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**Shri Nitin Gadkari**

Minister of Road Transport and Highways of Bharat

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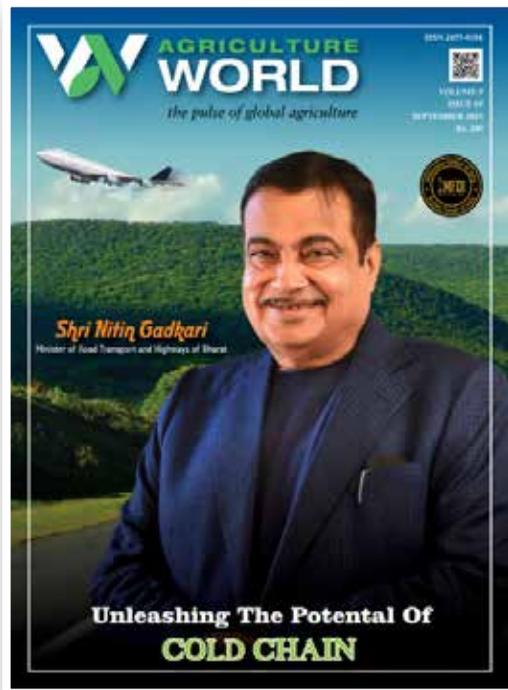
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## Finding The Millionaire Farmers of India – An Exhilarating Journey

The journey to the inaugural edition of the Millionaire Farmer of India Awards is both exhilarating and rewarding. French poet and novelist Victor Hugo famously said that "Nothing is more powerful than an idea whose time has come." These words have never rung truer than in our pursuit of recognizing the remarkable individuals who have been the backbone of our nation's growth - the farmers.

As we progress on this remarkable journey, we are forging ahead alongside agricultural titans and stalwarts hailing from diverse sectors, all of whom share a common vision - to realize the dream of Hon'ble Prime Minister Shri Narendra Modi, who envisions transforming India into a five-trillion-dollar economy. This aspiration has ignited a fire of enthusiasm and determination among those leading the charge in various sectors of our economy.

The Krishi Jagran Millionaire Farmer of India Awards isn't just about celebrating wealth but recognizing the wealth of knowledge, hard work, and innovation that our farmers bring to the table. It's a platform where we pay homage to the toil in our fields, the sweat on our brows, and the dreams in our hearts. It's a testament to the fact that when ideas, dedication, and innovation converge, extraordinary transformations are possible.

In the coming months, we eagerly anticipate the unveiling of these exceptional individuals, whose stories will inspire and drive our nation's progress toward economic prosperity and agricultural sustainability. Stay tuned as we embark on this incredible journey together.

**M C Dominic**  
Founder & Editor-in-Chief

# India's Transformative Journey in G20 Agriculture Initiatives

# Can India's cold chain infrastructure support the fast-growing industry?



India's journey within the G20 has been nothing short of remarkable, particularly in the realm of agriculture. As one of the world's largest agricultural producers, India has made significant strides in shaping the global agricultural discourse through its active participation in G20 meetings and initiatives.



The G20, comprising the world's major economies, has been an ideal platform for India to champion the cause of sustainable agriculture. India's commitment to addressing the challenges facing the sector, such as food security, climate change, and rural development, has been evident through its active involvement in policy dialogues and collaborative efforts.

One of the standout achievements has been India's role in promoting digital agriculture and technology adoption. By sharing best practices and innovative solutions, India has helped bridge the technological divide in agriculture, enhancing productivity and reducing waste.

India's push for inclusive growth in agriculture has been commendable. The country's efforts to ensure that smallholder farmers and marginalized communities have access to resources, finance, and markets have been crucial in advancing global food security goals.

In a world grappling with complex agricultural issues, India's G20 journey in the agriculture sector stands as a testament to its commitment to finding sustainable solutions and collaborating with the international community. As India continues to lead by example, we can look forward to a future where global agriculture becomes more resilient, equitable, and environmentally friendly.

**Shiny Dominic**  
Managing Director



Cold chain industry in India is still at a nascent stage... which means that the potential and opportunities in this domain are galore. As far as Agriculture is concerned, this segment is largely limited to the storage of perishable horticulture produce.

India is the world's largest producer of milk, the second largest producer of fruits and vegetables, and a significant producer of seafood, meat and poultry products. But due to the fledgling cold chain supply, there is heavy loss of foods / agricultural products. The Food & Agriculture Organization has stated that every year about 1.3 billion tonnes of food is lost, amounting to 1/3 of the total food produced. These losses have been estimated to be as high as USD 8 – 15 billion per annum.

In 2021, the Indian cold chain logistics market was valued at \$16 million, and its value is forecasted to reach \$36 million by 2027. This growth is in large part being driven by India's booming food industry which requires significant cold chain infrastructure, including temperature-controlled vehicles, storage and packaging.

Despite being such a crucial aspect of the country's economy, India's cold chain faces several challenges, among the most important ones being establishing the kind of infrastructure required for effective integration at various stages of the chain. Other problems include transportation, the unavailability of proper equipment, frequent power shortages, and a deficit of skilled staff.

**To simply say that cold chain fleet management is important... is underrated!**

Cold chain is among the most promising industries in India's growing economy, with investments in the country's supply chain infrastructure likely to increase year-on-year. At the helm of it all is the adoption of technology in creating a robust cold chain infrastructure. Cold chain is the need of the hour, as it is time the economy curbs the huge losses of perishable foods and medicines that are borne and initiates a robust and efficient cold chain infrastructure.

**Indeed, the way forward for India's complex cold chain infrastructure is powered by innovation!**

**Mamta Jain**  
Group Editor & CEO



Shri Nitin Gadkari with top officials of Tata Motors aboard their Electric Marcopolo

## “ Diversification of agriculture towards energy and power sectors is the need of the country

- ▶ The biggest challenge before the nation at present is to take the contribution of the agriculture sector in the Gross Domestic Product to 22 per cent.
- ▶ With a new thinking under the leadership of Prime Minister Narendra Modi, the farmer will not only be a provider of food but also a provider of energy.
- ▶ Farmers must adopt new technology to boost yields. They must contribute in the production of green hydrogen and ethanol.
- ▶ Diversification of agriculture towards energy and power sectors is the need of the country. There is urgent need for increased production of ethanol.
- ▶ I am telling you the truth, your life cannot be changed by growing wheat, rice, maize and bajra. No matter how much production you produce, the price remains the same.
- ▶ Ethanol is being made from sugarcane, maize, rice, and wheat. Blending of 20 per cent ethanol with petrol has started. Ethanol will not cause pollution.
- ▶ I have asked the Indian Oil Corporation (IOC) to open ethanol pumps in every village because scooters will also run on the ethanol made by the farmers.
- ▶ With increased ethanol use, the money spent on imports will reduce gradually and it will go to the villages and lead to development.

## “ Farmers should shift towards oilseeds cultivation to increase income

- ▶ We are spending one and a half lakh crores of rupees every year to import edible oil. To reduce the dependency on imported oil, the agricultural sector now needs to turn to oilseeds production to increase the income. It is important to be “Aatmanirbhar” in the oil sector. Crops like rice, wheat, sugar are getting lower prices day by day.
- ▶ Farmers should shift towards oilseeds cultivation to increase income.
- ▶ We are at least ten years behind in developing seeds compared to the rest of the world. There is need to increase income by reducing the cost of seeds, fertilizers and fuel for agricultural equipment.
- ▶ Seed cultivation development is necessary for agriculture growth. For rural development, it is necessary to convert knowledge into assets and to create wealth out of waste.
- ▶ India is importing fuel worth sixteen lakh crores of rupees every year. If we can divert at least five lakh crore rupees to the agriculture sector, then it will not take long for our farmers to become Urjaadaata (energy donors) as well as Annadaata (food providers).
- ▶ While the country's sugar requirement is 280 lakh tonnes, sugar production is over 360 lakh tonnes, which is much more than the requirement. Given the situation in Brazil, this surplus production can be utilized. As the demand for ethanol is very high, we have to focus on ethanol production rather than sugar. Last year India's ethanol production capacity was 400 crore litres. We have taken many measures to increase the production of ethanol.
- ▶ Now is the time to plan to meet the demand for ethanol using technologies like power generators that run on bioethanol.
- ▶ Germany has developed the technology to run trains on bio-ethanol. Bio-CNG is much cheaper than CNG. If a tractor runs on Bio-CNG, one lakh rupees will be saved in a year.

# India As Global Food Factory

## Cold Chain Challenges and Opportunities



### Policy Interventions

I appreciate government initiatives like SAMPADA, logistics policy and Krishi UDAN that offer financial incentives and policy support to spur cold chain infrastructure growth. The Krishi UDAN scheme for air transportation of agriculture produce from remote areas needs more traction through streamlining and scaling up implementation.

### Key Recommendations

- Providing additional incentives to attract higher private investments into cold storage infrastructure.
- Formulating location-specific policies targeting underserved production clusters and North-East regions.
- Making certification of cold chain facilities mandatory with enforced standards.
- Launching capacity building programs to create a skilled cold chain workforce.
- Expanding railway reefer services and airport cold chain facilities to improve logistics.
- Designing dedicated lending schemes to facilitate financing for cold chain projects.
- Promoting R&D on cold chain technologies best suited for Indian conditions.

### ABOUT THE AUTHOR

**Mr Satish Lakkaraju** is Senior Vice President and Global Head of Air Freight & Pharma at Wiz Freight

Envision India emerging as the food factory of the world owing to its massive agriculture base, vast farmer community and rapidly expanding food processing industry. India already ranks among the top global producers for several agricultural commodities like cereals, fruits, vegetables, dairy, spices and more. Leveraging its diverse agro-climatic zones, the country can further scale up production across multiple crops to feed the burgeoning world population. The Indian food processing sector is projected to reach \$535 billion by 2025, driven by rising incomes, changing consumer lifestyles and favourable demographics.

The fast-moving consumer goods (FMCG) industry has also witnessed rapid growth in India, expanding its reach into urban and rural markets. The sector is forecast to grow at 9-10% compound annual growth rate over the next 5 years. Increasing availability and penetration of FMCG products in India's hinterlands and villages highlight the tremendous scope for continued growth and expansion in this sector. India has huge potential to emerge as a global leader in food and FMCG if concerted efforts are made to develop a robust supporting ecosystem.

### Cold Chain Infrastructure

Development of cold chain infrastructure remains a critical gap area and poses a major bottleneck for India to realize its potential as a food factory for the world. The limited cold storage capacity leads to wastage of nearly 40% of the fruits and vegetables produced annually in the country. Much of the bulk storage capacity caters to single commodities like potato, onion, grains or milk. Integrated cold chain facilities comprising pack houses, pre-cooling units, distribution hubs and refrigerated transportation fleets remain inadequate.

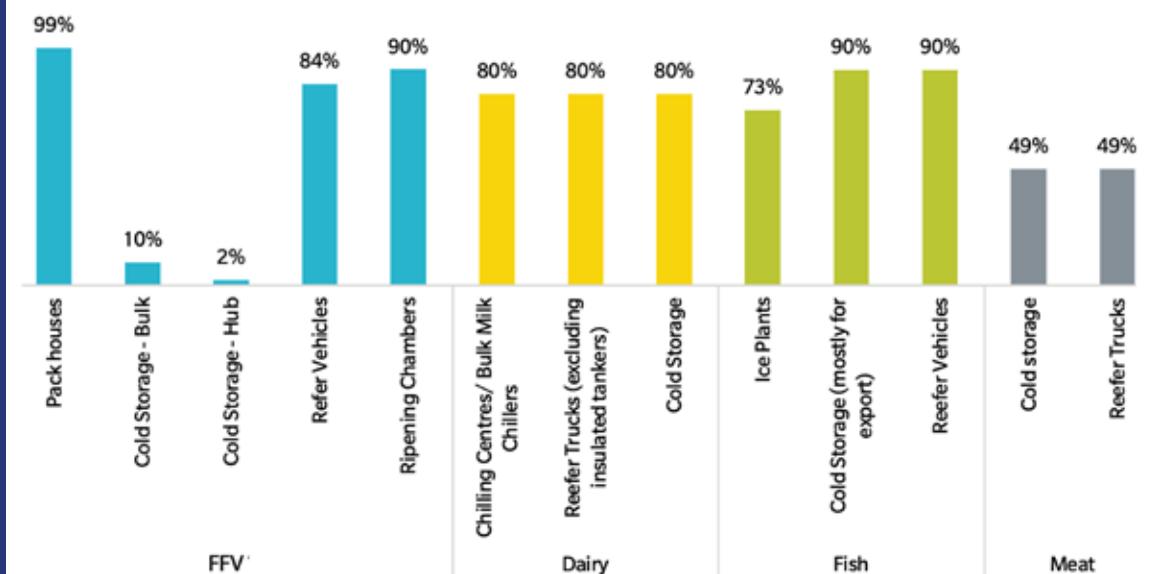
As per industry estimates, only 10-15% of perishable produce in India is transported through cold chain presently. Absence of pack houses and pre-cooling infrastructure at farm gates causes the cold chain to break at the very source. As I have highlighted earlier, huge scope and need exists to invest in pack houses, distribution hubs, refrigerated vehicles and end-to-end supply chain infrastructure to significantly bring down food wastage and improve realization for farmers.

### 2.1. Cold Chain Infrastructure in India

CCI in India largely consists of bulk cold storage, mostly for single commodities like potatoes and grains. There is little awareness of the need for farmgate packhouses (pre-cooling units with cold rooms) or other CCI components, resulting in low deployment and adoption rates. In 2015 the National Centre for Cold Chain Development (NCCD), formed by the Government of India to promote cold chain, identified a gap of 99% in packhouses and 9% in FFV cold storage. At the time of conducting this study in 2020, we found this FFV gap still exists, and analysis also revealed other significant infrastructure gaps at different stages of all four value chains (as shown in Table 2):

Although major CCI gaps exist in the FFV, fish and dairy value chains, the gap for meat is much lower. This is because 90% of this market is informal, whereby meat is consumed at the abattoir level immediately after slaughtering. For FFV, CCI consists mostly of cold storage units for single commodities like potatoes, onions, and grains, while a significant gap exists in packhouses, reefer vehicles and ripening chambers. For dairy, considering the highly organised nature of the market, there is a nearly 80% CCI gap in CCI components.

CCI Gap Across Value Chains in 2020



### Potential

The large and fast-growing food and FMCG sector offers tremendous growth potential for India, provided an efficient cold chain can be established to deliver safe, nutritious and quality produce to consumers across the country and globally. The rise in food exports also necessitates building integrated cold chains encompassing storage, handling and transportation of perishables. As I have emphasized during my interview on Krishi Jagran, bulk investments need to be made into cold chain infrastructure to substantially reduce wastage as well as fully capitalize on the immense growth opportunities in India's food sector.

### Opportunities in Cold Chain

I see the cold chain logistics sector poised for robust growth at 13-15% CAGR over the next 5 years, driven by rising demand for perishable foods, expansion of organized retail and changing consumer preferences. Significant opportunities exist to expand cold storage capacities near consumption hubs in cities, develop multi-commodity cold chain facilities, deploy pre-cooling units and pack houses at farm gates and modernize refrigerated transportation fleets.

Some emerging areas include ripening chambers, solutions for shelf-life extension of fresh produce, temperature-controlled last mile delivery and traceability systems leveraging IoT. New age business models can be introduced for shared infrastructure, cold chain-as-a-service, carbon-neutral logistics, and aggregation of agri-logistics. Technology integration in the cold chain sector also offers tremendous scope for innovation and cost optimization, as I have highlighted earlier.

### Challenges

While I am optimistic about the promise and potential this sector holds, some critical challenges need focused efforts to address. Massive gaps in cold chain infrastructure lead to heavy

wastage of fresh produce, financial constraints affect viability of projects, and regional imbalance in cold chain development impacts connectivity to production clusters.

As I have emphasized previously, acute shortage of skilled cold chain professionals across technical, engineering and logistics functions affects service quality and efficiency. Lack of uniform technical standards related to warehouse design, protocols, equipment, packaging etc. also impacts integrity of the cold chain. Limited availability of refrigerated transport vehicles and railway reefer services further hampers creation of an end-to-end cold chain.

### India – The Global Food Factory

India has immense potential to emerge as a global food factory due to its agricultural production strengths and rapidly growing food processing industry. However, realizing this potential requires addressing several challenges and building on opportunities.

One of the most important aspects is supporting farmers through encouragement, engagement, education and equipping them with information and tools to significantly contribute to the nation's economy. Alongside, the cold chain logistics sector necessitates policy interventions and investments for infrastructure development, capacity building, resolving supply chain bottlenecks and enabling financing.

With robust government backing and increased public-private participation in areas such as infrastructure, skill training, regulatory reforms and research, India can build a world-class food and FMCG industry. The food processing sector can be an engine of economic growth if systemic issues are resolved through coordinated efforts between policymakers, companies, and farmers.

Estimated CCI Deployment and Requirements in India Across Different Value Chains (2020)

VALUE CHAIN	CCI COMPONENT	REQUIRED (NOS.)	CREATED (NOS.)	GAP (%)
<b>FFV</b>	Packhouses	83,041	675	99%
	Cold Storage - Bulk	6,669	6,026	10%
	Cold Storage - Hub	231	225	2%
	Reefer Vehicles	70,035	11,000	84%
	Ripening Chambers	12,654	1,232	90%
<b>Dairy</b>	Chilling Centres / Bulk Milk Chillers	260,737	52,147	80%
	Reefer Vehicles *	8,733	1,747	80%
	Cold Storage	196	39	80%
<b>Fish</b>	Ice Plants	1,017	272	73%
	Cold Storage**	6,294	624	90%
	Reefer Vehicles	6,104	606	90%
<b>Meat</b>	Cold Storage	37	19	49%
	Reefer Trucks	1,776	910	49%

\*excluding insulated tankers \*\*mostly for export



## Savsol Lubricants: The Key to Longevity and Performance of Your Farm Machinery

As the demand for food production continues to rise, the modern agricultural industry heavily relies on tractors and other farming machinery to increase productivity and efficiency. However, these machines require proper maintenance to operate at their best and last for many years. One crucial aspect of maintaining these machines is using high-quality lubricants, and Savsol Lubricants is among the best manufacturers for the job.

Lubrication is essential for tractors and agricultural machinery because they often operate under extreme conditions such as heavy loads and high-pressure environments. Lubricants such as engine oil, gear oil, hydraulic oils, and greases play a vital role in reducing friction, heat, and wear and tear on these components, ensuring smooth and efficient operation.

Savsol Lubricants has been serving the agricultural sector for many years, providing a wide range of lubricants designed to provide constant protection and extend the service life of farming machinery. Their lubricants are formulated to provide high performance and efficiency, increasing equipment reliability, boosting performance, and improving efficiency. Using Savsol lubricants can result in increased resistance of machinery to heavy loads and high pressure, minimizing downtime and maximizing operational abilities.

Moreover, using Savsol Lubricants can increase equipment

uptime and ensure operational reliability, no matter the weather conditions or terrain. These lubricants have been tested under different weather conditions, and they have proven to provide constant protection, even under extreme temperatures. They are also designed to provide excellent oxidation stability, which means that they can maintain their performance for an extended period, reducing the need for frequent oil changes.

