



## Report on Cold-chain (*rationalising concept & requirements*)

NCCD

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Ministry of Agriculture & Farmers Welfare (MoA&FW) has mandate to support supply-chain and marketing connectivity for agricultural produce, especially for horticultural produce which is perishable and of high value.

Cold-chain is a chain of logistics activities that is primarily used to service the market connectivity of perishable produce from harvest to consumers. Categorized under the logistics sector, cold-chain does not alter the essential or raw characteristics of agricultural produce, but merely pre-conditions the produce and conveys it to consumers. There is no value-addition undertaken, and only safe custody and transport of the produced value is performed. A cold-chain system will rely primarily on a supply based approach, using both cooling and packaging techniques, cold-chain counters immediate perishability and makes it feasible to deliver perishable produce to where it could not otherwise have reached. Cold-chain thereby empowers producers by expanding access to multiple and distant markets. Cold-chain is used for multiple product types (fresh fruits & vegetables, meats, dairy products, pharmaceuticals, chemicals). In case of horticulture, the producer of value is the farm and cold-chain takes custody of the harvested produce to scientifically manage its delivery.

Ministry of Food Processing Industries (MoFPI) has mandate to promote the processing of raw agricultural produce into food ingredients and products through processes that involve a change in the essential characteristics of the raw material.

Food Processing Industries is a manufacturing activity that is primarily used to utilise non-saleable fresh produce, or non-table varieties (specially grown under contract), for the purpose of converting the material into new food products. Categorized as an industry, food processing units delink the value chain system from the farmer producer and initiates a new value chain where source-producer of value is the processing factory. Majority of processed food items, such as pickles, condiments, powders, jams, beverages, tetra-packed juices and milk, dried items, ready to eat snacks, flour, oils, extracts, etc. do not require cold-chain for market connectivity. Fresh meats, fresh milk (non-tetra packed), frozen peas, ice cream are the main industry segments that perforce take recourse to cold-chain logistics. To secure raw material for pulping or processing needs, the factory gate may also use refrigerated rooms to store certain fruit and vegetables to buffer against its processing line capability. Such cold stores are for captive use, and capacity is decided per the throughput capability of the individual processor. The material stored is sourced in raw unpackaged format, unlike in cold-chain where the produce is packaged for onwards movement and retail.

Cold-chain, is a modern agri-logistics service, and provides a safe mode to transfer value from producer to consumer. Strictly speaking, there is no value addition to the produce in the cold-chain and the various activities undertaken – preconditioning the produce for travel, the transport, buffer storage and retail – the cold-chain merely manages or safe-guards the value in its custody in its passage to markets. This fact is recognised by the Finance Ministry and under the Finance Act, there is no value added tax or service tax on activities for handling, transporting, storage and marketing of agricultural produce.





Food processing applies transformative - additives, ingredients, preservatives, chemical or physical - changes to fresh whole produce and converts it into a new product. In such cases value-addition is deemed and the relevant value-added-taxes are applicable. It may be noted, that in case of fruits and vegetables, the “value addition” occurs to culled (non-saleable quantity) or would-be-waste and effectively is a mechanism for recovering of value from that which would otherwise be wasted. In case of specially grown crops (process variety potato and tomato), the raw produce is not table variety and can only be processed for consumption.

The essential advantage to farmers of fresh produce, from cold-chain, is the enabling bridge to connect with markets, thereby realising value for their produce. Without such farm-to-consumer connectivity, surplus produce becomes non-marketable and loses consequential value. When, all attempts to connect farmer with market have been exhausted, the left-over quantum would typically find use in the food processing units. For manufacturers of temperature sensitive processed food products, cold-chain connectivity is also essential.

Cold-chain is promoted by Ministry of Agriculture and Farmers Welfare (MoA&FW) as a thrust area to empower producers through modern logistics. Cold-chain is also supported by Ministry of Food Processing Industries (MoFPI) to support the needs of food manufacturing projects as well as farmer producers where applicable.

## B. Capacity created

As of 31.3.2014, the country had created almost 7000 cold stores, with a total holding capacity of 32 million tons. The capacity created in the previous 7 years is as follows-

Central Scheme	Capacity created (MT)	Projects	Assistance Rs. Lakhs	Rate for General area, Scheduled area
NHB*	58,19,887	813	48003.5	35% - 50% subsidy, ceiling of Rs 7.5 cr
NHM*	45,72,389	776	54890.9	35% - 50% subsidy, ceiling of Rs 3.75 cr
MIDH	103,92,276	1589	102894.4	35% - 50% subsidy
MoFPI	1,91,200	108	33699.3	50% - 75% grant-in-aid, ceiling of Rs 10 cr
<b>Total</b>	<b>10583476</b>	<b>1697</b>	<b>Infrastructure created from 1.04.2007 to 31.3.2014</b>	

(in XI plan and XII plan up to 31-03-2014)

\*NHM & NHB are sub-schemes under the Mission for Integrated Development of Horticulture (MIDH).

