have the largest share of 77% while the share of potatoes was a mere 17%.

Cold Chain: Opportunities in India

YES Bank in collaboration with Embassy of the Kingdom of the Netherlands has prepared a report on “Cold Chain - Opportunities in India” which gives an overview of the cold chain sector in India including present storage capacity, regulatory framework and subsidies, trends, growth enablers, challenges and key success factors of the industry. The report also highlights the cold chain scenario in key states like Andhra Pradesh, Maharashtra, Gujarat and Delhi/NCR with focus on the key perishable commodities like meat, marine, dairy and fruits & vegetables.

Cold chain industry is at a nascent stage in India and multiple opportunities for intervention are present across the value chain. The commodities for the study have been selected from a range of commodities where cold chain interventions are at various stages of development and there is a potential to further develop the market in future. The selected states and commodities for the study include

States	Commodities
Andhra Pradesh	Mango, Marine & Meat Products, Milk & Milk Products
Maharashtra	Onion, Citrus, Banana
Gujarat	Potato, Fish, Milk & Milk Products
Delhi/NCR*	Apple, Mango, Milk & Milk Products

** including CA storage of Apples in Himachal and J&K*

State Profiles - A Snapshot

1. Andhra Pradesh

With annual production of around 28.9 million MT of horticulture produce, Andhra Pradesh (AP) stands 2nd in the country next to West Bengal. Andhra Pradesh ranks among top 5 states in production of fruits, vegetables, spices and meat. Presently, there are only 371 cold storages in the state with a total capacity of 1.4 million MT. More than 90% of the cold storages are multipurpose followed by dedicated cold storages for Meat & Fish, Fruits & Vegetables and Milk & Milk Products with a cumulative share of 6%. Only 1% of the cold storages store Fruits and Vegetables exclusively. Majority of the cold storages are located in Guntur region which are primarily used for storing Chili. The commodities for which profiling is done in AP include mango, meat, marine and dairy products a brief of which is given below.

✓ Mango

AP is the largest producer of mango with production amounting to 4.4 million MT (accounting for 24% of India's mango production). The major markets for mango are in districts of Chittoor, Krishna and Kadapa. The major varieties are Baiganpally, Suvarnarekha, Neelum and Totapuri. Mango ripening is still done using calcium carbide presenting an opportunity for establishment of modern ripening chambers nearby urban consumption centers. There is also a huge potential

to develop and propagate controlled atmosphere/modified atmosphere storage of mango to increase shelf life and gain price arbitrage during off-season.

Apart from domestic consumption, mango is also used to prepare mango pulp, which is produced from specific varieties like Totapuri and Alphonso. The market size of mango pulp industry in India is approximately INR 15 billion (~USD 245.9 million)¹ of which AP accounts for about 50-60%. Mango pulp packed aseptically is generally kept under ambient conditions but now the trend is changing and industry is using cold storages for storing mango pulp.

✓ **Marine Products**

AP is the major sea food exporting state of India with its 35-40% of the produce being exported to highly remunerative markets like EU, Japan and USA. The frozen shrimp (in value terms) is the major commodity exported from the state. The state has cultured shrimp production of vanamei variety at around 300,000 MT, of which approximately 80-90% is exported after being processed. There is a potential to intervene at all levels of value chain from grading/sorting at farm level to final processed product due to the expansion of the industry. Technology interventions in cold storage, transportation, ice making plants-flake and tube ice, freezing units-IQF, plate freezers, blast freezer, freezer cold storages etc. can be utilized for inducing efficiencies and reducing wastages.

✓ **Meat**

AP is the 3rd largest producer of buffalo meat (117,690 MT) majority of which is exported. In India, meat is mostly consumed in fresh form. With policy for modern abattoirs by the central government, cold chain could be integrated to meet the demand of domestic market.

✓ **Milk Products**

The state has recorded highest growth in milk production and per-capita milk availability as well. Reduction in space required of cold chain machinery and cost economization are the two major interventions that can be looked into for dairy industry.

2. Maharashtra

Maharashtra is the second largest producer of fruits with total production of 9.8 million MT. The commodities for which profiling has been done in Maharashtra include onion, citrus and banana a brief of which is given below.

✓ **Onion**

In Maharashtra, Nasik, Ahmednagar, Pune and Satara are the major onion producing districts. Majority of the crop (~50-60%) is produced in rabi season which has good storage quality as the

¹ 1 USD = INR 61

variety grown in this season has higher TSS, dry matter and more number of outer dried intact scales. For onion, entire domestic supply chain is via ambient temperature and cold chain is maintained only for exports. There is a potential to introduce technology for longer term storage of onion and harvesting procedure for effective cold chain intervention in the crop.