Savsol Lubricants is also environmentally friendly, complying with environmental regulations. Their lubricants are formulated with high-quality base oils and additives that meet or exceed industry standards, ensuring minimal impact on the environment. Furthermore, Savsol Lubricants offers a wide range of lubricants designed to cater to the needs of different types of farming machinery, including engine oils, gear oils, hydraulic oils, and greases.

In conclusion, proper maintenance of tractors and other agricultural machinery is crucial for increasing productivity and efficiency. Using high-quality lubricants such as Savsol Lubricants can significantly enhance the performance, efficiency, and longevity of these machines. Savsol Lubricants is a reputable manufacturer of lubricants, and their products are among the best fit for tractors and other agricultural machinery. To learn more about Savsol and its range of products, please visit their official website at – [www.savsol.com](http://www.savsol.com).



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**Comprehensive  
Range of Tractor  
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# Cold Chain or Cold-Chain

A “green house” is not the same as a “green-house”. The first is a green coloured residential structure, the latter an enclosed and controlled space where plants are grown. The compound word has a meaning that is different, or more specific, than the two separate words.

The similar difference needs to be understood in reference to cold-chain. The concept of “cold-chain” is frequently lost in translation when it is read as two separate nouns as “Cold” and “Chain”. Actually, the cold-chain is not just about the “cold” but refers to the integration of various logistical process that are applied, to maintain multiple parameters, during the pre-conditioning, handling, transport, storage and retail of perishable products. Immediate interpretation of it merely being a chain of refrigeration needs to be corrected.

#### Safeguarding perishable produce

The cold-chain must be understood as the merging of various logistic practices that are done to safeguard perishable produce or goods taken under care, in the post-production phase of its marketing cycle.

Therefore, the National Centre for Cold-chain Development (NCCD), from its inception, insisted on hyphenating the words cold-chain, so as to impress upon its compounded meaning, a definition that includes varied aspects of packaging, atmospheric gases, biology, injury, humidity, traceability, infrastructure, people & product flow, and not just cold temperatures.

In fact, limiting the concept to temperature control alone is detrimental and it can only work when all others aspects are in synch. The integrated cold-chain, a much bandied-about phrase, is also not in reference to unified ownership of associated infrastructure, but the integration of functions through shared procedures, irrespective of asset ownership.

Cold-chain is also not about endless preservation of an item, but about taking special care of the goods as it transits from source to consumption. The activities under transit can be physical movement to a distant destination, or even across a limited period of time for which refrigerated

storage is deployed. Nevertheless, in all cases, the goods under care are perishable and shall not survive in perpetuity, so the priority should always be to connect with demand or the end-user. The safe communication of value that is produced and/or manufactured, from source to destination is the core function of cold-chain.

#### The Technology Components

Cold-chain, requires certain tools or technology components, starting at the post-production aggregation centres; for its transport activity; for temporary storing or cross-docking; and, at the last mile for retail delivery and merchandising. These are the factory-gate cold rooms or pre-cooling pack-houses (depending on the goods being handled); the refrigerated transport (refrigerated containers, vehicles or train); cold stores or refrigerated distribution hubs; small reefer transport and retail outlets including refrigerators for short-term storing.

The process in the cold-chain, therefore, involves a frequent change in custody of the goods, where it is handled by separate entities. This requires the integration of independent activities, such that each actor is guided by the attentive care required by the involved goods. The system-wide procedural integration among the multiple activity segments becomes important to avoid a breach or failure of the system. Such breaches can lead to total loss of saleable value, and in the case of medical goods the harmful loss of potency or lifesaving purpose.

#### Potential For Cold-Chain Yet To Be Unleashed In India

In India, the cold-chain is highly successful and this is evident in the facts that it has the world’s largest supply network of milk and dairy products, is it is among the top exporters of meat and fish, has the most extensive

vaccine delivery network, and sustains the supply of potatoes and apples all throughout the year – albeit these being single harvest crops.

However, the potential for cold-chain is yet to be properly unleashed in our country. Most of the aforesaid are actually the easiest to handle in the cold-chain. They are either homogeneous in character, require no other special attention except temperature maintenance, have a larger temperature range in which they keep safe, have demand-linked metrics for production and supply or have evolved into a closely organised supply chain system. The untapped potential remains in developing somewhat similar methodologies in the case of vegetables and various other fruits. The cold-chain for the horticultural sector is highly underdeveloped and this laggard sector is focused upon, the true potential of cold-chain in India will remain subdued.

#### Cold-Chain In The Horticultural Domain

Unfortunately, the use of cold-chain in the horticultural domain is still understood along lines of the age-old practice of store and sell. The trading mindset that prevails, predominantly remains focused on cross seasonal storage to take advantage of time-based price arbitrage.

Yet, the majority of perishable horticultural produce is not amenable to such long-term storage and is therefore ignored. The horticultural sector requires a far more dynamic cold-chain, that focuses less on storage and more on connectivity between pack-houses at farm-gate and terminal markets. It requires moving away from a network of food storage towards a food delivery network – the true cold-chain.

To promote this paradigm shift, the government had launched a GrAM program to encourage the creation of first-mile aggregation hubs and reefer transport, it ensured GST exemption for the involved services (specifically preconditioning, including transportation and storing), besides other initiatives.

These incentives have lacked the appropriate efforts to disseminate and propagate the improved understanding among budding entrepreneurs, financiers and future cold-chain operators. The untapped horticultural cold-chain sector shall be unleashed – there is no other option – but there

should be no need to wait for this eventuality to incrementally evolve. Appropriate efforts can be taken within the ecosystem to target a far quicker transformative development.



**The horticultural sector requires a far more dynamic cold-chain, that focuses less on storage and more on connectivity between pack-houses at farm-gate and terminal markets. It requires moving away from a network of food storage towards a food delivery network**



#### About the Author

**Mr Pawanexh Kohli** was the founding CEO of the National Centre for Cold-chain Development (NCCD), a PPP body established by the government and the Indian private sector, to guide and advise on policies that foster cold-chain development. He also functioned as the Chief Advisor on supply chain and cold-chain logistics to the Department of Agriculture, Cooperation & Farmers’ Welfare from 2012 to 2020

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**F**ounded in 1945, the Mahindra Group is one of the largest and most admired multinational federation of companies, with 2,60,000 employees in over 100 countries. It enjoys a leadership position in farm equipment, utility vehicles, information technology and financial services in India and is the world's largest tractor company by volume. It has a strong presence in renewable energy, agriculture, logistics, hospitality, and real estate.

The new visual identity serves as a hallmark of quality and innovation for customers opting for electric vehicles. It symbolizes a blend of revolutionary engineering, cutting-edge technology, and environmental responsibility, offering a distinct and appealing option for those driven towards a sustainable future. It encapsulates Mahindra's ambition to lead in the electric vehicle revolution, providing a clear and unique value proposition for modern, eco-conscious consumers.

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mahindra <sup>Rise</sup>

### Authentic Design

The design of the Global Pik Up by Mahindra is founded on creating a versatile and multipurpose tool tailored to the modern world. Mahindra's R&D teams and engineers conducted thorough research to gain insights

from diverse countries, shaping the vehicle's design to meet customer preferences. The Global Pik Up has been designed as a versatile, robust, and stylish vehicle, suitable for a wide range of applications. Whether utilized for professional purposes or recreational activities, the Global Pik Up is engineered to perform efficiently.

Characterized by its strong design, the Global Pik Up reflects both resilience and elegance. Its exterior is built to withstand demanding conditions, while its interior offers comfort and ample space.

### Technology to Delight

The Global Pik Up aims to offer unparalleled practicality and features to cater to a wide range of needs. Whether for daily commuting or adventure trips, the vehicle's versatility and capability make it a reliable companion for various purposes. The Global Pik Up has been thoughtfully designed to serve various lifestyle requirements. Engineered for functionality, the Global Pik Up emphasizes both utility and convenience, meeting the needs of a wide range of users.

With safety as a core focus, the Global Pik Up aims to meet global standards, including a 5-Star rating, using advanced safety technologies. The vehicle's convenience and driving experience is elevated through innovative technology features, ensuring that it meets diverse needs without compromising quality or appearance. Mahindra's intelligent 4Xplore four-wheel-drive system further augments the Pik Up capabilities, making it suitable for diverse environments. It adheres to the highest global and local safety standards.

### Go Global Vision

Mahindra's global plan revolves around the Global Pik Up and a range of new products. The initial launch in existing markets, including South Africa, ANZ, Africa MENA & SCA, will mark the first step in strengthening and expanding Mahindra's presence. Subsequently, ASEAN markets will witness the Global Pik Up's introduction, reflecting a phase-wise strategy.

### Mahindra Unveils Its Global Pik Up Concept for International Markets

Mahindra & Mahindra Ltd., a global leader in compact and mid-sized pickups, showcased its new Global Pik Up concept at its signature Futurescape event in Cape Town. The concept represents a well-considered approach to entering newer international markets while strengthening its presence in existing ones with a range of world-class products, beginning with the Global Pik Up.

Based on the Tough & Versatile New Gen Ladder Frame platform, the Global Pik Up promises to be one of the market's most versatile and capable pickups when it goes into production. The new Global Pik Up, crafted with a focus on Toughness, Versatility, and Capability, adheres to contemporary standards of pickup technology and safety. This vehicle represents Mahindra's commitment to providing an authentic experience that combines utility and innovation.

**Mr Veejay Nakra, President** – Automotive Sector, Mahindra & Mahindra Ltd., said, "The new Global Pik Up marks a significant step in Mahindra's Go-Global Strategy. This robust and Tough vehicle, engineered with cutting-edge Technology, is not only Versatile and Capable but also meets high standards of Safety. Our move with the Global Pik Up is poised to not only reinforce our presence in existing markets but also pave the way to new frontiers."

**Mr R Velusamy, President** – Automotive Technology and Product Development, Mahindra & Mahindra Ltd., said, "This Global Pik Up from Mahindra, based on the Tough & Versatile New Gen Ladder Frame platform is engineered to deliver performance, safety, utility, and robust capability. The core principles of this concept lie in crafting a multifaceted vehicle for the contemporary era. We are focused on building a true global pickup that reflects authenticity, with engineering and safety features designed to resonate with the global audience."

**Mr Pratap Bose, Chief Design Officer**, Mahindra & Mahindra Ltd., said, "The Global Pik Up's rugged, dependable, and purposeful appearance appeals universally, reflecting a desire for adventure and exploration."

[www.krishijagran.com](http://www.krishijagran.com)

## VISION THAR

Mahindra Electric Automobiles Limited (MEAL), a subsidiary of Mahindra & Mahindra, the pioneer of the SUV segment in India, unveiled the audacious “Vision Thar.e” at its signature Futurescape event in Cape Town, South Africa. The Thar.e is more than an electric evolution of the legendary off-roader; it’s a daring, distinct design transformation that continues to embody the spirit of Mahindra’s authentic SUV.

**Mr Veejay Nakra, President** – Automotive Sector, Mahindra & Mahindra Ltd. said, “Vision Thar.e is a testament to innovation and a pioneering design philosophy that is uniquely Mahindra and distinctively global. Thar.e caters to the adventurer in all of us, craving exploration without compromise. Aligned with the global movement towards responsible consumption, our focus on sustainable materials resonates with the broader shift towards being planet positive, ensuring that Thar.e is both timeless and timely.”

**Mr Pratap Bose, Chief Design Officer, Mahindra & Mahindra Ltd.** said, “Creating Vision Thar.e was about embracing a future that’s bold and innovative. Our design forges a new path, standing as a testament to Mahindra’s commitment to cutting-edge creativity and breakaway thinking. We have maintained the adventurous spirit and off-roading capability that is quintessentially Thar, but we have crafted a unique identity in the world of electric SUVs. This endeavor goes beyond creating another off-roader; it shapes a vision that represents a progressive step in automotive design, without losing sight of where we came from. Thar.e is our declaration of an exciting and responsible future.”

### Unique Elements

The Thar.e’s one-of-a-kind modular construction and adaptable components position it as a standout in the electric SUV field. This robust design philosophy aligns with the SUV’s timeless appeal and confident presence, suited for any terrain.

### Design – Key Features

**New Path in Design:** Thar.e’s design forges its own innovative and distinctive trail. Yet it remains an authentic off-road SUV, maintaining the tenacity and exploration spirit of the brand.

**Exterior Design:** The Thar.e exterior crafts a unique, formidable, and fresh vision. The crisp, geometric surfaces embody the robust ‘explore the impossible’ ethos, while innovative features like near-vertical windows maximize space and create a commanding presence.

**Interior Design:** The interior blends minimalism with functionality, focusing on the essentials of off-road driving. Elements like a central pivoting screen, robust grab handles, and an uncluttered layout emphasize Thar.e’s practicality for both urban and off-road adventurers.

**Sustainable Composition:** With fabrics made of 50% recycled PET and a commitment to uncoated recyclable plastics, Thar.e aligns with a philosophy where simplicity serves sustainability.



Mahindra OJA set to Transform Farming in India, with the launch of 7 Revolutionary Lightweight 4WD Tractors

### Built Tough in India, for India & the World

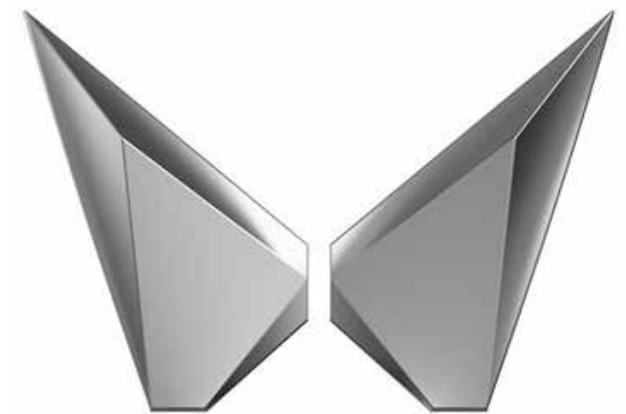
Mahindra Tractors, a part of the Mahindra Group and the world’s largest tractor manufacturer by volume, launched its much-anticipated, future-ready range of tractors – the Mahindra OJA – at Futurescape, an event held in Cape Town, South Africa.

Derived from the Sanskrit word “Ojas”, meaning Powerhouse of Energy, OJA is Mahindra’s most ambitious global lightweight tractor platform. Developed in collaboration between the engineering teams of Mahindra Research Valley, India, the R&D centre for Mahindra AFS and Mitsubishi Mahindra Agriculture Machinery, Japan, at an investment of INR 1200 crore, the new OJA range brings about a transformative shift in Light Weight 4WD Tractor design and engineering, to deliver cutting-edge innovation in tractor technology.

In Cape Town, Mahindra unveiled new tractors on 3 OJA platforms – the Sub Compact, Compact and Small Utility platforms, addressing diverse market needs. With 4WD as standard, Mahindra launched 7 new tractor models for the Indian market on the Compact and Small Utility platforms. These models range from 20HP – 40HP (14.91kW – 29.82kW), for a wide array of applications, for unparalleled platform versatility and efficiency to handle diverse agricultural tasks.

After kickstarting its exciting journey in India, the OJA range will subsequently be launched in North America, ASEAN, Brazil, Australia, South Africa, Europe and the SAARC region. Mahindra will also mark its debut in the ASEAN region starting with Thailand in 2024.

Speaking on the launch of the new OJA tractor range, Mr. Hemant Sikka, President – Farm Equipment Sector, Mahindra & Mahindra said, “The new OJA range of lightweight tractors is a



S P O R T  
U T I L I T Y  
V E H I C L E S

powerhouse of energy, aimed at progressive farmers. Embodied with innovation and technology, OJA tractors empower Mahindra to address 25% of the Global Tractor industry, while opening new markets like Europe and ASEAN. Unveiling 7 agile Lightweight 4WD Tractors Light Weight 4WD OJA tractors (21-40HP) in India, equipped with pioneering technologies, truly embodies our commitment to revolutionize farming worldwide.”

Further talking about OJA’s launch plans for India, Mr. Vikram Wagh, CEO, Farm Division, Mahindra & Mahindra Ltd. said “The OJA tractor range introduces a paradigm shift in Indian agriculture. With 4WD capabilities as standard, pioneering automation controls amplify precision and performance across the range. Reducing operator effort and elevating farm productivity enables us to further embrace fast growing segments like horticulture and grape farming to redefine mechanized farming. Featuring three advanced technology packs – PROJA, MYOJA, and ROBOJA – we proudly present OJA as India’s global innovation.”

Alongside the introduction of the OJA range, Mahindra will enhance its network of over 1100 channel partners, to enhance customer experience.

### MADE IN INDIA, FOR THE WORLD

The Mahindra Oja tractor range will be exclusively manufactured at Mahindra’s state-of-the-art tractor facility in Zaheerabad, Telangana, one of India’s largest and most advanced tractor manufacturing plants. A vertically integrated tractor facility, this facility rolls-out Mahindra’s wide range of tractors.



#### ABOUT THE AUTHOR

**Mr Devendra Gupta** is CEO,  
Ecozen Solutions Pvt. Ltd.



# Unleashing The Power Of The Cold Chain



Unleashing the cold chain and building a brand around cold chain enabled produce can make Indian agriculture a provider for the world and address the growing concern around food security globally

**W**hen we speak about the cold chain in an Indian context our minds are automatically drawn to the large cold storage facilities, which are over 8,000 in number with a total capacity of over 375 lakh MT. Cold chain in India so far has been limited to larger cold storage being used for managing the distribution of commodities or doing longer-term storage for time arbitrage; 70-80% of investments have been on this front.

These are cold stores and they form a part of the cold chain but are not 'the cold chain'. This distinction is important, and while there have been significant investments in the creation of cold storage capacity, more focus needs to be brought to the cold chain. An integrated cold chain ensures proper handling at the farm gate, cold stores and during transport.

An effective cold chain increases the shelf life, reduces loss, improves produce quality delivered and increases market reach. Leveraging these benefits can increase farm income, prevent food loss and make countries hubs for perishable products, like Iran for Kiwis and USA (Florida) for cherries.

#### Impact of access to cooling technology and integrated cold chain at farmgate

In our work with strawberry growers in Maharashtra, we saw first-hand the impact that access to cooling technology at the farmgate and an integrated cold chain can have. Growers in the region using our decentralised cold rooms pre-programmed with strawberry-specific post-harvest pre-cooling and storage parameters were able to reach markets that are 5 times further away as compared to when they had no access to a cold chain. Our farmgate solar cold rooms (Ecofrost), also reduced up to 30% loss and allowed them to hold produce and sell only when the price was right, both of which increased farm income. Also, on a retail level, the retailers have an average loss of 25%. We also saw that due to the right post-harvest intervention this was brought down to 6%. The cold chain based produce on its second day was fresher than the market produce on its first day.

While the cold chain drove tremendous value for the strawberry growers in Maharashtra, owing to the higher end-consumer

price, many other commodities struggle with justifying the cold chain infrastructure cost on a per kg basis. Coriander is one such commodity. However, when we worked with coriander farmers in Karnataka, we found that coriander when sent by flight from Bangalore to Delhi landed at INR130/kg, whereas through the cold chain it landed at INR80/kg. However, this phenomenon exists for just three months and accounts for less than 5% of the national coriander volume.