From 2014 to December 2015, an additional 238 projects of capacity 1.04 mill tons has been created through MIDH (NHM/NHB).

It is observed that support was provided mainly for cold storage space with an estimated less than 5% capacity for other cold-chain components. On average, in capacity terms, NHB created 7158 tons per project, NHM created 5892 tons per project and MoFPI supported 1770 tons of space per project in the same period. Projects under MoFPI scheme may include other value addition centres/components, not differentiated from cold-chain components.

In 2014, with the launch of MIDH, the support for cold-chain under MoA&FW was rationalised a revision to cost norms and components, and with a 5% reduction of subsidy rates. To avoid duplication, the sectoral & regional focus of NHM and NHB (the two sub-schemes under MIDH) were segregated. NHM operates as a Central Sector Scheme with States contributing 40% of the subsidy (10% in case of NE States) and NHB functions as a Centrally Supported





Scheme without contribution at state level. Both support programs allow subsidy to projects after physical creation of infrastructure (50%) and remaining after operationalising of infrastructure. Typically the total project cost (civil work, plant and machinery) is higher than the admissible cost for subsidy, in effect the subsidy may amount to less than 25% of total project cost. Currently work is in progress to align convergence between ongoing schemes of various central agencies. State governments may at times add or supplement such support.

### C. Infrastructure Required and Gap

NCCD has been taking a lead role in promoting the fact that market linkage through physical connectivity of produce from farms-to markets is a key area. Such development will strengthen farmer and will ensure the well-being (कल्याण) of our farmers. Physical logistics connectivity serves as a bridge between the rural-urban supply-demand divide and helps scale up sales, to promote any associated or relevant farm-level productivity.

There existed no holistic study on cold chain infrastructure requirement, except for broad based recommendations on cold stores requirements, by the National Spot Exchange Limited (NSEL). The NSEL report of December 2010 estimated that there existed a need for creating cold storage capacity of 61.13 million metric tonnes in the country.

The National Centre for Cold-chain Development (NCCD) found the estimations by NSEL to be speculative, having assumed cold storages to be the sole infrastructure component needed for integrated cold-chain operations. The NSEL analysis presumed all surplus inventories of perishable foods, sourced during peak production periods, could directly enter cold storages for unlimited storage periods, without any other necessary interventions such as pre-coolers and packaging systems. Critical components such as pre conditioning at source points (pack-houses with pre-coolers), reefer transportation (road/rail), distribution hubs and front end infrastructure were not factored. NCCD reported to the Task force on Cold-chain of 2014, that the NSEL report was not appropriately aligned with the infrastructure needs of market linked supply chain.

NCCD completed a comprehensive “All India Cold-chain Infrastructure Capacity (Assessment of Status and Gaps)” in August 2015. The study took a consumption driven approach to assess the cold-chain infrastructure needs and captured all components that contribute to setting up integrated supply chains. The key findings of the “All India Cold-chain Infrastructure Capacity (Assessment of Status and Gaps)” (AICIC-2015) are tabulated below-

Type of Infrastructure	Infrastructure Requirement (A)	Infrastructure Created (B)	All India Gap (A-B)	% share of Gap to Required
<b>Pack-house</b>	70,080 nos.	249 nos.	<b>69,831 nos.</b>	<b>99.6%</b>
<b>Reefer Vehicles</b>	61,826 nos.	9,000 nos.	<b>52,826 nos.</b>	<b>85%</b>
<b>Cold Storage (Bulk)</b>	341,64,411 MT	318,23,700 MT	<b>32,76,962 MT</b>	<b>10%</b>
<b>Cold Storage (Hub)</b>	9,36,251 MT			
<b>Ripening Chamber</b>	9,131 nos.	812 nos.	<b>8,319 nos.</b>	<b>91%</b>

- AICIC-2015 – NCCD -

The above AICIC study was not intended to capture the captive storage requirement of individual industry such as hotels, pharmaceuticals, processing. A separate focus study can be conducted for the purpose of meeting those assessments.