✓ **Citrus**

Maharashtra ranks 4th in the country with total citrus production of 878,000 MT. Citrus in domestic market is generally stored and transported under ambient conditions. It is also a seasonal crop available for 6-7 months only. Players are storing second season crop under cold chain as it has good storage quality. New age cold chain interventions could be adopted for lengthening the storage time of the citrus fruits.

✓ **Banana**

With Banana production of 3.7 million MT Maharashtra ranks 3rd in the country. Nasik division (Nasik, Dhule, Nandurbar, Jalgaon) and Latur division (Latur, Osmanabad, Nanded, Parbhani, Hingoli) contributes to 48% and 35% of total banana production in Maharashtra. In case of banana, there is minimal post harvest infrastructure in Maharashtra at present. Thus, major intervention can be taken-up for the region in terms of establishment of modern pack houses at main production clusters which would cater to the banana and citrus grown in the surrounding area.

3. Gujarat

In Gujarat, the major categories for which cold chain is maintained are fruits & vegetables, marine produce, milk & milk products. The commodities for which profiling has been done include potato, fish and dairy products a brief of which is given below.

✓ **Potato**

In terms of potato production, Gujarat ranks 6th after UP, West Bengal, Punjab and Bihar but it has a unique advantage of being the state capable of producing good quality processing varieties of potato. Total potato production in Gujarat during 2012-13 was 2.5 million MT. Presently, a few entrepreneurs have started construction of modern potato cold storages using technology in the areas of storage ventilation, cooling system and programmed logic controller equipment. New technologies will be required for storage of processing grade potato as companies are expanding their procurement from Gujarat.

✓ **Fish**

Gujarat has a long coastline extending to 1,600 km, a continental shelf area of 0.18 million square km and Exclusive Economic Zone (EEZ) of 0.214 million square km. Fish for consumption in domestic market is not processed and is stored in ice flakes for transportation. Veraval and Porbandar are key fish landing centers in Gujarat. In Veraval, around 50 factories

with the processing capacity of 200-2,500 MT capacity are located. All the factories in Veraval are 100 % export oriented units (EOU) exporting the processed fish to countries like China, Korea, Japan, Canada and Europe. The potential exists in providing cost effective cold chain solutions starting from ice manufacturing/handling, refer vans/insulated vehicles and cold storages to improve the quality of fish.

✓ **Milk Products**

Dairy industry is well established in Gujarat and has been taken as a model for other states in the country. Anand model cooperative dairying has emerged as one of the successful dairy development programs in India. Dairy players are still looking for cost effective, energy efficient and space saving technology interventions in chilling and storage of milk and milk products.

4. Delhi/NCR

In Delhi, the total cold storage capacity is 126,158 MT out of which multipurpose and milk & milk products cold storages accounts for 93% and 4% respectively. The commodities for which profiling has been done in Delhi/NCR include apple, mango and milk & milk products a brief of which is given below.

✓ **Apples**

In India, Controlled Atmospheric (CA) stores, which use more advanced technologies, are mostly dedicated to apples. Apples arriving in Delhi/NCR region are mainly procured from Himachal Pradesh and J & K. With increase in demand of good quality produce the percentage of apples going under CA storage is bound to increase, indicating a potential for cold storage of the produce. Presently apples are transported at ambient temperature from the producing regions to consumption markets. Transportation of apples under cold chain and pre cooling after harvesting are the potential areas where technological intervention is required.

✓ **Mango**

In Delhi/NCR, mango is majorly procured from Uttar Pradesh, Maharashtra and Andhra Pradesh. Some players in Delhi/NCR are experimenting to store mango under controlled atmospheric conditions at a small scale but have achieved limited success. Increase in shelf life and ripening of mango has potential for intervention.

✓ **Milk Products**

The total Delhi/NCR liquid milk market size is estimated at 7.6 million litres per day which translates to 2,774 million litres annually. Milk being a highly perishable commodity, cold chain is maintained starting from the milk procurement in villages to the retailer level and there is a potential to maximize the operating efficiencies in the already established cold chain by introduction of energy efficient low cost technologies.

Key Opportunities

The cold chain industry is an emerging and fast growing business sector in India. Considering the current levels of fruits and vegetables wastage along with focus on food safety and security, cold chain facilities will play an important role in meeting the demand of food in the country. Development in the food processing sector and organized retail, government initiatives, increasing investments as well as increasing willingness on the part of consumers to pay a premium for higher quality of food products, will drive overall growth for the industry. However, interventions are required to bring down operating costs, to improve quality of end produce, for adoption of new technology solutions and training of manpower. Some of the potential areas of intervention include

- ✓ Controlled atmosphere/modified atmosphere storage for extension of storage life of perishables
- ✓ New technologies for storage of processing grade potato
- ✓ Low cost solutions for pre cooling at farm
- ✓ Modern pack houses and ripening chambers
- ✓ Innovation, cost effectiveness and service support in reefer technology
- ✓ Low cost technology for automation of operations in a cold store
- ✓ Space and energy saving solutions in cold storage