#### Efficient Cold Chain Management

Hence we come to the question of ‘how do we scale up the cold chain in India?’ The key lies in both consumer and retailer perception. Consumers currently associate produce that is shipped through a cold chain to be of inferior quality, lacking nutritional value and not being fresh.

The primary reason for this is that they draw a parallel between the cold chain, cold storage and frozen foods. In reality, produce shipped through an integrated cold consisting of decentralised (off-grid) farm gate cooling solutions, pack houses, cold stores and reefer trucks are fresher, more nutritious, crispier and better-tasting food.

Retailers in most cases are not aware of the operational, food loss and commercial efficiencies that build with the cold chain. With the proper PHM guidelines being followed through an integrated cold chain, they can stock their shelves with produce that will stay fresher longer, ensuring they have more time to sell.

With the reduction in loss, demand can be met without stiff supply-side competition, and with both these benefits, the retailers can earn more from their produce. Retailers can get an 8% benefit due to a reduction in loss of moisture, an 8% benefit by sourcing in higher volumes due to better negotiations, economies of scale on the logistics front and a 6% premium from the consumer for the fresher produces being supplied by them.

#### Managing Perceptions

We ran a controlled pilot to test out the benefit the retailers get from customers by supplying cold chain enabled produce. Initially, we were met with resistance as the retailers were not willing to cover the extra cost of the cold chain which ranged from INR1-5/kg depending upon the commodity.

Later when they saw that their customers preferred the cold chain based produce they were ready to even procure the cold chain enabled produce even for a 7-8% premium. This perception of the consumer and retailer once changed can lead to a significant scaling up of the cold chain in India, which transports just 4% of horticultural produce through a cold chain today.

These efficiencies and benefits have been demonstrated by certain commodities; for example, fresh milk. Even when in the cold chain, fresh milk is highly perishable. As Pawanexh Kohli, CEO



“

**An effective cold chain increases the shelf life, reduces loss, improves produce quality delivered and increases market reach. Leveraging these benefits can increase farm income, prevent food loss and make countries hubs for perishable products**

of the National Centre for Cold-chain Development (NCCD), puts it in his article titled Agri-business Opportunities in Cold-chain; “instead of milk cold stores, the dairy cold-chain developed into one that is dynamic enough to allow for daily traffic of that commodity. More so, this sector demonstrated how proper use of cold-chain technology does not make the commodity more expensive, but instead, expands the selling range to capture a wider market, and thereby allows for large commercial scale in operations”.

To proliferate the knowledge and build awareness around the benefits of the cold chain, we work closely with Farmers, FPOs, Foundations and retailers on a daily basis. The information on produce stored, solar energy generated and other operational parameters shared through dashboards on our app ecosystem enables them to make informed decisions and make demand and supply management more efficient.

#### Unlocking The Potential Of Our Agricultural Sector

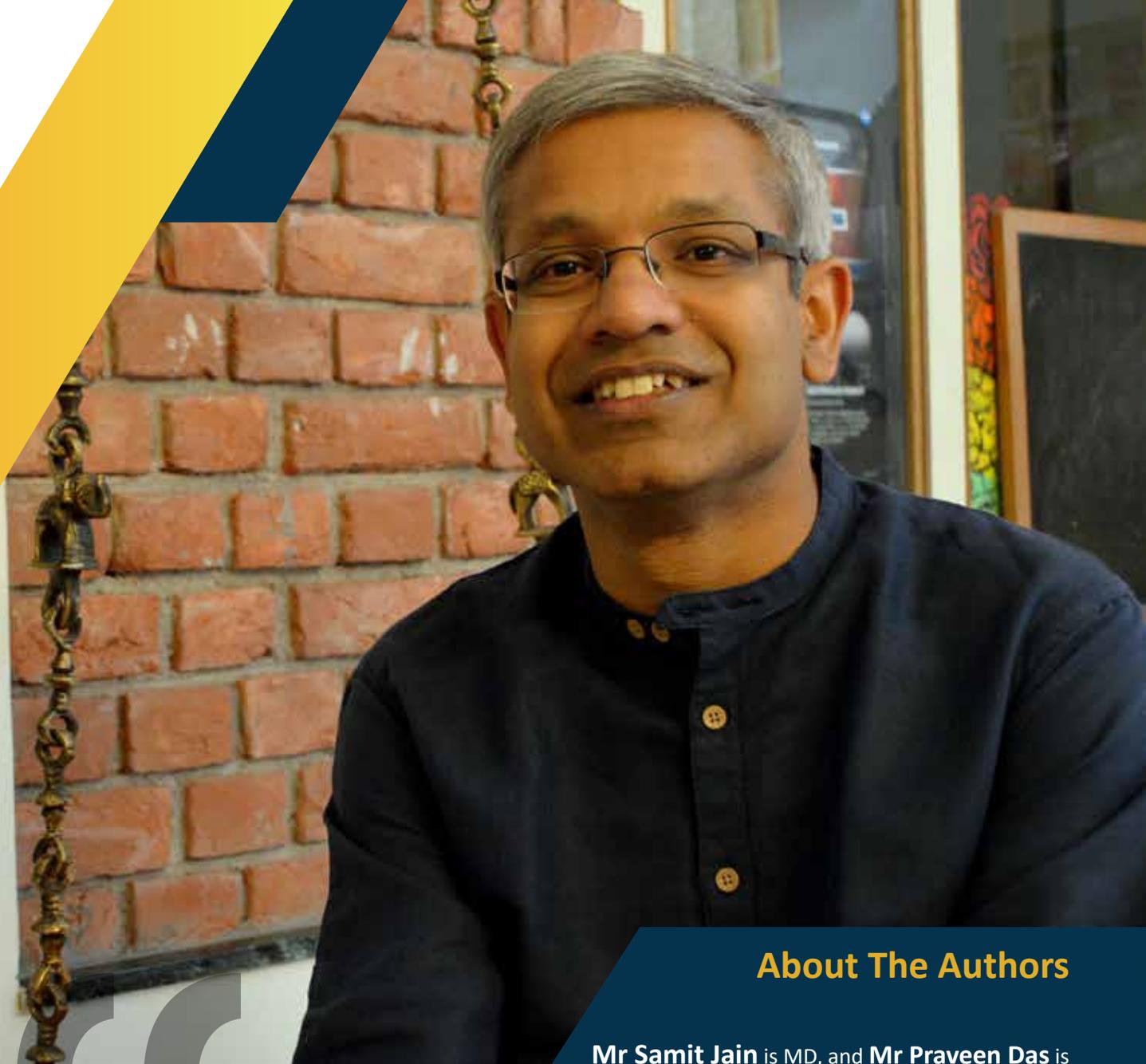
Unleashing the cold chain and building a brand around cold chain enabled produce can make Indian agriculture a provider for the world and address the growing concern around food security globally. It would enable us to unlock the potential of our agricultural sector. Through our market connectivity initiatives, litchis from Bihar and cherries from Himachal Pradesh, through the cold chain, have made their way to homes in Mumbai, Pune and Bangalore, and have boosted farm incomes by up to 30% and reduced food loss by 20%~25%. This impact can be seen in other countries as well. In Kenya, our portable solar cold rooms, Ecofrost, help the local farmers pre-cool and store their mangoes, and avocados at the right temperature and humidity level. This gives the small-holders the much-needed time to aggregate the produce to meet the minimum volume needed for exports. This process has prompted an increase in exports of these mangoes, and avocados with growing interest and demand from European customers.



Phase Change Materials (PCM) offer a promising solution to address the challenges faced by the cold-chain industry in India. These materials have the unique ability to absorb and release thermal energy as they change phases from solid to liquid and vice versa, enabling businesses and farmers to store and transport their perishables effectively and conveniently

## *Revolutionizing India's Agriculture Industry Through Sustainable Technologies*

# The Potential of Advanced Energy Storage Materials



### About The Authors

Mr Samit Jain is MD, and Mr Praveen Das is Head, Food and Agri Division and Pluss Advanced Technologies

As India progresses toward a more sustainable and efficient cold-chain network, and empowering farmers with sustainable technologies, the integration of PCM technology marks a crucial step in ensuring that fresh and nutritious produce reaches consumers' tables while uplifting the lives of farmers and stakeholders along the way

India's agricultural sector is a cornerstone of the nation's economy, contributing significantly to its GDP and providing employment to a vast portion of the population. However, the sector faces numerous challenges, including post-harvest losses due to inadequate cold-chain infrastructure. India is the largest producer of fruits and the second largest producer of vegetables in the world.

Despite that, the per capita availability of fruits and vegetables is low because of post-harvest losses. We can trace most problems relating to the marketing of fruits and vegetables to their perishability. Besides, the quality of a sizable quantity of produce also deteriorates by the time it reaches the retail consumer. The cold-chain industry in India is still at a nascent stage, presenting a vast realm of untapped potential.

#### The Current State of the Cold-Chain Industry in India

According to the 2018 report of the high-level Dalwai Committee, the proportion of produce that farmers cannot sell in the market is 34% for fruits and about 44.6% for vegetables.

India's post-harvest losses amount to nearly 40% of GDP, costing farmers an annual loss of ₹92,651 crores. Currently, India has about 7,129 cold-storage facilities with about 32 million metric tonnes capacity and about 10,000 actively refrigerated vehicles, most of which are operated by small cold-storage and/or transport service providers. In terms of metric tonnage, almost about 60% of the cold-chain area in the country is spread amongst 4 to 5 states within India.

The cold-chain industry in India is characterized by limited infrastructure investments, fragmented distribution approaches, low compliance standards, and a lack of expertise in handling perishable goods. While the demand for high quality agricultural products is on the rise, the inability to maintain consistent and appropriate temperatures during storage and transportation has led to substantial post-harvest losses. This not only affects the livelihoods of farmers but also limits the availability of fresh produce for consumers. The Indian cold chain logistics market was stated to be owned mostly by private players (almost 90%) and was valued at \$16 million in 2021 and is forecasted to reach \$36 million by 2027.

#### Challenges faced by the Cold-chain industry

**Inadequate Infrastructure:** The absence of well-established cold-storage and transportation facilities hampers the industry's ability to maintain the required temperature conditions for various perishable commodities.

**Fragmented Distribution:** The lack of an integrated cold chain network leads to inefficiencies in distribution, increasing the chances of temperature fluctuations during transit.

**Compliance Issues:** Stringent regulatory standards require perishable goods to be stored and transported within specific temperature ranges. Non-compliance can lead to spoilage and loss of product quality.

**Expertise Deficiency:** Handling perishable goods requires specialized knowledge and expertise. The lack of skilled personnel in this domain further hampers the growth of the cold chain industry.

**Energy Consumption:** Traditional refrigeration systems consume a significant amount of energy, resulting in higher operational costs and environmental concerns.

**High fuel costs:** The costs of fuel used for Cold chain solutions are going up day by day causing the average operating costs for businesses to increase.

#### Phase Change Materials (PCM)

A class of energy storage materials, technically also referred to as Phase Change Materials (PCM) offer a promising solution to address the challenges faced by the cold-chain industry in India. These materials have the unique ability to absorb and release thermal energy as they change phases from solid to liquid and vice versa enabling businesses and farmers to store and transport their perishables effectively and conveniently.

This characteristic can be harnessed to create a more effective and efficient cold-chain infrastructure for the agricultural sector. Integrating PCMs into storage containers and transportation vehicles ensures a consistent and optimal temperature environment, preventing spoilage and extending shelf life.

Furthermore, by utilizing PCMs to manage temperature fluctuations, the reliance on energy-intensive refrigeration systems is significantly reduced. This leads to substantial energy savings, making cold-chain infrastructure more environmentally friendly and economically viable.

Various studies carried out by independent agencies and manufacturers of PCMs have demonstrated an energy reduction of 10 to 15%. This will widely reduce the energy requirements as India implements the India Cooling Action Plan. In addition, the CO2 emissions are significantly reduced, thereby enabling both energy transition and contributing towards being Net zero by 2070.

#### Solutions Utilising PCMs For Improving Post-Harvest Losses

Solutions utilising PCMs for improving post-harvest losses are further explained below.

**Portable Cooling Solutions:** These help farmers immediately store their freshly harvested crops and safely transport it at ideal storage temperature to aggregation hubs for further segregation and distribution. These can add value since it would be tough for farmers to enable reefer vehicles and can utilize these box solutions as a cheaper alternative to effectively maintain temperature and keep their perishables fresh. The temperature retention time of these boxes are upto 48 hours for chilled (2°C to 8°C) applications.

**Crop Preservation:** PCMs have enabled off-grid cold rooms that integrate solar energy with thermal energy storage. Cold generated through solar during the day is stored as 'cold' in PCMs and utilized for cooling applications, such as cold-rooms to preserve harvested crops. By maintaining low temperatures during storage, farmers can extend the shelf life of their produce, reduce spoilage, and minimize post-harvest losses, ultimately increasing profitability by mitigating distress selling. These off-grid cold-rooms improve linkages in cold-chain connectivity and will help reduce post-harvest losses. It is able to maintain temperature in the range of 2°C to 8°C for 24 hours by sustainable use of PCM technology.

**3. Food Drying –** It is not just cold that can be stored 365 days of drying power to improve productivity and increasing their value for the product. While preserving the nutritional value, PCM based solar dryers are able to provide consistent drying temperature between 45°C to 55°C even during night-time by storing the heat generated during the day. This will reduce dependence on electric dryers and enable a constant temperature ideal for dried horticulture produce.

#### PCMs Can Revolutionize Agriculture Industry

By addressing the challenges of temperature regulation, multi-temperature storage, energy consumption, and product quality, PCMs have the potential to revolutionize the agriculture industry. This transformation will not only reduce post-harvest losses but also contribute to the overall growth of the agricultural sector and the nation's economy. As India progresses toward a more sustainable and efficient cold-chain network, and empowering farmers with sustainable technologies, the integration of PCM technology marks a crucial step in ensuring that fresh and nutritious produce reaches consumers' tables while uplifting the lives of farmers and stakeholders along the way.



Image: PronGO® solutions from Pluss Advanced Technologies Ltd.



Image: PCM based HimaCool solutions from Pluss Advanced Technologies Ltd.



Image: PCM based Aagun® solar dryer from Pluss Advanced Technologies Ltd.

# Digital literacy for a *Digital World*



**My husband has the phone and I will access it when he gives it to me. I am a member of a Whatsapp group and I check the messages when my husband is home and is in a good mood to give me the phone. I watch the videos shared through the group. They are good. I know that the money for the work I do comes to the phone, but I don't know how to operate that. My husband does all the financial stuff.**

**A woman farmer, Bihar**

## About the Author

**Mr Krishnan Pallasana** is the Managing Director India for Digital Green, a social enterprise that uses technology and data for small and marginal farmers to enhance their income and strengthen resilience

In recent times, digital technology has impacted the human civilisations in ways unfathomed before. Digitalization has become an essential as well as integral part of our daily lives, redefining the way we communicate, interact, transact, entertain ourselves and seek information. We are currently witnessing a rapid civilisational shift influenced by technology, from conventional methods to digital platforms. Digital is no more a mere option, but an essential imperative to survive and thrive in the society.

In July 2015, Honourable Prime Minister Narendra Modi launched an ambitious and forward-thinking program called Digital India – with clearly laid out targets including broadband connectivity, public access points as well as job creation with a major focus on connecting rural areas to the internet. Digital India seeks to expand India's digital infrastructure so that every citizen has access to the Internet and knows how to use it. Three core goals are: creating infrastructure, delivering services digitally and increasing digital literacy.

India has over 650 million smart phone users and is expected to cross 1 billion by 2026. Under Bharatnet project, close to 200,000 Gram Panchayats have been covered with required infrastructure for broadband connectivity. While infrastructure, technology and digital applications are in abundance, success and impact of Digital India will depend on digital literacy among citizens, particularly in rural India.

While two thirds of India's households have now access to smart phone, it is estimated that only less than 40% of the households are digitally literate. This means digital literacy is growing at a lesser pace compared to access to technology and data services, an anomaly that needs to be corrected through targeted interventions. To specifically address the digital literacy gap in India, Pradhan Mantri Gramin Digital Saksharta Abhiyan was approved by Union Cabinet in February 2017 with a target to cover 6 crore rural households across the country. An impact assessment report on the scheme by Indian Institute of Public Administration (IIPA) concluded that PMGDISHA as a digital literacy programme plays an indispensable part in not only bridging the digital gap in the country but also transforming it into a knowledge economy and society.

### Digital Literacy

Digital literacy is the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital devices and networked technologies for participation in economic and social life (United Nations).

Digital Literacy is thus a combination of both technical and cognitive abilities in

understand and use information and communication technologies to learn, live and work in today's society. The advent of the smart phones, internet and social media has resulted in a shift of digital literacy components from technical skills to vocational and essential life skills. Digital literacy skills continue to develop with the rapid advancements of artificial intelligence, which is rapidly transforming aspects of everyday life such as education, workplaces, and public services.

Despite India running the largest digital literacy programme in the world, digital divide exists, as elsewhere, in various degrees and extending beyond access to technology and infrastructure. This digital literacy divide is apparent and reflects other socio economic paradigms in the society, including gender, social and economic status. The Digital in India 2019 Report by Neilsen revealed that 99.9 per cent of Internet users in the country use a mobile device to access the web. Diffusion of technology as well as digital literacy varies by age, gender, occupation, geography, caste and economic status.

### The Way Forward

For India to reap the fruits of technology advancements, there is a need to rapidly scale the reach as well as quality of digital literacy. While a number of government programs and civil society initiatives are in place, there is a need to relook and refresh our approach to match the emerging needs and aspirations of the society.

Catch them young. Make digital literacy a compulsory part of formal education. While children have higher aptitude to learn digital skills, focus on digital ethics, etiquettes, values, functional skills like finance and commerce to ensure high quality of digital literacy

Get women involved. There are millions of Self Help Groups, a matured social and economic structure that keeps rural engine running. Promote digital literacy through those small groups through curated short and interesting courses. When women see the benefit of digital, they will learn and adopt faster through both self-learning and peer education.

Put safeguards in place. With new technologies, one bad experience will distance the user from the platform. Proliferation of technology has also resulted in proliferation of cybercrime, phishing and organised frauds. Protect genuine digital users from falling prey by strengthening law, regulations and control. Bring faster and easier relief to consumers and their rights.

# Air Cargo

## Enhancing Perishable Efficiency and Sustainability



### About the Author

**Mr Raveen Pinto**  
Vice President - Aviation  
Business, Bengaluru  
International Airport Ltd.



**The demand for air cargo services is projected to increase by 4% to 5% every year for the next ten years. The goal of creating a better temperature-controlled supply chain in India is not just a desire; it is a necessity for development**

The Indian aviation industry has seen remarkable growth in the cargo segment in the last two years, opening new opportunities for domestic and international players. As airports become more connected globally, enhancing the infrastructure and practices for temperature-sensitive cargo transportation becomes even more crucial. A well-established temperature-controlled supply chain is essential for critical industries like agriculture, as it ensures product quality, reduces losses, facilitates global market access, and contributes to economic growth.