NCCD's capacity report (AICIC) was finalised and accepted after consultation and in coordination with all stakeholders (MIDH, MoFPI, APEDA, ICAR) and includes inputs from allied Ministries / Departments of Government of India viz. MoA&FW, MoFPI, Ministry of Railways, including APEDA, MPEDA, CONCOR & IWAI.

The study highlights that integration of cold-chain does not exist due to a large gap in form of pack-houses along with the associated capacity in transport. The report highlights that to fulfil the agenda to establish supply chain links from farm-to-consumer, development focus is required for creation of pack-houses and transport at village level (without the preconditioning centres, the produce cannot be readied for the cold-chain, and without transport, there are breaches in integrating the movement in the cold-chain). The study also recommends that at the pack-house (village level) locations, promotion of cottage industry sized food processing units be undertaken, so that the handling waste generated at farm-gate can be processed into pickles, jams, etc.

#### D. Recommendations

To avoid confusion among prospective investors, there is need for convergence between schemes. Towards this, clear segregation between technologies captive to an individual industrial unit and those that promote logistics as a supply chain service may be made. A common pattern of assistance and normative costs as a guideline is recommended.

- i) Schemes to support food processing technologies (captive industrial units for manufacturing food items) be differentiated from scheme for supporting cold-chain components (logistics infrastructure used in farm-to-market supply chain).
- ii) Support be considered for fully financed projects and linked to amount of credit, so as to have long term participation of banks in cold-chain projects. For the promoter, the subsidy leads to minimise monthly payback amount to banks, improving cash flow during initial years of operation for the period under credit.
- iii) Special consideration can be made for projects by government entities, Cooperatives or Farmer Producer Organisations (FPOs), for considering as venture capital to fund such projects.
- iv) The pattern of assistance be common for cold-chain across all central government schemes. State governments can supplement the subsidy if so desired.
- v) All infrastructure components be defined and governed by common cost norms as standardised by NCCD, an autonomous body for cold-chain development.
- vi) Cost norms be devised so as to reflect strategic direction to promote development in weak areas and not as a reflection of market price of components. This strategy is currently used by MIDH.

Segregating the area of focus of the implementing agencies is recommended. In this context, clarity between manufacturing activity (food processing) or production (farming activity) and cold-chain which is an agri-logistics service is also emphasised. The development of agri-logistics for providing market linkage for small and medium farmers will remain a necessary thrust area.

The following is additionally suggested-





- vii) Infrastructure components that are exclusive to market connectivity of fresh perishable horticulture produce, such as modern pack-houses with precoolers and ripening chambers, be developed under aegis of MoA&FW.
- viii) Infrastructure components that secure raw material captive for an industrial units use for transforming into new products be developed under aegis of MoFPI.
- ix) Infrastructure components used exclusively for dairy products and frozen meat products or other frozen goods be developed under aegis of MoFPI.
- x) Transportation and Front end cold stores are common to both segments (horticulture and non-horticulture) and can be developed under both Ministries.
- xi) Support for items specific for export compliance, such as x-ray machines, phytosanitary labs, etc. for agricultural goods be continued as focus area of APEDA.
- xii) All components exclusive to processing lines of industry, be handled separately from the cold-chain schemes. Currently cold-chain components are included alongside support for food processing equipment and can cause confusion to at time of data collation and appraisal.

#### E. Future Direction

Analysing the AICIC study indicates there are four critical areas for considering future focused implementation for developing cold-chain-

- i. Modern pack-house with pre-cooler and staging facility (village level).
- ii. Refrigerated transport (to connect pack-house with market).
- iii. Multi-modal logistics (rail, road, waterways and/or air).
- iv. Clean energy sources for operating pack-houses, cold stores and transport.
- v. Packaging material for safe transportation.
- vi. Improved traceability systems to safeguard and complement nutritional security.

The first three are infrastructure components that will help direct investment into rural areas and create near farm jobs allied to production from farms. Such development will support and maintain a prioritisation to establish greater market reach of perishable fresh produce. The creation of such back-end infrastructure to provide a logistics intervention that increases market capture of farmers will also support greater collaboration between farmers in form of FPOs/Cooperatives. The development will help integration with the existing asset base (cold stores at front end) and set off supply links in the existing marketing network.

#### F. National agenda for convergence

India has been successful in creating the world's largest footprint in cold storage space, however it has not developed integration with other components of the cold-chain. Given new understandings, there is a need to incentivise infrastructure creation to meet specific gaps, so as to fulfil the agenda of overall holistic development and integration of activities.

To provide strategic direction for such future development, the instituting of a National Policy for Cold-chain Development is also recommended.