India's perishable exports grew by 5% in FY23 compared to FY22. However, there are challenges and potential opportunities in maintaining temperature-controlled cargo operations. The post-harvest losses of fruits and vegetables in air cargo during transit in India are estimated to be 30% to 40%. To reduce these losses and improve the quality and safety of the products, India's cold chain cargo sector needs to evolve into a resilient and efficient ecosystem.

#### Real-Time Tracking And Predictive Analytics

The use of IoT has transformed the temperature monitoring and data analysis of the cargo. Real-time tracking and predictive analytics help the stakeholders prevent temperature deviations and ensure the integrity of sensitive products. Digitisation is

expected to save the air cargo industry \$150 billion by 2030 and automation is expected to create 1.5 million new jobs in the air cargo industry by 2030.

Agencies like APEDA are taking several measures to develop the industries related to the scheduled products for export by providing financial assistance, setting standards and specifications, improving packaging and marketing, and training the industry players.

#### Significant Increase In Cargo Volume

BLR Airport is a leading destination for air cargo of perishable goods in India, thanks to its strategic location, infrastructure, and capabilities. It has grown threefold in cargo volume every decade since 2008 and surpassed pre-Covid levels for two years in a row. With a processing capacity of 715,000 MTPA, BLR Cargo is the largest in South and Central India and aims to reach 1 million MTPA soon. In FY23, BLR Airport handled 53,751 MT of perishable goods, a 3% increase from FY22. It accounts for 27% of India's and 41% of South India's perishable air cargo.

It also exports more poultry and flowers than any other airport in India. BLR Airport connects these perishable goods to over 60 international destinations. Our proactive efforts to enhance air cargo connectivity have resulted in a substantial increase in capacity to various destinations. This progress has had a direct and positive impact on the export of perishable goods. By expanding our cargo network and partnering with leading airlines, we have facilitated the seamless export of these valuable commodities, ensuring their freshness and quality preservation.

#### Connecting all stakeholders

Our cold chain processing capacity at WFS BLR Coolport is 40,000 MTPA and we plan to double it with our partnership with WFSBPL (WFS Bengaluru Pvt Ltd). We will also scale it up as needed to meet the growing demand for perishable exports from BLR Airport. We are optimistic about this segment, and we have invested in an Air Cargo Community System (ACS) that connects all stakeholders in the air cargo supply chain and improves efficiency and reliability.

The demand for air cargo services is projected to increase by 4% to 5% every year for the next ten years. The goal of creating a better temperature-controlled supply chain in India is not just a desire; it is a necessity for development.

At BLR Airport, we are committed to excellence, and we are working with various stakeholders from different sectors, such as government agencies, industry colleagues, and technology allies. We want to create a culture of cooperation, where we can exchange ideas, share knowledge, and solve problems together. By adopting technology, sustainability, partnerships, and capacity development, we can achieve resilience and excellence in the cold chain network.

# Agricultural Supply Chains Overcoming Challenges, Shaping India's Future



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The emergence of organised food retail, the growth in the processed food sector, and the increased need for organic fruits and vegetables are great enablers for developing the Indian cold chain

## ABOUT THE AUTHOR

**Mr Anand Chandra** is the Co-founder and Executive Director for Arya.ag, India's largest integrated Grain Commerce Platform

Cold chains allow the supply of commodities in this condensed world, and technologies that can optimise and streamline cold chain logistics and help provide greater supply chain visibility become growing necessary. Currently, there are 8200 cold storage facilities in India with a combined capacity of 39 million tons. These temperature-controlled refrigerated packaging solutions ensure we preserve the quality of products and adhere to committed temperature ranges as they travel through the supply chain, ensuring that they are fit for use and prevent waste.

### Challenges For Cold Chain Infrastructure

The absence of cold storage across the country due to limited investment in infrastructure and lack of consistent power supply are more significant issues that continue to plague the industry. Most facilities are concentrated in West Bengal, Uttar Pradesh, and Bihar, catering to potato mostly; access to cold storage supply continues to be limited for the rest of the country.

Then come the operational efficiency of the existing and available cold chain storage. The current capacities are being used at 30%, with most storage available for single commodities like potatoes, oranges, etc. Large repositories result in poor utilization. The high costs of real estate and power backup only add to the woes of the unorganized players in the sector. In India, fuel costs account for around 30% of cold storage operating expenses against 10% in the west. Efficiency falls with a lack of training in product handling and compliance with the management of temperature-sensitive products. Additionally, poor quality monitoring and control ensure commodity stability and viability.

However, during the pandemic, we saw an exceptional performance in the cold storage supply chain and derived some key learnings. These learnings can be adopted to unleash the true potential for cold storages in India.

### Unit Economies To Be Worked Out

It's been more than two decades since we have been talking about the development of cold chains and cold storage. Unfortunately, we have not seen significant developments, especially in the creation of cold storage space. While assessing the creation of cold storage space, evaluation is to be done on creating small storage units to make them available far and wide in rural markets, which will create better access to commodities. Compartmentalisation is key to allowing for multi-commodity storage.

### Subsidy Scheme To Be Aligned

The subsidy schemes rolled out are more focused on individuals setting up the infrastructure. It is not an accepted

fact that stand-alone creation of infrastructure is not a recipe of success. The owner who deposits the produce in the cold storage may seek finance against the stocks as it chokes/blocks their working capital. An individual running the cold storage doesn't garner the interest of the Banks / Financial Institutions to lend against the commodities managed by individuals. The Government should relook the subsidy scheme to encourage corporates to participate more, which will help bolster the cold storage infrastructure by giving them a subsidy per unit as given currently to individuals.

### One-Size-Fits-All Approach To Change

Vegetables have a shorter shelf life and leave storage faster. Their churn rates are quicker, too. Fruits have more extended durability and need larger structures. However, fruits and vegetables are often considered together, while both have very different supply chains, churning durations, and storage needs. Designing cold storage in keeping with their needs will benefit us both in cost and quality.

### Innovation

What works in this country is the desi jugaad the last mile supply needs that we design beyond the traditional forms, such as two-wheeler carriers with cooling the unit while on the move using the carrier energy, provide for temperature cooling without a power source while maintaining temperature from 24-48 hours. No matter the form, the critical constant is optimal asset utilisation of accessible, flexible, cost-effective solutions.

### Effective Demand Assessment, Linking The Same To Production

We have witnessed a herd mentality in this country. Price appreciation in one crop creates greed, and most growers then move to that crop in the coming season, leading to a glut in the market and, thus, a fall in prices. We should look at agriculture as our core competency and have a demand-led production, which will first ensure better price utilisation for the grower and also help in creating proper utilisation of the created infrastructure.

While the challenges seem towering given the state of the cold chain in the past decades, there is reason to believe this sector has immense possibility. The emergence of organised food retail, the growth in the processed food sector, and the increased need for organic fruits and vegetables are great enablers for developing the Indian cold chain. During the pandemic, its footprint expanded significantly across the country and is expected to grow at over 20% CAGR by 2025.



## Safeguarding Fruits & Vegetables from Farm to Fork

# Critical Role of Cold Chain Logistics

### ABOUT THE AUTHOR

**Mr Pranav Malik** is Associate Director – Food & FMCG, Gurugram



**Fruits and vegetables should be kept in environments where temperature, air composition and humidity can be kept under control. Ironically fruits and vegetables are harvested and transported to cold storages at high temperatures by vehicles without a cooling system**

In fruit and vegetables, if a suitable environment is created, they continue their vitality activities after they are harvested. Normal weather conditions are also conditions for fruits and vegetables to continue their vital activities. Therefore, they may deteriorate after a short period of time, varying from product to product, when kept in normal weather conditions. In order to prevent this, the environment that allows the activity of life to continue must be changed. The most important factors for fruits and vegetables to continue their vitality activity after harvest are temperature, oxygen in the air and relative humidity level. Therefore, fruits and vegetables; should be kept in environments where temperature, air composition and humidity can be kept under control.

Ironically fruits and vegetables (F&V) are harvested and transported to cold storages at high temperatures by vehicles without a cooling system, especially since the harvest season is the period when high temperature averages occur. Instead of taking the products at these temperatures directly to the storage temperature, it is more appropriate to first cool them in the pre-cooling warehouses and then take them to the temperatures where they will be stored. For this reason, it is necessary to have rooms that can be used for this purpose in fresh fruit and vegetable warehouses.

### Logistics Challenge: Transporting fruits and vegetables

It is worth remembering that failures to maintain the cold chain lead to 13% of the world's food production being wasted every year.

Exposing F&Vs to an appropriate cold chain slows and limits ripening. And that preserves their visual and gustatory quality. And ensures they are fit for sale and consumption.

### External factors that have an impact:

- Temperature
- Humidity
- Light
- Ventilation

### Factors influencing the ripening of a fruit or vegetable

As already stated, there are several types of factors that can impact the premature aging of F&Vs.

### Temperature Control – A Vital Factor

Submitting a fruit or vegetable to a thermal shock can be fatal to it. A thermal shock can cause condensation on the surface of a fruit or vegetable and, in some cases, the development of rot.

A low temperature can slow the metabolism of F&Vs. However, you must be careful not to overexpose them. For temperatures that are too low can have the opposite effect: blackening of the flesh, dulling of the aromas, etc. These symptoms are referred to as “chilling injury”.

### At what temperature should fruit and vegetables be stored?

For guidance, here is a scale of storage temperatures for fruit and vegetables:

**Temperature <0°C:** risk of freezing. A vegetable that contains a lot of water will quickly crystallise. E.g. lettuce, which should never be allowed to come into contact with low-temperature container walls as there would be a risk of the leaves freezing and turning black;

**Temperature between 0°C and +8°C:** risk of disease due to cold;

**Temperature between +8°C and +15°C:** standard temperature range for storing fruit and vegetables;

**Temperature between +18°C and +25°C:** ideal temperature range for ripening;

**Temperature above +28°C:** risk of deterioration and damage to F&Vs;

### Humidity Control

By this we mean the moisture content in the air around the fruit and vegetables. On average, it is necessary to maintain the humidity of the air at around 80%.

### Air Ventilation

Fruit and vegetables give off heat and vegetables and ethylene, a plant hormone that accelerates their ripening. So to avoid peaks and homogenise the temperature, the air has to be renewed by ventilation.



**The harvest season is the period when high temperature averages occur. Instead of taking fruits and vegetables at these temperatures directly to the storage temperature, it is more appropriate to first cool them in the pre-cooling warehouses and then take them to the temperatures where they will be stored**

#### Light

Light is a decisive factor for all tuber and root vegetables that mature underground in the dark. This is why we often see products wrapped in tissue paper to protect them from exposure to the light and therefore potential aging.

#### How should fruit and vegetables be transported?

- Group F&Vs with the same temperature sensitivity together, which require a temperature of between +1°C and +4°C inclusive.
- Separate F&Vs that emit ethylene from those that are sensitive to it to avoid accelerating the phenomenon of climacteric respiration;
- Group F&Vs sensitive to dehydration together, Ensure that your logistics equipment has a humidifier.

#### Critical Impact points grossly ignored as a trade practice

##### Pre-cooling the delivery containers

This is something we systematically advise all our customers to do. Some of them are fortunate enough to be able to store their insulated containers in a temperature-controlled chamber (+4°C or -20°C). This will mean that the air circulating inside the container is already at the right temperature.

#### Lowering the temperature in advance in this way allows you to :

- Limit the heat exchanges;
- Avoid wasting energy on your cold source;
- Extend the use time of your cold source;

A container that is not at the right temperature is a parameter that must be taken into consideration and which will have an impact on the amount of cooling needed for the intended transport time.

#### The right sort of cold for the right length of time

To ensure you have a cost-effective approach to your cold logistics, it is important to always begin with the parameters of your distribution circuit and not your original issue, namely how to keep your goods at a specific temperature. To be able to provide you with the best possible support in this approach, we need to be aware of all the thermal "breaking points" when the cold chain is at risk of being broken. The transit stage very often accounts for 90% of these cases. Only during this phase, you need to be equipped to keep foodstuffs in a secure thermal environment.

#### Important Steps In Transit Phase

- loading/waiting on the dock
- transport
- unloading/waiting on the dock.
- Outside temperature
- Volume to be transported
- Checking temperatures of incoming goods.

#### Action plan: efficient cold chain logistics

Once you have defined your mode of transport and the means of controlling temperatures, you then have to think about the continuity of your cold chain in itself. Different contingency factors influence cold chain logistics for foodstuffs and the calibration of the cold source that will be necessary:

- *Temperature to be maintained:*
- *Sensitivity of the product to be transported:*
- *Estimated time the foodstuffs are in transit:*
- *Equipment available*
- *The external conditions*
- *Delivery frequency:*
- *Warehouse infrastructure*

#### How to convey temperature-sensitive F&V safe and secure from farm to fork

##### Choose Your Mode Of Transport: And Logistics Partner

Today, the fact remains that the most sustainable and flexible solution is to use a standard, i.e. non-refrigerated vehicle, combined with the use of [insulated food containers](#) that maintain the temperature of the products at +2°C/+4°C or -20°C thanks to a passive cold source.

Also having the right logistic partners who have SME as control tower for monitoring and advising /sharing best trade practices that are sustainable and can be customised basis perishable produce being transported will not only minimize the cold chain abuse in the entire process but shall also help in reducing food wastages which is need of the hour looking at dwindling agri land and drastic climatic changes happening erratically across nations.

# Synergy of CSR + ISR = THANK YOU FARMER CLUB

CORPORATE SOCIAL RESPONSIBILITY+ INDIVIDUAL SOCIAL RESPONSIBILITY

किसान की दुनिया दुनिया का किसान

अन्नदाता हम आपके साथ है-धन्यवाद

THANK YOU MY FARMER

AN INITIATIVE TO SUPPORT FARMERS GLOBALLY-RESPECT FOR FARMING

- Let's take a Commitment
- Let's change the way we look at Farmer & Farming
- Farming as a sustainable way of living
- Avoid Wastage of Food - Respect for Farming
- Save Water - Save Electricity - conservation of resources - pass on to farming
- Jai Jawan - Jai Kisan - Jai Jawan Kisan
- Smart Farmer - Successful Farmer
- Support to FPOs (Farmer Producer Organizations )
- Remote Farming - Sunday Farming - Partnership with Farmer
- Farmer Adoption - Village Adoption
- Agri Tourism for Real Time Farming Experience
- Each Employee - Adopt a Farmer
- Corporates Adopt Villages
- Let's bring harmony in Society

**AGRITHON is now FARMTHAN**  
ALL INDIA FARMTHAN Campaign launching soon .. Campaign to connect all stakeholders of Farm Sector across India : Campaign to start from Kashmir to Kanyakumari & Assam to Ahmadabad.. Activity calender and Website launching soon .. Stay connected [info.farmthan@gmail.com](mailto:info.farmthan@gmail.com) / 9390757567

#### WHY NOT AGRO COLONIES ???

Across India we have many colonies for different segments : Say, POSTAL COLONY, BANK COLONY, RAILWAY COLONY, TEACHERS COLONY, JOURNALIST COLONY .. even MLA COLONY and so on & on ...But How many areas across India have AGRO COLONIES ???As a concerned group connected with all stakeholders of farming, we are pushing the idea of AGRO COLONIES - ACROSS INDIA..Concept note, Society Formation Process & Affiliation modalities follows .. stay connected

**AGRI INPUT INDUSTRY EMPLOYEES & STAKEHOLDERS CO-OPERATIVE HOUSE BUILDING WELFARE SOCIETY LTD..**

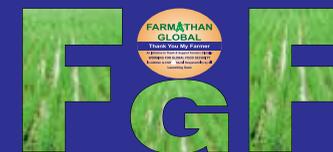
Signature Campaign to Rename **PESTICIDES** As

**PLANT MEDICINES**

LET'S CHANGE THE WAY WORLD LOOKS AT PESTICIDES- AGROCHEMICALS

PERCEPTION MATTERS

RESPECT FOR FARMING  
PLANT MEDICINES FOR  
GLOBAL FOOD SECURITY



**FARMTHAN GLOBAL FOUNDATION**

H.No. 5-35-263, Shakthipuram I.E., Prashanthi Nagar, Kukatpally, HYDERABAD - 500 072.



# Swaraj Unveils New Range Of Tractors To Address Core & Emerging Needs Of Indian Agriculture

**S**waraj Tractors, a rapidly growing brand in the country and a part of Mahindra Group, today introduced the new range of tractors in the 40 to 50 HP category.

Celebrated for its pivotal role in the Green Revolution and for pioneering India's first indigenous tractor, the new range of tractors from Swaraj epitomizes its steadfast dedication to advancing India's agricultural mechanization and addressing the evolving needs of Indian farmers. Poised to bolster the competitiveness of Swaraj's product portfolio, the new range has been launched within India's rapidly expanding and dominant 40-50 HP tractor segment.

With an unwavering commitment to empower farmers and boost agricultural productivity, this range sets new performance standards in this fast-growing segment. The new tractors seamlessly blend power, reliability, and style to conquer even the most challenging conditions with the latest features and technology.

Designed to handle heavy and modern implements with ease, the new range redefines agricultural operations, effortlessly meeting the demands of modern-day agriculture, delivering exceptional power and increased productivity in both existing and emerging applications.

**Mr Hemant Sikka**, President – Farm Equipment Sector, M&M Ltd., commented, "Swaraj brand's resonance in the hearts of Indian farmers is a source of immense pride. Through this new Tractor range, we are offering the latest features and technology to

elevate mechanization in Indian agriculture and empower farmers to achieve higher yields and reduce effort, fostering growth and prosperity."

**Mr Harish Chavan**, CEO – Swaraj Division, M&M Ltd., expressed excitement about the introduction of new tractors. He stated, "With this new tractor range, we are steering the brand into the future, by enhancing its core of Power, Reliability and making it ready for future agriculture mechanisation needs. Beyond performance, this new range emphasizes comfort, versatility for emerging applications and broader customer appeal with its contemporary but authentic styling."

Through this new range, Swaraj has infused modern aesthetics, integrated contemporary design elements, and preserved its brand's authentic timeless design, ushering in a sense of modernity and a new era for the brand. To enhance the brand's appeal to a wider customer base, Swaraj has also roped in its own satisfied customer and legendary cricketer MS Dhoni to endorse the brand, featuring in its new marketing campaign.

The new campaign highlights the superior features of the latest range and underscores the enduring loyalty of Swaraj's customer base.

The new Swaraj range is now available at all Swaraj Dealerships across India, offering excellent value for money. Prices start at Rs 6.9 Lacs for 42 HP (31.3 kW) for the base variant and go up to Rs

9.95 Lacs for 50 HP (37.2 kW) for the top-end model. To support farmers, Swaraj Tractors will also provide attractive financing options, ensuring easy access to the latest Swaraj tractor range.

These tractors come with a six-year warranty, highlighting Swaraj Tractors' unwavering commitment to quality and customer satisfaction, assuring reliability and peace of mind for the farming community.

### USPs of new tractor range

- Higher CC (Cubic Capacity) and higher torque engines
- Enhanced hydraulic lift capacity
- Best-in-segment 6-speed PTO to seamlessly handle heavy and modern farm implements.
- More reliable engine with a 400-hour service interval, a more reliable front axle, and transmission
- Enhanced productivity with the option of multi speed 12+3 transmission IPTO and 4WD available across the product range
- Enhanced comfort with side shift, IPTO, and easy hitch features
- Stylish single-piece bonnet with the latest digital cluster, LED tail lamps, and daylight running options



- Best-in-segment standard warranty of 6 years or 6000 hours

### About Swaraj

Swaraj Tractors, a division of the Mahindra Group, is India's second largest and rapidly growing tractor brand. Established in 1974 and based in Punjab, the grain bowl of India, Swaraj is a brand created 'by the farmer, for farmer', as many of its employees are also farmers themselves. They bring real-world performance to create an authentic, powerful product with assured performance and enduring quality, all designed with one purpose – enabling the Indian farmer to Rise.

Swaraj Tractors manufactures a range of tractors from 15HP to 65HP, providing comprehensive farming solutions and pioneering horticulture mechanization.

### About Mahindra

Founded in 1945, the Mahindra Group is one of the largest and most admired multinational federation of companies with 260,000 employees in over 100 countries. It enjoys a leadership position in farm equipment, utility vehicles, information technology and financial services in India and is the world's largest tractor company by volume. It has a strong presence in renewable energy, agriculture, logistics, hospitality and real estate.

The Mahindra Group has a clear focus on leading ESG globally, enabling rural prosperity and enhancing urban living, with a goal to drive positive change in the lives of communities and stakeholders to enable them to Rise.

#### ABOUT THE AUTHOR

Mr Rohit Sareen is Senior Vice President,  
DeHaat



# Unleashing the Potential of Cold Chain in India



Cold chain has the power to revolutionize the agricultural and food industries in India. By overcoming the challenges and leveraging the opportunities, we can ensure the freshness and quality of perishable goods, boost farmers' income, and enhance food safety and security

India, a country of diverse climates and landscapes is today the largest producer of milk in the world, the second largest producer of fruits and vegetables, and a considerable producer of fish, meat, and poultry products. And while these statistics instil pride, it is disheartening to note that about a third of the entire food produced in the country is lost due to inadequate cold chain conditions. However, with the advent of cold chain logistics, there is great potential to overcome these challenges and revolutionize the Indian agricultural and food industries. The Indian cold chain logistics market is on the rise. And given the massive size of the Indian Agri ecosystem, it is safe to say that the Agri cold chain infrastructure in India is ripe for disruption.

#### Understanding the Cold Chain

The cold chain refers to the series of refrigerated systems, transportation, and storage facilities that are used to maintain the freshness and quality of perishable goods. This includes not only food products such as fruits, vegetables, dairy, and meat but also pharmaceuticals and vaccines. By maintaining a consistent temperature throughout the entire supply chain, the cold chain ensures that these goods reach the consumers in optimal condition.

#### Challenges and Opportunities

India faces several challenges when it comes to the cold chain. One major hurdle is the lack of adequate infrastructure and technology. Many small farmers and producers do not have access to refrigeration facilities, which leads to significant post-harvest losses. Furthermore, the transportation system in India is often unreliable, leading to delays and temperature fluctuations that can affect the quality of perishable goods. Add to this the issues of improper awareness & training among traders, owners and other stakeholders, high cost in setting up cold chain stores and strong seasonal impact and the challenges are accentuated.

However, these challenges also present great opportunities. With rapid advancements in technology, refrigeration equipment has become more affordable and accessible. The Indian government has also recognized the potential of the cold chain and has introduced various initiatives and subsidies to encourage the adoption of refrigeration techniques. This presents a golden opportunity for entrepreneurs and investors to tap into the cold chain market and develop innovative solutions.

#### Boosting Agricultural and Food Industries

The cold chain has the potential to transform India's agricultural and food industries. By maintaining the quality and freshness of perishable goods, farmers can now access distant markets and demand better prices for their produce. This not only improves their livelihoods but also strengthens the overall agricultural sector. Furthermore, with an efficient cold chain in place, food manufacturers and retailers can expand their reach and offer a wider variety of products, catering to the diverse demands of Indian consumers.

#### Ensuring Food Safety and Security

Food safety and security are critical issues in a country like India, where a large population is dependent on the agricultural sector. By implementing a strong cold chain, the risk of food-borne illnesses can be significantly reduced. Proper refrigeration ensures that food products are stored and transported at safe temperatures, minimizing the growth of harmful bacteria and pathogens. This instils confidence in consumers and contributes to overall public health.

#### The Way Forward

To unleash the full potential of the cold chain in India, there needs to be collaboration between the government, private sector, and farmers. The government should invest in the development of cold storage facilities and transportation infrastructure, providing financial support and incentives to small-scale farmers. Private companies should invest in research and development to improve refrigeration technologies and optimize the supply chain. Finally, farmers should be educated on the benefits of the cold chain and provided with training on post-harvest management practices.

Cold chain has the power to revolutionize the agricultural and food industries in India. By overcoming the challenges and leveraging the opportunities, we can ensure the freshness and quality of perishable goods, boost farmers' income, and enhance food safety and security. It is high time that India unleashes the potential of the cold chain and harnesses its power to transform the nation's economy and improve the lives of millions.

# CONSTANTLY FRESH

*The vital role of cargo in transporting perishable goods in India*

“ India is ripe with various perishable goods such as bananas, mangoes, grapes and more, and the demand in places like London for these fresh fruits and vegetables is only continuing to grow



## ABOUT THE AUTHOR

Mr Camilo Garcia Cervera is Chief Sales and Marketing Officer, IAG Cargo

In the ever-evolving landscape of global cargo transport, few sectors are as pivotal as perishable goods. They are an essential market for the airfreight industry and make up roughly 15 percent of total global air cargo.

These items, with their stringent handling demands, lie at the heart of the global economy. In particular with India's rich agricultural heritage, varied landscape and fertile climate, there are an array of fruits and vegetables that need to be transported around the world due to high demand.

This demand for perishable goods is surging due to factors like population growth and changing consumer preferences. In fact, we're seeing year on year growth for transporting food items via our Constant Fresh product from India where we have 56 flights per week to London. Through our expansive network, cargo gains the capability to seamlessly continue its journey across our network spanning six continents.

Moving fresh produce is a huge part of our day-to-day here at IAG Cargo. Every year from India we ship a wide variety of delectable and exotic foods like baby corn, pomegranate ariels, to name a few. We also ship seasonal fruits like mangoes from Mumbai, Delhi, Bangalore to London and fresh fruits and vegetables to Canada.

In order to guarantee that items reach supermarket shelves in the same state as harvest, we offer specialised services with cool and fast vehicles that move perishable commodities between aeroplane holds and the perishable-handling hubs in Madrid and London.

### The Challenges

However, transporting perishables by air doesn't come without its challenges. Preserving product quality and maximising shelf life are the key objectives behind perishable supply chains.

By their very nature, perishable goods are extremely sensitive and our focus at IAG Cargo is always therefore to ensure that we achieve speed and reliability for our customers, whilst at the same time handling their goods with the utmost care.

Depending on the type of commodity travelling, there may be specific temperature requirements that we need to control, or even packaging materials that may be particularly sensitive to physical handling or moisture. Getting all of this right means working

extremely closely with our customers in aligning our process to best suit their needs, and this is exactly why our Constant Fresh product exists.

The transportation of cargo by air is still the fastest way to transfer goods from one side of the world to the other. It's also safer and more reliable than other modes of transport. A good example is fresh fish – such as fresh salmon and hake – which must be delivered to supermarkets 72 to 84 hours after catch – only air cargo can meet this need for speed.

### Cutting-edge cargo handling facility

Continuing our commitment to delivering top-tier service to our customers, we are delighted to have recently opened New Premia in May 2023 - a cutting-edge cargo handling facility at London Heathrow. New Premia serves as IAG Cargo's new home for handling premium loose shipments, enabling double the amount of cargo to be managed daily.

To accommodate this increase in cargo handling capacity, significant focus has been given to designing bespoke IT systems and systems integration to regulate freight movements and allocations inside the facility. But New Premia isn't just about advanced technology; it's about precision.

The facility has been designed to handle more cargo for customers as efficiently as possible, with 11 new landside doors, meaning even faster engagement for drivers to collect or drop off cargo – perfect for ensuring products arrive on supermarket shelves in pristine condition. Additionally, the temperature-controlled building includes a state-of-the-art Constant Climate Quality Centre (CCQC) for pharmaceuticals, with 29 dedicated cool cells and temperature facilities available from +2°C to +8°C (COL), +15°C to +25°C (CRT) and -20°C (FRO) ensuring sensitive shipments are held in a temperature-controlled environment at all times.

India is ripe with various perishable goods such as bananas, mangoes, grapes and more, and the demand in places like London for these fresh fruits and vegetables is only continuing to grow. With the development and use of cold chain technology, alongside IAG Cargo's long-standing expertise in transporting fresh produce, we are proud to facilitate international trade and provide the best possible service for our customers.

# Cold Chain Sector

## The Roadmap

The cold chain business in India is experiencing rapid growth and is expected to reach 4,500 Bn rupees by 2029, with a compound annual growth rate (CAGR) of 13% to 15% over the next five years. This growth presents both opportunities and challenges for the industry.

### Lack Of Post-Harvest Storage Infrastructure

India is the second largest producer of fruits and vegetables, annually producing around 85+ million tonnes of fruits and 125+ million tonnes of vegetables. However, a significant portion of this produce, valued at an annual 8.3 billion USD, perishes before reaching consumers. This is primarily due to a lack of post-harvest storage infrastructure.

The challenges in the cold chain industry in India can be categorized into four main areas. Firstly, there is a disproportionate distribution of cold storages. The market is divided into cold storages and refrigerated transportation.

Currently, the cold storage business dominates the market share, indicating an imbalance in cold storage infrastructure. Regions such as the eastern, northeastern, and southeastern parts of the country have weaker availability of cold storage facilities.

As a result, approximately 22% of fruits and vegetables in India perish annually due to the lack of post-harvest storage infrastructure. To address this issue, government bodies should encourage local investors to build cold storage infrastructure in these weaker areas.

### Irregular Fulfillment Of Refrigerated Transportation

Secondly, there is an issue of irregular fulfillment of refrigerated transportation. The shortage of refrigerated trucks is primarily attributed to high capital expenditure and seasonality factors in the cold chain industry. The demand for refrigerated trucks, such as during the peak season for ice cream from March to July, leads to a shortage of available trucks for other sectors like pharmaceuticals, processed food, fruits, vegetables, and floriculture.

Conversely, these same trucks are underutilized during the rest of the year. To alleviate this problem, service providers should

network and share their excess capacity or trucks. Additionally, the government should consider adjusting subsidies based on investments and streamline the approval process for subsidies.

### Need For Better Highways, Connected Roads

Thirdly, there is a need for better highways and connected roads. While the National Highways Authority of India (NHAI) has made significant progress in creating and maintaining highways and connected roads, there is still room for improvement, particularly in connecting the maximum number of highways with intersecting cities and towns. Greater efforts should be made by the government to create highways and develop infrastructure in tier 3 and 4 cities.

### Requirement For Uniform Technology Standards

Lastly, there is a requirement for uniform technology standards in the cold chain industry. Initially, cold chain logistics focused on activities like ice harvesting and freezing vegetables, meat, and poultry products.

However, the scope of the cold chain has expanded to include segments like ice creams, fruits and vegetables, processed food, pharmaceuticals, dairy products, floriculture, and even industries like tyre manufacturing that store raw materials in cold storages.

To accommodate a wider range of products under the cold chain umbrella, the industry needs to adopt new technologies and raise awareness. This includes implementing advanced technologies in warehousing and logistical practices, such as reliable power sources, appropriate material handling equipment, multilevel racking cold storages, and cost-efficient refrigeration systems. Additionally, awareness among farmers and stakeholders involved in the cold chain is crucial.

While there have been notable achievements in the field of cold chain logistics in India, it is still in its nascent stage compared to more developed economies. To drive further growth and success, key industry players must invest in advanced technology and strive to improve infrastructure visibility across the nation. Government support in the form of policies and incentives, networking among



To drive further growth, key industry players must invest in advanced technology and improve infrastructure visibility across the nation. Government support is pivotal in the form of policies and incentives, networking among service providers, enhanced subsidies, streamlined approval processes for investments, infrastructure development, and widespread adoption of advanced technologies

service providers, enhanced subsidies and streamlined approval processes for investments, infrastructure development, and the widespread adoption of advanced technologies are pivotal for the continued success and expansion of the cold chain industry in India.

As the industry continues to grow, it holds tremendous potential to not only reduce food wastage but also strengthen the agricultural sector, empower rural communities, and contribute to the overall economic development of the country. With the right strategies and collaborative efforts, the cold chain industry in India can truly thrive and become a global leader in ensuring the seamless and efficient delivery of perishable goods from farm to fork.



### ABOUT THE AUTHOR

Mr K Udyan Kohli is an accomplished professional with a management background and 18 years of experience in the field of cold chain and end-to-end logistics operations. He has successfully driven and managed various aspects of the cold chain industry, contributing to its growth and efficiency

# Ensuring Food Security

India's First Step Towards Global Competitiveness



“

**Better quality food produced in an efficient manner can feed 1.2 billion people and provide better income for 58% of Indians that are into agriculture profession- that's the potential of India's food chain**

The Indian sub-continent is one of the fastest growing economies in the world, which is currently striving to optimise the utilisation of its demographic dividend and geographic expanse amidst the rising issues of pollution and climate change. However, the most critical challenge that the country faces today is - food security which needs to be addressed on priority to support India's growth and development.

Even though India is the second largest in the world in terms of total farm output, over 40 percent of India's total agricultural produce gets wasted due to the lack of proper cold storage facilities.

Better quality food produced in an efficient manner can feed 1.2 billion people and provide better income for 58% of Indians that are into agriculture profession- that's the potential of India's food chain. A growing Indian population needs better quality and increased volume in the food supply which can only be enabled by minimizing the wastage along the food chain. There is significant scope for enhancing the productivity of the cold chain and improving energy efficiency.

#### Cold Chain – The Ground Reality & the Opportunity

Post-Harvest infrastructure is a vital link of the agriculture supply chain to minimize the moisture losses and prevent any biochemical change by keeping the product fresh. Cold chain includes critical post-harvest management practices to prolong shelf life and preserve quality of fruits and vegetables. While cold storages are established in few pack houses, market yards and select airports, the available capacity is substantially low, particularly at the farm level. With the current capacity of cold chain infrastructure, less than 11% of the country's produce can only be stored. To put this in perspective, this leads to a loss of approximately 126 kg of food for each Indian.

According to Danfoss India, it's the shortage of sufficient cold chain infrastructure in the country. With the current rate of agricultural production, our country still requires over 35000 more pack houses, fitted with effective cold storage system. While Cold Chain contributes to the reduction of food loss, it also creates newer avenues for employment for the people at the grassroots as each of the pack houses can employ close to 100 villagers.

To address this, Danfoss' is focussed on the development of food infrastructure in the country. Understanding the fragmented nature of India's cold chain infrastructure, Danfoss has been closely working with the government and industry bodies like CII to collaborate with the FPOs (Farmer Producer Organisations) and improve the efficiency of cold storages to reduce post-harvest losses and thereby double farmers' income. The engagement with farmers at grassroot level is key to building avenues for India to emerge as the 'food factory of the world'.

#### Cold Chain –Game-changer For World's Top Banana Producer

India is the world's largest banana producer. 30% come from the state of Tamil Nadu. But, over the years, Tamil Nadu has lost 30% of its bananas because of insufficient pre- and postharvest methods. Things changed when Danfoss and the Confederation of Indian Industry formed a taskforce and started sharing knowledge and new tech including cold chain with the farmers.

Today, banana farmers' income in Tamil Nadu has increased by 300%, and wastage reduced by almost 20%. And now the Indian bananas are exported by ship to Europe, which marked a new era for the agricultural giant.

For our country to develop its food infrastructure sector effectively, a change of mindset is needed. Despite fivefold growth in agricultural output over the past sixty years, the sector accounts for only 14.9% of GDP. It is therefore critical for all stakeholders involved in the farm-to-fork process to invest in skill development and capacity building in the long run.

Danfoss India provides solutions that help in sustaining the farm-to-fork process, ensuring freshness all along the way with cold chain machinery installations and automation systems that are reliable, cost and energy efficient. From dairy and fishery products to farm produce such as vegetables and fruits, or processed foods such as bakery items, Danfoss' technology for cold storage provides a haven for all food items. Danfoss innovative solutions— such as hot gas defrost systems with two-stage solenoid valves, variable frequency drives, valve stations and system controllers, among others—reduce downtime, lower maintenance costs and operational expenditure to save as much as 15–20% in energy costs when compared to conventional cold stores.

At Danfoss, we believe that we have a huge opportunity to transform the country's agricultural productivity as India is the second largest producer of fruits & vegetables in the world and the largest producer of milk. To capitalise on this potential, industries should take an active role in educating farmers on how they can reduce post-harvest losses, thereby improve their income, and ensure that consumers have access to fresh and healthy food from farm to fork.

#### ABOUT THE AUTHOR

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Country Head, Oceana Minerals

# PM-PRANAM Yojana Can Be A Game Changer

**“The scheme “PM Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth” (PM-Pranam Yojana) has been launched to promote “Alternative Fertilizers”. This is a welcome initiative but we have to be very cautious about the effective execution and propagation of the scheme in true spirits**

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**PM-Pranam Yojana should not only be focused to reduce the subsidy bill but it should also be a trendsetter to inculcate good agricultural practices amongst Indian farmers for optimum production, sustainable agriculture and environmentally friendly practices**

The consumption pattern of any product reveals how the government wants to regulate it and what is in the best interest of the industry. More so in the case of fertilizers, which is governed by The Fertilizer Control (inorganic, organic or mixed) (Control) Order 1985 [FCO] and The Essential Commodity Act 1955. The consumer has either no knowledge or no accessibility to the products required by him. Therefore, to bring any shift in consumer behaviour; policymakers require a fresh mindset and the industry should come forward to achieve it in Amritkal.

There is a need to change the definition of “Fertilizers” and subsequently FCO as it is a culmination of chemical fertilizers. We have promoted various chemical fertilizers to boost agriculture production as plant nutrients with the least consideration for the soil or how to increase the efficacy of chemical fertilizers by lesser consumption – effective utilisation of resources. We have greatly damaged the natural processes of the soil and hampered the natural environmental recycling of nutrients by ignoring the important role of microbes in the soil for better absorption of nutrients by plants.

**Farmer As An Entrepreneur**

Agriculture is a continuous commercial activity of the farmer for the survival of his family; for him, it is not segmented into seeds, fertilizer, agrochemicals etc. Similar to other businesses, the farmer as an entrepreneur has a limitation of funds, he has to manage his farm within available finances along with other contingencies like weather, pest infection etc. The aggression of chemical fertilizers and the concept of immediate yield increase has buried the sustainability of agriculture. Diminishing returns of chemical fertilizers are evident. We should stop calling chemical plant nutrients – a fertilizer.

**The new definition of fertilizers should be:** “Fertilizer - A product which gives nutrition to the plants and rejuvenates the soil”.

While promoting chemical nutrients, we dissociated the soil from the plant. We caused callous negligence for Mother Earth, the environment and the entire ecosystem. We are wasting precious foreign exchange, spending huge tax-payers money, making soil dead, and generating more carbon emissions with stagnated production.

**Objective: To Promote Alternative Fertilizers**

Apart from the above reasons, the Ministry of Chemicals & Fertilizers (MoCF) is irked about the excess use of chemical fertilizer, therefore, a scheme “PM Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth” (PM-Pranam Yojana) has been launched to promote “Alternative Fertilizers”. This is a welcome initiative but we have to be very cautious about the effective execution and propagation of the scheme in true spirits. This scheme should not only be focused to reduce the subsidy bill but it should be a trendsetter to inculcate good agricultural practices amongst Indian farmers for optimum production, sustainable agriculture and environmentally friendly.

The pertinent question is what are alternative fertilizers? How can companies sell good organic fertilizers which cannot be chemically tested, do they fit in FCO? How to implement the scheme and measure deliverables? How to de-addict Indian farmers from excess use of urea and introduce better fertilizers? How to reduce carbon emissions and restore ecological balance?

PM-Pranam Yojana can address all the above-mentioned issues and it can be a big game-changer to set the tenor of reducing fertilizer subsidies and motivating farmers for sustainable agriculture. PM-Pranam yojana can get the best of both worlds; agronomically and financially.

It is envisaged in the scheme that alternative fertilizers will replace subsidized chemical fertilizers and half of the ‘subsidy-saving’ can be utilized in promoting alternative fertilizers. This is an assertive and praiseworthy approach.

It appears that government is keen on promoting Nano-fertilizers to lessen the consumption of Urea, DAP & MOP for a reduction in the subsidy. The success of Nano-fertilizers is not yet established. Maybe they can take care of the nutritional requirement of the plant but what about the other goals like soil revival and restoring the natural processes of the ecosystem? Therefore, the promotion of only Nano-fertilizer will kill the spirit of the scheme.

The best way to curtail the belligerence of chemical fertilizers is to define and promote good alternative fertilizers. Alternate fertilizers have to be designed for different regions to utilize locally available organic and chemical fertilizers to maintain productivity



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and sustainability. The government should not push anything for economic gains without achieving all the objectives.

Before designing a product, we have to understand the major influencers of fertilizer market dynamics; government and industry.

#### **Government- Central & State**

The responsibility of the government is not only to make fertilizer available and implement FCO but the bigger role is to set the direction for the fertilizer industry and farmers. In this Amrit kaal, when reforms are taking place even in The Indian Penal Code of 1860, to do away with outdated colonial rules. FCO 1985 is a strong case for reforms which came into existence when chemical fertilizers were flooding the Indian market. Many amendments have been incorporated in FCO from time to time like Water Soluble Fertilizers, bio-fertilizers, organic fertilizers, bio-stimulants etc. but still, the required emphasis on scientifically promoting other than traditional chemical fertilizers is missing.

Knowing a brief FCO background will help us better understand the factors that shaped the present and will guide us to move forward. To regulate fertilizers, first came The Fertilizer (Movement Control) Order in 1973 under the Essential Commodities Act, when chemical fertilizers came into vogue and the non-availability of chemical fertilizers started becoming a political issue in assemblies and parliament. Subsequently, twelve years later FCO came into reality on 25th September 1985, to regularize other aspects of the fertilizer business-like products, specifications and sampling etc.

Many amendments were made in FCO at the behest of industry both by Indian and MN Companies to include a new product.

This is a rigorous, time-taking and expensive process. Bio and organic fertilizers were included in FCO in 2006 but still couldn't make much mark in the farmers' minds. The reason is FCO has not covered the nuances of bio-fertilizers in the supply chain and lyophilized techniques of biofertilizers were not available. Therefore, re-establishing farmers' trust in good biofertilizers has become harder. The latest inclusion of Bio-stimulants in 2021 has no clarity, on how the government wants to take it forward. The mindset of policymakers for bio/organic fertilizers has to be different from chemicals.

Introducing chemical fertilizers is also an arduous task, take the example of Water-Soluble fertilizers (WSF), the first product in the FCO was "potassium nitrate (13-00-45)" in 1996-97 and subsequently other combinations were added. Till 2014, there were only 16 grades of WSF in FCO and the all-India consumption of WSF was around 80,000 tons. On the other hand, China started using WSF at the same time as India and by 2014 they were consuming around 40 lakh tons.

#### **Two Major Bottlenecks**

**There were two main bottlenecks in India.**

(i) In China, Urea, DAP & MOP are not subsidized therefore, WSF competed with other chemical fertilizers on an equal-level field.

(ii) In 2014 when India was having only 16 grades in the WSF category, China was using more than 1200 grades - WSF blended with amino acids, humic acid, fluvic acid, micronutrients etc., which increases the Nutrient Use Efficiency (NUE) of fertilizers manifold with little extra cost. These combinations are still not permitted in India by FCO.

Biofertilizers are in the FCO, a consortium of lyophilized bacteria that can be mixed with WSF for manifold benefits at little additional cost. WSF with biofertilizers and micronutrients are a very strong contender for PM-Pranam Yojana insofar as NUE and cutting down subsidy of GoI is concerned.

MoCF has to ensure that any amendment in FCO should be communicated to state governments and industry by a webinar so that everyone is on the same page. Otherwise, an amendment takes two-three years to settle down between different states and center, meanwhile, the industry has to suffer.

A recent case is regarding biostimulants, every state is interpreting it differently, prompting officials for unfair practices. Ethically responsible companies cannot operate on a pan-India basis. When good biostimulants are not available, a farmer loses trust in technology. Reestablishing the faith of farmers in the same technology is a herculean task for a new company.

Before identifying the eligible products under PM-Pranam Yojana, policymakers should set aside FCO and should encourage the industry to design a product that is conducive to crop

productivity, soil fertility and the environment. Industry can be permitted for a time-based trial run before the evaluation by Central Fertilizer Committee (CFC). The industry has tremendous research data, they can design wonderful products. This will cut down the time in transferring the technology from lab to field.

#### **Fertilizer Industry**

Indian fertilizer Industry; manufacturers, traders and MNCs are having all the required capabilities and capacities to fulfil any demand in Indian agriculture. The introduction of most of the new fertilizers in FCO is an admirable effort of the industry. Particularly, the private sector is always on the lookout for new products and technologies trending in the global agriculture market. The introduction of a new product requires investment, once the product is in FCO, it's anybody's game. Ethical companies not only face problems from regulatory authorities but major problems come from imposter products. Somehow, these products do not catch the eyes of regulatory authorities. Who will invest in new products?

There is another side to the story. When the government gives flexibility to the industry, it is being misused by the section of the industry, mostly regional players. Let's continue with the same illustration of WSF with two gazette notifications in 2014 & 2015, FCO gave the flexibility to introduce any combination of NPK blended with micronutrients. Unscrupulous manufacturers killed the soul of WSF for price competition, a tough time for guanine products. When the law and order of the state can be set right which deals with hard criminals, how can an offender of the essential commodity can go scot-free?

In the Indian fertilizer industry, most giants with manufacturing and marketing networks are in the coop or public sector. In the last four decades for the very first time, the public sector is aggressively promoting a new product; Nano fertilizers. That hints government's desperation for the fertilizer subsidy and there is nothing wrong with it. Surprisingly, the private sector is not coming forward who are champion in introducing new products. Why?

If we look at the other segments of fertilizers included in FCO are biofertilizers, organic fertilizers and biostimulants. The journey of biofertilizers and organic fertilizers in FCO started together in 2006 indicating the growing concern of government over soil health, recognition of biotechnology and the necessity of carbon content in the soil.

The biggest hurdle in the progress of biofertilizers is the nuances involved in the supply chain to maintain the stability and concentration of microbes up to the point of application. Biofertilizers are living organisms thus more sensitive for production, storage, transport and application.

The lyophilization technique is available to address issues like

stability, shelf-life and a huge reduction in transport and packing costs. To restore the faith of farmers in biotechnology only lyophilized microbes should be allowed to sell at least for some time.

#### **Inclusion of Organic fertilizer in FCO**

The inclusion of Organic fertilizer in FCO was the right move but it lost its track due to a thrust by the urban development ministry as a novel idea to resolve the problems of two ministries. MoCF welcomed the step because of the carbon content in city compost and pushed the fertilizer industry for its sales. Later some value addition was done in city compost and PROM was promoted by adding some cheaper grade of rock phosphate. Technically, the idea was to provide at least one nutrient along with the necessary carbon required by soil. Theoretically, it appears good but adding value without much utility makes no sense. In PROM or city compost, we are compromising the bad of lead for the good of carbon to handle the problem of waste from cities. Later on, we introduce other products in Schedule IV to commercialize the waste generated from other activities, like slurry from the gobar-gas plant and molasses from the sugar mill etc. Schedule IV of FCO of organic fertilizers has become the waste-product management of other industries. We never designed a good organic product from the angle of the nutritional requirement of plants and the rejuvenation of the soil. It would have been better to fortify city compost with lyophilized bio-fertilizers, it will be a synergistic product. We should look at fertilizer as a product, not as a commodity of nutrients.

The government can ask the companies having a certain turnover to suggest good organic fertilizers and permit them to sell under the PM-Pranam yojana, as a special fertilizer. The Indian fertilizer industry has tremendous technical talent backed by research data that they can come up with wonderful products. Grant provisional licenses to the industry for innovative products after the clearance of undesirable elements. Organic fertilizers and their efficacy can't be evaluated like chemical fertilizers.

#### **Evaluating PM-Pranam Yojana**

It has to be seen whether PM-Pranam Yojana is going to be a trendsetter or a trick to cut down subsidies.

It is becoming clearer by the day that chemical fertilizers alone are not a sustainable option for the problem of depletion of soil nutrients as a result of agriculture, particularly crop production. Biofertilizers and Organic fertilizers not only provide nutrients to crops, they also help in restoring soil health and ecological balance. As we discover the power and potential of bio/organic fertilizers, we need to ensure their quality and accessibility.

We hope that the product under PM-Pranam Yojana will address saving in subsidy, productivity, soil health & environmental issues and give the right direction to the farmers.

# A Journey of Growth and Innovation

In a country known for its diverse agricultural produce and rapid industrialization, the cold chain sector is emerging as a pivotal player, ensuring the preservation and efficient distribution of temperature-sensitive goods. The Indian cold supply chain industry has rapidly grown, especially after COVID-19. In 2021, the Indian cold chain logistics market was valued at \$24.62 billion, and it is expected to reach \$53.07 billion by 2027, growing at a compound annual growth rate (CAGR) of 13.66% from 2021 to 2027.

## The Backbone of Perishable Goods

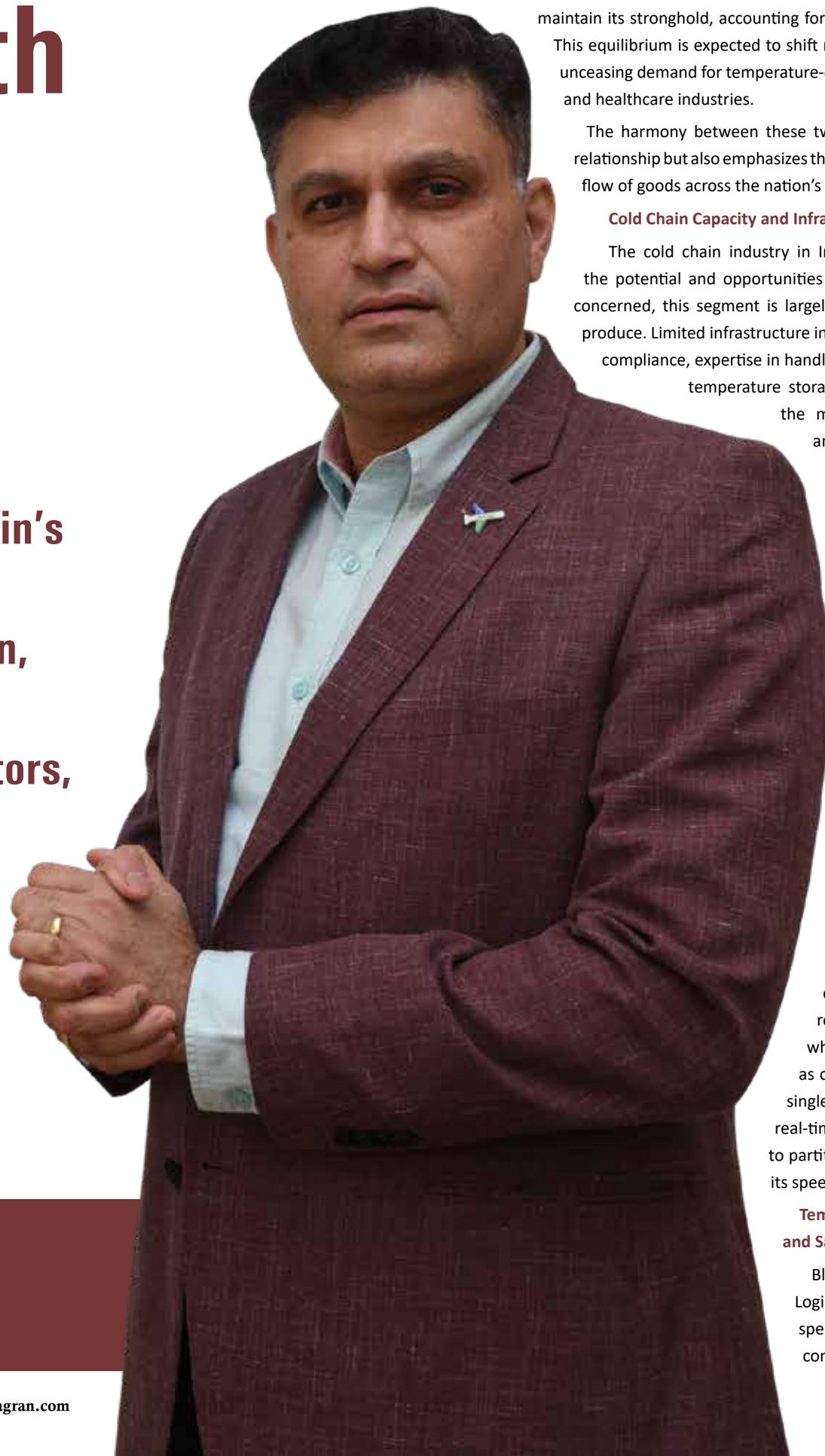
Cold chains, often unseen but undeniably indispensable, provide the critical link between producers and consumers for products that require specific temperature conditions. These chains encompass storage and distribution services tailored to preserve the quality and safety of perishable items. The cold chain sector's growth story is shaped by several key factors. The burgeoning demand for cold storage facilities from the food, healthcare, and retail sectors, coupled with evolving consumer lifestyles and heightened awareness about wellness, serves as a driving force behind the market's expansion. The Indian government's proactive initiatives have also played a pivotal role in advancing the cold chain landscape. Notably, the approval of 27 integrated cold chain development projects under the Pradhan Mantri Kisan SAMPADA Yojana in 2020 underscores the commitment to bolstering this vital infrastructure. However, challenges such as high operating costs and the absence of standardized practices continue to hinder the sector's growth trajectory.

## Segmenting Success: Cold Chain Storage and Logistics

In the grand tapestry of India's cold chain market, two distinct segments stand out: cold chain storage and cold chain logistics. The year 2020 witnessed the cold chain storage segment claiming a significant 44.50% of the total market share. As the calendar turns to 2025, the cold chain storage segment is projected to



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maintain its stronghold, accounting for approximately 44.79% of the overall market share. This equilibrium is expected to shift marginally during the forecast period, fueled by the unceasing demand for temperature-controlled storage and transportation from the retail and healthcare industries.

The harmony between these two segments not only underscores their symbiotic relationship but also emphasizes the integral role they play in ensuring the uninterrupted flow of goods across the nation's vast expanse.

## Cold Chain Capacity and Infrastructure: A Strategic Investment

The cold chain industry in India is still at a nascent stage, which means that the potential and opportunities in this domain are galore. As far as agriculture is concerned, this segment is largely limited to the storage of perishable horticulture produce. Limited infrastructure investments, a fragmented distribution approach, low compliance, expertise in handling perishables, and lack of multi-commodity/multi-temperature storage facilities continue to be a challenge. However, the market is gradually getting better and organised and focus has shifted towards multi-purpose cold storages, which can help reduce the cost incurred in establishing separate cold storage for various kinds of perishables.

Blue Dart, a leader in the express logistics industry, has recognized these challenges and is actively working to transform the Temperature Controlled Logistics landscape in India. Our commitment to excellence and innovative solutions as an express player has positioned us as a key player in unleashing the potential of cold chain infrastructure especially in premium consumption segments in which non-preservative based sustainable consumption is preferred, making consumer want to rely more on organic rather than preservative laced products.

The Government of India pushed for ONDC innovation, which included infrastructure development, such as the creation of a national grid of expressways and a significant increase in overall road infrastructure. The removal of impediments, which had been slowing down surface mobility (such as octroi), coupled with innovations in packaging (from single-use to multi-use), data loggers (from passive to real-time data loggers), and reefer trucks (from single trucks to partitioned trucks), helped the express industry enhance its speed within the cold chain infrastructure.

## Temperature Controlled Logistics (TCL) – For Quality and Safety throughout the supply chain

Blue Dart is a pioneer in Temperature Controlled Logistics (TCL) solutions, addressing crucial sector-specific needs. With specialized infrastructure and a comprehensive service range, we aim to transform the

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**Reduced post-harvest losses for perishable produce, steady availability of goods, remunerative prices for farmers, and affordable access to fresh fruits and vegetables for consumers are among the promises held by an optimized cold chain sector**

handling, storage, and distribution of temperature-sensitive items. Tailored to specific requirements, our Temperature Controlled Solutions come with reliable express distribution, complimentary dry ice top-ups, real-time shipment tracking, regulatory clearance, validation services, and eco-friendly, cost-effective packaging.

By integrating South Asia's top logistics network, these solutions ensure a secure supply chain, safe transport under various temperature conditions using suitable cooling methods, maintaining temperatures ranging from 2 to 8 degrees, 15 to 25 degrees, and dry ice at -80 to -20 degrees for different distribution timelines. We specialize in transporting organic fruits and vegetables under frozen (-20°C to -180°C) or chilled (2°C to 8°C) temperature settings.

**Innovative Infrastructure for Uninterrupted Flow**

The success of a cold chain, crucial for preserving environmentally sensitive products during transit, hinges on an innovative and robust infrastructure. Acting as a bridge between producers and end-users, this system requires careful development of key components. The static infrastructure includes cold stores, pack-houses, and pre-coolers, serving as initial storage points. Complementary to this are mobile elements like reefer vans, trucks, and merchandising carts, ensuring seamless transport and adherence to stringent controls.

Central to the cold chain's efficiency are well-defined handling protocols and design standards that guide every stage of the process. Skilled personnel are indispensable in maintaining product quality and handling. However, the modern cold chain's reach is expanded through collaboration, uniting producers, transporters, regulators, and technology experts. This synergy

optimizes the system's capabilities and global reach. In crafting such an infrastructure, uninterrupted product flow is ensured. By intertwining static and mobile elements, adhering to protocols, harnessing skilled personnel, and fostering collaborations, the cold chain seamlessly delivers sensitive products, meeting global market demands and upholding uncompromising quality.

**Collaboration for Unprecedented Reach**

Leveraging Blockchain, data analytics, and IoT presents promising solutions for surmounting challenges within conventional cold supply chains. The transition to paperless procedures, such as e-bills and digital customs clearances, amplifies the swiftness of consignment movement. Real-time updates, accessible through applications or web-based dashboards, imbue transparency and foster customer satisfaction. The infusion of AI, Robotics, and IoT into cold storage bolsters operational efficiency. Integrating these technologies with existing Warehouse Management Systems (WMS) facilitates real-time temperature oversight, energy optimization, and seamless operations.

The complexity of last-mile deliveries, encompassing temperature control and tracking insufficiencies, can be combated through AI, robotics, drones, and compact reefer vehicles. Further enhancement is realized through the integration of self-driving vehicles. Blue Dart, a part of DHL Group's DHL eCommerce division, gains access to an expansive global network encompassing over 220 countries and territories, offering comprehensive distribution services. To realize optimum cold supply chain efficiency, strategic technology adoption plays a pivotal role. Integration is achieved through big data, predictive analysis, and AI-powered planning for shipments and demand projection. Streamlining shipments based on route optimization ensures punctual, cost-efficient, and temperature-regulated deliveries, ultimately forging an uninterrupted, value-enriched cold chain.

**A Glimpse into the Future**

As India marches confidently towards its cold-chain future, the implications are far-reaching. Reduced post-harvest losses for perishable produce, steady availability of goods, remunerative prices for farmers, and affordable access to fresh fruits and vegetables for consumers are among the promises held by an optimized cold chain sector.

The journey towards unleashing the potential of the cold chain in India is characterized by collaboration, innovation, and a shared vision for progress. With the projected market growth and the National Centre for Cold-Chain Development (NCCD's) steadfast commitment to excellence, the cold chain landscape is set to be a vital conduit in the nation's agricultural and economic prosperity. As the cold chain sector embraces technological advancements, standardized practices, and holistic development, it is poised to shape a future where quality, efficiency, and sustainability converge in perfect harmony.

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# Cold Chain Is The Future



**An estimated 14% of all food produced for human consumption becomes unfit to eat before it reaches the consumer: United Nations Environment Program (UNEP)**

## ABOUT THE AUTHOR

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**F**ood cold chains are potentially equipped to feed a surplus of 2 billion population by 2050 and engage the rural community's cohesion while preventing greenhouse gas emissions. In 2022, the global market size of cold chain logistics was USD 373783.48 million and is expected to increase at a CAGR of 15.14% to reach USD 871060.99 million by 2028.

### Challenges Faced By Indian Agriculture

India depends heavily on monsoon-dependent agriculture to feed its ever-growing population. However, due to climate change, the Indian agriculture sector witnessed an exit of around 25 million people between 2000 and 2019. Also, the post-harvest losses (PHL) in Indian markets from durables are close to 10%, semi-perishables and commodities (milk, fish, meat, eggs, fruits, and vegetables) are between 10 to 20%, and horticultural produce hovers at around 16%.

These losses, according to the estimate equal USD 8 - 15 billion per annum. Further, hunger is a serious problem in India as evidenced by Global Hunger Index (GHI). To sustain this growing population, India needs not only to ramp up its food production but at the same time minimize food loss to a considerable amount.

This is achieved through efficient storage and transportation of perishable food via a food cold chain. Also, it has the potential to boost incomes, and job creation, and thus, foster economic progress.

Moreover, other than agro-industries, the pharma industry is also at the core, which depends heavily on a cold supply chain network. In 2022, the Indian cold chain market value is estimated at USD 20.18 million, which is expected to reach USD 45 million by 2028 with a CAGR of 14.3%. Thus, in the context of India, the food cold chain market has a bright future.

### Higher Demand Pushing Growth

Presently, the Indian cold chain market is dominated by the cold chain storage segment, and among industries, the private sector is leading followed by the cooperative and public sector. The growing organized food retail and a rise in the production and consumption of perishable food products are the major drivers of the Indian cold chain market.

Another factor is the rising middle-income group, which demands products of optimum quality and thus, entails cold chain requirements. Sensing the importance, the government improvised suitable policies in tandem with the intent to establish mega food parks so that a favorable ecosystem can be created to boost the cold chain industry. Presently, the Indian view of a cold-supply chain is at the very initial stage. However, in the coming days, its transformation into the cold chain warehousing and logistics industry is very certain.

### Major Challenges

In rural regions, high electricity costs and common outages restrict the arrival, absorption, and effective utilization of cold storage technologies. In general, they require diesel-powered

## AREAS OF CONCERN

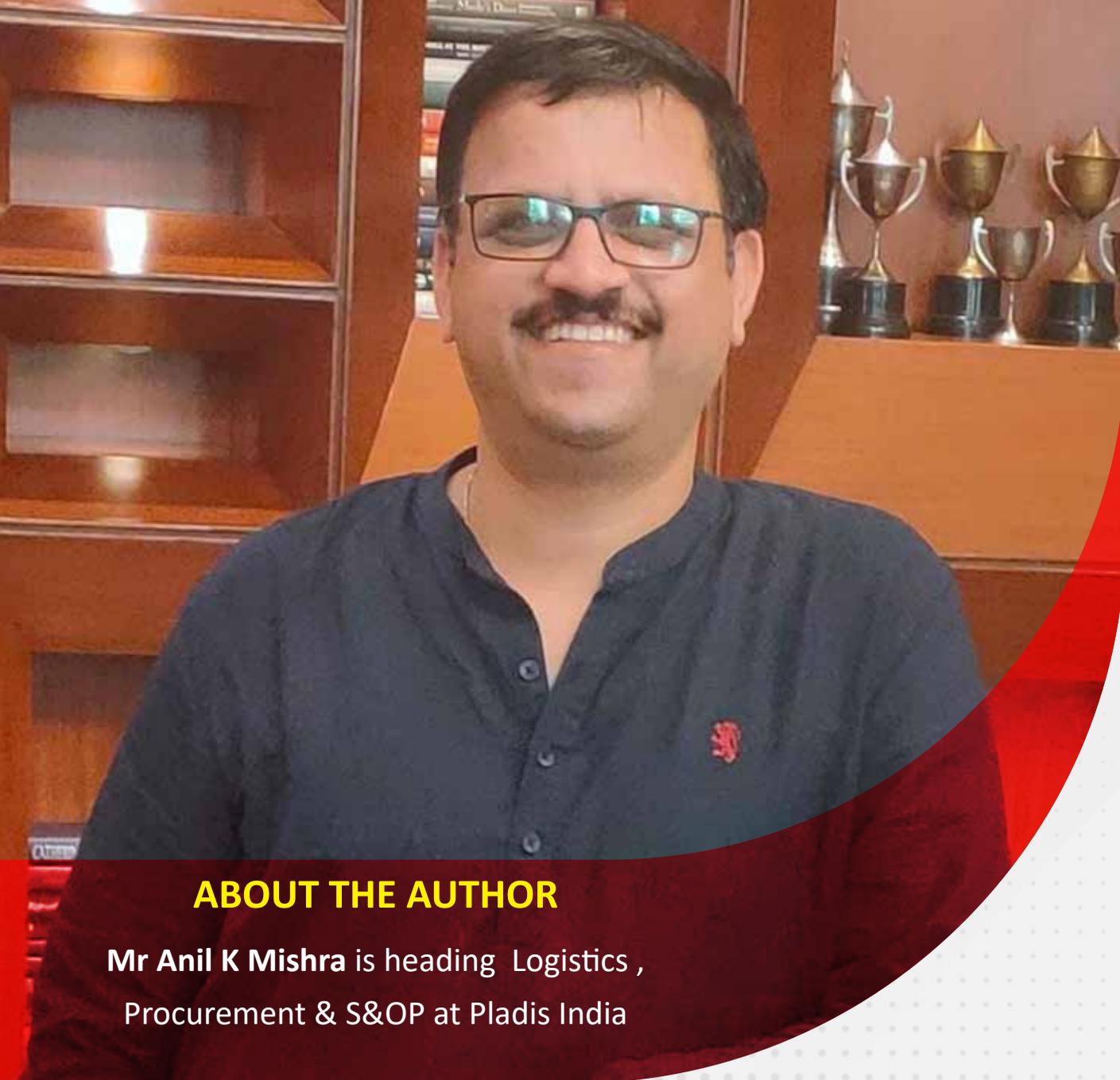
- ▶ How does off-grid cold chain entrée to rural areas contribute to lowering the post-harvest losses (PHL) for budding agro-industries and their supplying small farmers?
- ▶ Is the agro-industries and their supplying small farmers get benefited by enabling certified, budding modular cold storage and food-processing facilities and finding their entry to higher-value markets?
- ▶ Lastly, smart, energy-efficient, and green cold storage technologies are excellent to transform the agri-food system (e.g., horticulture, dairy, livestock, fisheries, etc.). Additionally, it can support climate change goals - in terms of improving adaptation through flexibility as well as lowering greenhouse gas emissions. However, awareness among financial institutions is required so that they convinced and support funding to smart, energy-efficient, and green cold storage technologies.

generators as an energy source which ends in high operational costs and pollution. Thus, the supply of continuous power at a lower price in a rural region poses a considerable challenge for the cold chain. The application of renewable energy sources to power cold storage at improved energy efficiency is a promising solution and fits in the carbon-neutral framework of the government of India. However, to realize this, a framework is required to facilitate the transition from established energy sources to new ones and to revamp their efficiency. Also, it needs awareness, competencies, knowledge, and private-sector involvement.

2) Sluggish and hesitation in adopting digitalization and contemporary business practices is another challenge that limits the adoption of cold chains. For example, irrespective of the government of India's steps to digitalize payments and increase small farmer income, their purchasing capacity and proportion to utilize digital is very limited. They sell for domestic production with an over-reliability on cash at the farm direct, broker, and produce market levels, resulting in inadequacies due to manual practices and instituting security concerns.

3) Insufficient information among end users and main players (financial institutions) has limited growth. In India, most farmers and agricultural holdings are small and scattered. They are ignorant about smart cold storage systems and their potential in lowering post-harvest losses and preserving food production. Also, knowledgeable farmers are limited by the reliable vendors to supply cold storage equipment, and alternative energy solutions (solar power). Moreover, financial institutions lack contemporary knowledge of smart cold storage technology and its business potential.

# Blueprint for Cold Chain Development



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**Ensuring consistent temperature control and maintaining quality standards throughout the supply chain is challenging and requires careful monitoring**

In the cold chain, precision is the conductor, and temperature control is the melody. Every link, from farm to table, plays a vital role in orchestrating the symphony of freshness, ensuring products remain pristine, and consumer expectations are met with a crisp, satisfying note.

The cold chain industry in India, especially in the agriculture sector, is still at a relatively nascent stage. While there has been progress and some growth in recent years, there are several challenges and opportunities that need to be addressed to fully harness the potential of the cold chain industry in agriculture.

### URGENT NEEDS

**Infrastructure Development:** Establishing a well-connected network of cold storage facilities, refrigerated transportation, and distribution centres across the country is crucial. This includes both rural and urban areas to ensure efficient supply chain management.

**Technology Adoption:** Implementing advanced technologies like IoT (Internet of Things) sensors, real-time monitoring, and data analytics can enhance temperature control, reduce wastage, and improve overall efficiency.

**Energy Efficiency:** Focus on sustainable practices such as energy-efficient refrigeration systems, use of renewable energy sources, and thermal insulation to reduce operational costs and environmental impact.

**Skilled Workforce:** Developing a skilled workforce trained in cold chain management, maintenance, and quality control is essential for ensuring proper handling and safe storage of temperature-sensitive products.

**Regulatory Framework:** Establishing clear regulations and standards for cold chain operations, including temperature monitoring, hygiene, and safety, to maintain product quality and consumer health.

### OPPORTUNITIES

**Agriculture and Food Processing:** Reducing post-harvest losses can lead to increased farmer income, better food availability, and enhanced export potential. Expanded food processing and value addition can create employment and boost economic growth.

**Reduced Post-Harvest Losses:** The adoption of cold chain solutions can significantly reduce post-harvest losses, improving farmers' income and food security.

**Value Addition:** Cold chain facilities enable value addition to agricultural products through processing, packaging, and extended shelf life, leading to higher profitability.

**Market Access:** Cold chain infrastructure can facilitate access to distant and export markets, expanding opportunities for farmers

**Promoting Food Processing:** A strong cold chain supports the growth of the food processing industry, leading to increased employment and economic development

**Improved Quality and Safety:** Cold storage maintains the quality and safety of produce, reducing contamination and health risks.

**Government Initiatives:** Various government schemes and initiatives, such as the Pradhan Mantri Kisan Sampada Yojana, aim to promote the development of the cold chain and food processing sector.

#### STEPS FOR GROWTH

**Investment and Funding:** Increased investment from both public and private sectors is essential to develop cold storage facilities, refrigerated transportation, and other cold chain infrastructure.

**Education and Training:** Farmers, processors, and other stakeholders should receive training on the benefits of cold chain practices and how to effectively use them.

**Awareness Campaigns:** Government and industry associations should run awareness campaigns to promote the adoption of cold chain technologies and practices.

**Technology Adoption:** Encouraging the use of advanced technologies like IoT sensors, data analytics, and efficient refrigeration systems can optimize the cold chain.

**Policy Reforms:** Streamlining regulations, providing incentives, and creating a conducive policy environment can attract investment and promote growth.

**Public-Private Partnerships:** Collaborations between the government and private sector can help develop and manage cold chain infrastructure.

**Research and Development:** Focus on research and innovation to develop cost-effective, energy-efficient, and sustainable cold chain solutions.

**Infrastructure Expansion:** Prioritize the development of cold storage facilities in rural areas to address post-harvest losses at the source.

**Pharmaceuticals and Healthcare:** The need for a reliable cold chain is critical for vaccine distribution, medical supplies, and pharmaceutical products, especially in rural and remote areas. Ensuring quality storage can improve healthcare access and outcomes.

**Retail and E-commerce:** The growth of online grocery and food delivery services can be accelerated with a robust cold chain, meeting consumer demand for fresh and frozen products.

**Export Potential:** A well-developed cold chain can open up



opportunities for exporting high-quality perishable goods to international markets, contributing to foreign exchange earnings.

**Investment and Partnerships:** Public-private partnerships and foreign investments can accelerate the development of cold chain infrastructure, bringing in expertise and capital.

#### CHALLENGES

**Lack of Infrastructure:** Inadequate cold storage and transportation facilities, especially in rural areas, hinder efficient supply chain management.

**Distribution of Part load :** we r not having ample opportunity to distribute pan India part load for cold chain in different temperature range , which lead high product cost

**Freight standardization :** as we are not having standardization of freight and vehicle

Due to that some time loss the opportunity and damage & expiry increased

**Energy Costs:** High energy consumption in refrigeration and the lack of reliable power supply can increase operational costs.

**Quality Control and Compliance:** Ensuring consistent temperature control and maintaining quality standards throughout the supply chain is challenging and requires careful monitoring.

**Technological Barriers:** Limited adoption of advanced technologies and lack of awareness about best practices can hinder the sector's growth.

**Logistical Complexities:** India's diverse geography and often underdeveloped road and transportation networks can pose logistical challenges for maintaining a seamless cold chain.

**Regulatory Hurdles:** Complex regulations, licensing issues, and a lack of uniformity in standards can create obstacles for cold chain operations.

**Skills Gap:** The shortage of skilled professionals with expertise in cold chain management and maintenance can impact the sector's efficiency.

**Inadequate Investment:** Insufficient investment in cold chain infrastructure, both by the public and private sectors, has hindered the industry's expansion.

**Awareness and Education:** Many farmers and stakeholders in the agricultural supply chain are not fully aware of the benefits of cold chain technologies and practices.

**Fragmented Supply Chain:** The lack of integration and coordination among various stakeholders in the supply chain, such as farmers, processors, distributors, and retailers, can lead to inefficiencies

#### KEY INITIATIVES TAKEN BY GOI

GOI has recognized the importance of the cold chain industry, particularly in sectors such as agriculture, food processing, and healthcare. Various initiatives and policies have been introduced to promote the development of the cold chain sector and address the challenges it faces. Here are some key government efforts in this regard.

**Pradhan Mantri Kisan Sampada Yojana (PMKSY):** Launched in 2017, PMKSY aims to modernize and strengthen the entire food processing value chain, including the cold chain infrastructure. The scheme provides financial assistance for setting up new cold chain facilities, expansion of existing ones, and improving transportation and distribution networks.

**National Horticulture Mission (NHM):** NHM focuses on promoting horticulture and aims to establish and strengthen post-harvest management infrastructure, including cold storage and supply chain facilities, to reduce wastage and enhance value addition.

**Atmanirbhar Bharat Abhiyan (Self-Reliant India Campaign):** As part of the economic stimulus package during the COVID-19 pandemic, the government announced measures to strengthen the cold chain infrastructure, especially for agricultural products and perishables, to reduce post-harvest losses.

**National Centre for Cold Chain Development (NCCD):** NCCD was established to promote and facilitate the development of integrated cold chain infrastructure in the country. It works on research, training, and awareness programs related to cold chain management.

**Goods and Services Tax (GST) Incentives:** The introduction of GST has simplified the tax structure and reduced tax barriers, positively impacting the movement of goods, including perishables, across state borders and supporting the growth of the cold chain.

**Ease of Doing Business Reforms:** The government's efforts to improve the ease of doing business in India have indirectly benefited the cold chain sector by reducing bureaucratic hurdles and simplifying regulatory processes.

**Make in India Campaign:** The Make in India initiative encourages domestic manufacturing, including cold storage equipment and refrigeration units, which can contribute to the growth of the cold chain sector.

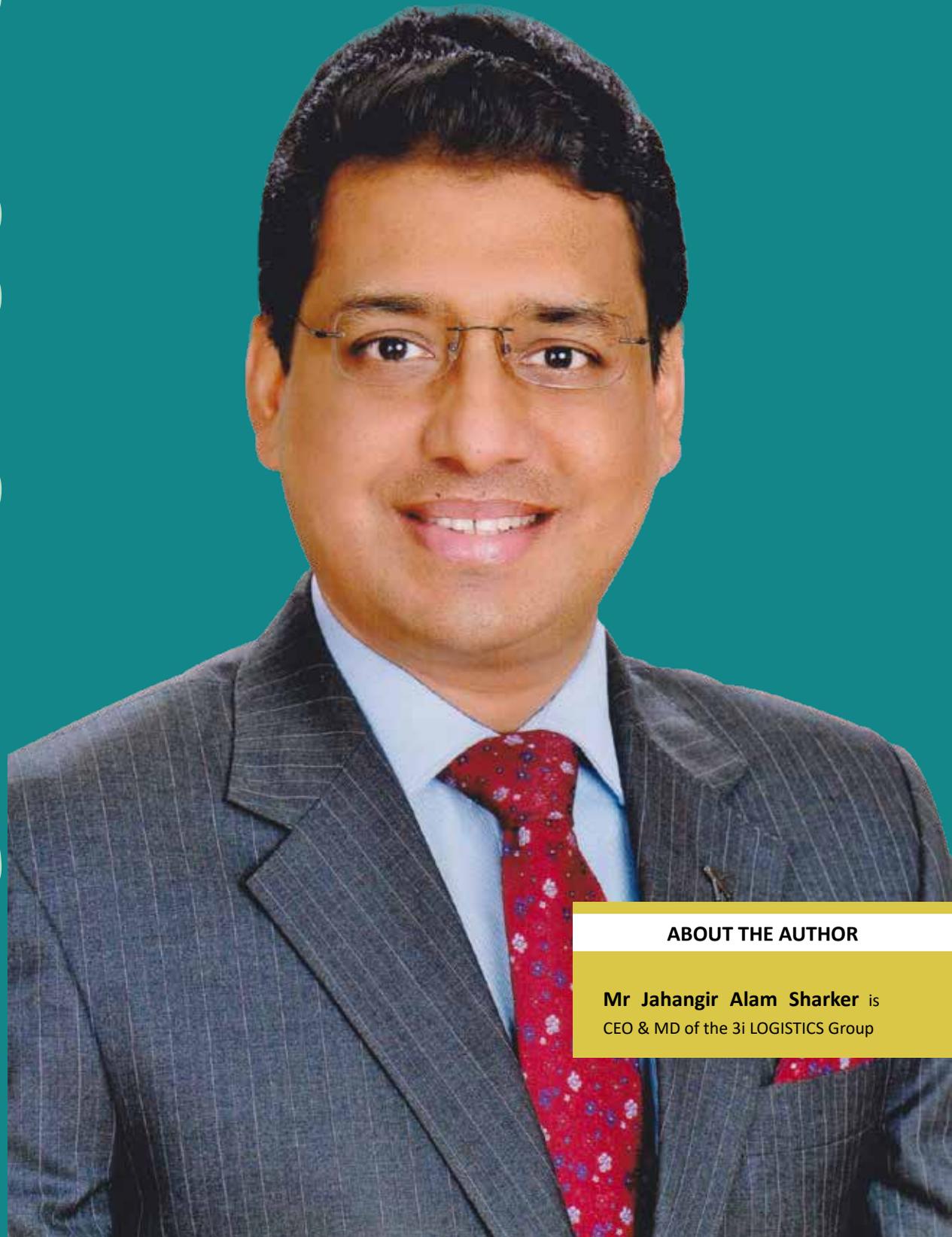
**Investment Promotion and FDI:** The government has been promoting foreign direct investment (FDI) in the food processing sector, which includes the cold chain, to attract international expertise and capital.

**Subsidies and Financial Support:** Various state governments offer subsidies and financial incentives for setting up cold storage and other cold chain facilities, contributing to the growth of the sector.

**Research and Development:** Government research institutions and agricultural universities conduct studies and develop technologies to improve cold chain management and reduce losses.

## COLD CHAIN

### The powerful synergy



#### ABOUT THE AUTHOR

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**Cold chain can be integrated into the logistic processes of most of the companies. In this way, companies can start taking advantage of the initiatives and support of Cold Chain stakeholders**

In the phase of fast-track urbanization and global challenges, developments in cold chain logistics can help balance growth and sustainability. The cold chain can play a very vital role in the agricultural supply chain. The significance of cold chain was heavily realized during the period of covid-19 pandemic when vaccines were to be delivered and businesses were compelled to change their business model and switch to home delivery solutions.

In Bangladesh, [millions](#) people go hungry every day, despite the country producing enough food to feed its population around 10.62 million tons of food are wasted every year in Bangladesh, as crops are left to rot in the sun, or become infested with pests without proper storage and transportation.

#### Cambodia Has Set An Example

Bangladesh could in fact increase its domestic agricultural production by making more efficient use of its resources, reducing post-harvest loss and waste, and increasing yield through technology and innovating farming.

Cambodia is a good example of a country that has been able to substantially improve, and was able to reduce its trade deficit by almost 24% from January 2022 to December 2022. Bangladesh can do and achieve the same. Multiple local agricultural products have high export potential including fruits, vegetables and aquaculture products

Being a top agriculture country in South Asia, Bangladesh was supposed to be able to feed its large and growing population while exporting them to the international market. But as the government is struggling to feed the growing population, the reasons for this scarcity of foods demand an explanation.

#### Need For Proper Cold Chain Logistics

The prime reasons of huge agricultural food loss occurring during the production and post-harvest processing, and food waste comes in bin. This happened due to lack of the availability of proper Cold Chain Logistics including proper storage, technology and processing facilities, and inadequate transportation system for agro-products.

[The Cold Chain](#) System can play a significant role in ensuring safe, secure and reduce waste of productions. Many industries that benefit from developments in cold-chain logistics, food and life sciences are among the most vital. Increasing agricultural production is only half of the battle; the other half is building cold chain logistics ecosystem that can support the entire supply chain and further enhance the country to trade at international standard.

However, the safe cold chain has many challenges for any industry whether it is agricultural, pharmaceutical or food. There has been a need solution to mitigate risk of temperature excursions while the shipment is in transit using appropriate packing and technology. The 'COLD CHAIN' is a paramount importance given the high degree of temperature variations across the globe. The is the high time to understand the significances, challenges and the way forward.

#### Opportunities in the Cold Chain for Agriculture

- Job Creation
- Urbanization
- Stop wasting Food
- Organized Retail
- Food Habit
- Availability

#### List Of Challenges Faced By Cold Chain for Agriculture

- Higher running costs
- Lack of Technological Advancements
- Lack of Logistics Infrastructure
- Human Workforce Errors
- Unorganized Industry Structure

Cold chain can be integrated into the logistic processes of most of the companies. In this way, companies can start taking advantage of the initiatives and support of Cold Chain stakeholders.

# Cold Chain Sector

## Opportunities For Growth



92% of India's cold chain facilities are owned and operated by the private sector. The industry is very fragmented and virtually non-existent in many states



### ABOUT THE AUTHOR

**Keku Bomi Gazder**

Managing Director & Chief Executive Officer  
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The Cold Chain Supply (CCS) is one of the current focus areas of Research and Development in Supply Chain Management, and there is a lot of potential for it to grow and an urgent need for it as well.

India is the world's largest producer of milk, second largest producer of fruits and vegetables and has a substantial production of seafood, meat, and poultry products. But due to the fledgling cold chain supply, there is heavy loss of foods / agricultural products.

The Food & Agriculture Organization has stated that every year about 1.3 billion tonnes of food is lost, amounting to 1/3 of the total food produced. Apart from perishable food, the pharma industry is another crucial sector that depends on an efficient cold supply chain network. The storage and transport of vaccines, life-saving drugs, and other pharma raw materials need a robust and well-managed cold supply chain network. India's vast agricultural sector produces a wide range of perishable goods, including fruits, vegetables, dairy products, seafood, and pharmaceuticals.

#### Essential To Prevent Post-Harvest Losses

A robust cold chain infrastructure is essential to prevent post-harvest losses and maintain the quality of these products as they move from farms to consumers. The Indian government recognizes the importance of the cold chain and has launched initiatives to promote its development. Programs like the Pradhan Mantri Kisan Sampada Yojana (PMKSY) focus on creating integrated cold chain and value addition infrastructure to reduce post-harvest losses and enhance the income of farmers.

The cold chain industry in India is still in a developmental stage, making it one of the most promising fields in the cold chain warehousing and logistics industry. In 2021, the Indian cold chain logistics market was valued at \$16 million, and its value is expected to reach \$36 million by 2027. India is likely to be the world's 5th largest economy by 2027, and as an established key player in the global market, investment in India's supply chain infrastructure is likely to increase year-on-year.

#### Challenges In Terms Of Food Loss And Waste

India faces significant challenges in terms of food loss and waste. A well-developed cold chain can help reduce these losses by extending the shelf life of products and reducing spoilage during transportation and storage. This not only benefits food security but also contributes to economic growth by maximizing the value of agricultural produce.

As incomes rise and urbanization accelerates, there is a shift in consumer preferences towards convenience foods, processed items, and perishable goods. A reliable cold chain is crucial to meet the demand for these products, ensuring that they remain fresh and safe for consumption.

#### Essential Factors For Delivery In Optimal Condition

The growth of organized retail and e-commerce presents a

significant opportunity for the cold chain industry. Both sectors require efficient temperature-controlled storage and transportation to deliver products to consumers in optimal condition.

The pharmaceutical industry relies heavily on temperature-sensitive storage and distribution. A well-established cold chain is essential to maintain the efficacy and safety of medicines and vaccines, particularly in a country as populous as India.

However, the cold chain industry in India also faces challenges that need to be addressed. Several components need to be developed to be able to design an effective cold chain infrastructure:

**Mobile infrastructure** – Transport units such as freezer trucks, freezer containers, reefer vans/trucks, carriers, merchandising carts, etc. need to be developed. This can also result in a higher transportation cost, as one needs to invest heavily in getting the right equipment and fleet.

**Higher operating costs** – Fuel costs in India constitute around 45% of operating expenses of cold storage in India, leading to significantly higher costs. Indian cold storage businesses pay approximately Rs 100 plus per cubic feet every month as operating costs. It costs half of that in the West, as fuel costs constitute a mere 10% for them.

#### Tech Adoption

While the West has integrated technologies such as Artificial Intelligence, Machine Learning, and Internet of Things among others in their operations, India lags way behind in this aspect. Lack of tech leads to unoptimized and broken cold chains, which create losses for both operators and food manufacturers.

**Equipment breakdown**– Power outages or electricity fluctuations can cause the breakdown of the powered cooling systems. Coolant failures and poor cooling circulations can also impact the cold chain management, leading to increased costs due to the maintenance needs. It can also lead to a lot of wastage as perishable goods get affected by heat exposure for a prolonged period, leading to loss of product quality and profitability.

**Human errors** – Cold chain logistics management requires highly trained professionals who are well-versed with all the processes and protocols, have hands-on experience in operating various cold storage and transportation equipment.

**Unorganized industry** – 92% of India's cold chain facilities are owned and operated by the private sector. The industry is very fragmented and virtually non-existent in many states – in fact, only 4 states account for 60% of the country's cold storages – UP, Gujarat, West Bengal and Punjab.

Thankfully, the Indian government is one of the driving forces in developing the cold chain industry and supports private participation through various subsidy schemes and grants. The Ministry of Food Processing Industries (MoFPI) had started a program exclusively for cold chain, "scheme on cold chain, value addition & preservation infrastructure".

# The Role of Gender Wage Divide in Indian Agriculture



The gender wage divide in Indian agriculture is a complex issue that requires a multifaceted approach for resolution. As India aims for inclusive and sustainable agricultural development, addressing this gap is essential not only for promoting gender equality but also for ensuring the overall growth and prosperity of the sector



## ABOUT THE AUTHORS

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Gender wage disparities have been a pervasive concern worldwide, and the agricultural sector in India is no exception. This study delves into the intricacies of gender-based wage differentials, examining the factors contributing to the disparities, their implications on agricultural productivity and socio-economic dynamics, and potential pathways towards equitable solutions.

The study employs a mixed-methods approach, combining quantitative data analysis from national and regional labor surveys with qualitative insights drawn from interviews and focus group discussions with farmers, laborers, policymakers, and gender experts. The research identifies key factors that perpetuate gender wage gaps in Indian agriculture, including traditional gender roles, limited access to education and training, unequal distribution of productive resources, and societal norms that undervalue women's work.

### Understanding the Gender Wage Divide:

The gender wage divide in Indian agriculture refers to the disparity in earnings between male and female agricultural workers. Despite women making substantial contributions to various agricultural activities such as sowing, planting, weeding, and harvesting, they often receive significantly lower wages than their male counterparts. This wage gap is reflective of broader gender inequalities prevalent in society, stemming from historical, cultural, and structural factors.

### Factors Contributing to the Gender Wage Gap

**Societal Norms and Traditional Roles:** Traditional gender roles and stereotypes have led to the undervaluation of women's work, both within households and in the broader economy. Women's work in agriculture is often considered an extension of their domestic responsibilities, leading to its under-recognition and lower compensation.

**Limited Access to Productive Resources:** Women in agriculture often face barriers in accessing resources such as land, credit, technology, and training. This limits their ability to adopt modern agricultural practices and hampers their productivity, which in turn affects their bargaining power for fair wages.

**Unorganized Workforce:** A significant portion of agricultural work in India is informal and unorganized. This lack of formal employment contracts and social security measures makes it easier to exploit female labor and pay them less than their male counterparts.

**Lack of Education and Skill Development:** Limited access to education and skill development opportunities further perpetuates the wage gap. Women with lower levels of education and skill training are often confined to low-paying and labor-intensive tasks.

**Inadequate Legal Protection:** Despite legal provisions for equal wages for equal work, enforcement remains a challenge,

especially in the informal sector. This lack of legal protection leaves women vulnerable to exploitation and discrimination.

### Impacts of the Gender Wage Divide

**Poverty and Vulnerability:** Lower wages for women in agriculture contribute to their economic vulnerability, increasing their risk of poverty and limiting their ability to access healthcare, education, and other essential services.

**Food Security:** Women play a crucial role in ensuring household food security through their involvement in agricultural activities. The gender wage gap can lead to reduced agricultural productivity and food production at the household level.

**Reduced Agricultural Growth:** The agricultural sector's growth is hindered when a significant portion of the workforce, i.e., women, is underpaid and underutilized. Closing the gender wage gap can lead to increased productivity and overall growth in the sector.

**Social Inequity:** Gender inequality in wages perpetuates broader social inequalities, reinforcing the marginalization of women and their limited decision-making power within households and communities.

### Addressing the Divide

**Promoting Gender Equality:** Comprehensive efforts are needed to challenge traditional gender norms and stereotypes, promoting the equal valuation of men's and women's contributions to agriculture.

**Enhancing Skills and Education:** Investments in education and skill development for women in rural areas can empower them to access better-paying and more skilled roles within the agricultural value chain.

**Access to Resources:** Policies that ensure women's access to land, credit, technology, and training can enhance their productivity and bargaining power.

**Legal Enforcement:** Strengthening the enforcement of existing labor laws and promoting awareness of women's rights can contribute to reducing the gender wage gap.

**Social Protection Measures:** Implementing social protection measures such as healthcare, maternity benefits, and pension schemes for women agricultural workers can enhance their economic security.

### Multifaceted approach for resolution

The gender wage divide in Indian agriculture is a complex issue that requires a multifaceted approach for resolution. As India aims for inclusive and sustainable agricultural development, addressing this gap is essential not only for promoting gender equality but also for ensuring the overall growth and prosperity of the sector. Empowering women in agriculture through fair wages and improved working conditions will not only enhance their lives but also contribute to the nation's progress.



*Through frosty trials,  
we've found our way,  
Championing change,  
come what may  
From challenges to  
triumphs, our course is  
clear,  
The Cold Chain's  
potential, forever held  
dear*



**A**s we step into the enigmatic realm of the Cold Chain—a world where temperatures orchestrate a symphony of preservation, freshness, and sustenance—we come face to face with not just frosty climates, but also a series of challenges that have cast shadows over this pivotal industry for far too long.

**Challenge 1: The Enigma of the Missing Cold Chain Policy**

Picture a dance of temperature, humidity, and compliance—all choreographed to perfection. The Cold Chain's exquisite performance hinges on the seamless synchronization of these

**About The Author**

**Mr Ravi Gulgulia** is born from the heart of North East India's groundbreaking "Integrated Cold Chain Project," filled with the latest technology. He is credited with creating smart plans that won big awards, even important National Awards. All these experiences come alive in *Food Fahrenheit*, a book written by him. The book explores new things about not just making a cold storage place, but also running it really well

factors #HarmonizingColdChain. Yet, the absence of a universal script has led to a chaotic cacophony. Imagine a symphony without its conductor—utter chaos. Fear not, for we're stepping onto the icy stage with a resolve as firm as a figure skater's grip, advocating for a comprehensive Cold Chain policy. This policy, akin to a conductor's baton, will lead every player to their perfect note, ensuring harmony from farm to fork.

**Challenge 2: Unleashing the Potential of GI Tagged Gems**

Behold the treasures—Geographical Indication (GI) tagged jewels from diverse corners. Yet, these gems remain veiled, lacking a clear map for handling and preservation #GIGemsUnveiled.

With fervour in our hearts, we need to devise meticulously tailored SOPs for each unique product. Visualise a bespoke wardrobe, ensuring these treasures gleam with consistent brilliance on the world stage.

**Challenge 3: Navigating the Power Struggle in the Cold Chain**

Power, the lifeblood of Cold Storage, is no simple game. A labyrinth of power tariffs looms, with the operators bearing the brunt #PoweringTheColdChain. The financial frostiness is a formidable barrier, casting shadows on sustainability.

With strategic finesse, we're embarking on a negotiation journey to level the playing field for power tariffs. Our aim? To

light up the Cold Storage landscape at a cost that doesn't leave a shivering financial trail.

**Challenge 4: Green, Clean, and Cold-Chain-Conscious**

Enter eco-friendliness—the Cold Chain's environmental legacy often leaves a frosty footprint. A greener route beckons, yet the path remains unclear #EcoColdChain.

With innovation at our helm, we're embracing Non-Conventional Energy sources—think Solar, Biomass, and Wind. This leap isn't just economical; it's a symphony of sustainability that resonates with generations to come.

**Challenge 5: Empowering the Champions of Chilled Storage**

Cold Storage personnel—modern-day heroes enduring sub-zero temperatures for hours on end. The hurdle? The lack of training centres tailored to these frosty explorers #ChilledHeroesRise.

With the determination of an adventurer, we're championing Centers of Excellence for training. Imagine a sanctuary where skills flourish, and frostbite becomes a mere myth.

**Challenge 6: From Waste to Worth: The Food Edition**

**Food waste**—a silent saboteur lurking within food processing units and Cold Storages. Yet, could this waste be transformed into a golden opportunity?

**Envision our ambition:** a realm where Grant-in-Aid initiatives metamorphose food waste into organic treasure #WasteToGold. This is more than recycling; it's a symphony of sustainability.

**Challenge 7: Navigating the Path to Quality**

Transporting food products often feels like navigating a precarious bridge. Bumps, bruises, and compromised quality await due to the scarcity of Refrigerated Trucks.

With determination ablaze, we're championing Refrigerated Truck Grants—the catalysts that preserve food's integrity #QualityOnTheMove, even on the bumpiest roads. Picture food arriving at its destination, unblemished and truly exquisite.

**Challenge 8: A Battle Against Inflation with a GST Twist**

Inflation—a fiery beast often tamed by the Cold Chain's prowess. But here's the twist: GST, a formidable adversary that takes a toll on the sector's services.

With a united call, we rally for the Government's Recommendation Letter to the GST Council. The outcome? Exemption from GST on Cold Chain services, breathing life into affordability and propelling progress #ColdChainGSTChallenge.

The voyage of reshaping the Cold Chain from its icy cocoon is no longer a distant dream. Empowered with strategy, advocacy, and unwavering determination, we are poised to metamorphose these challenges into stepping stones leading us to a future where freshness thrives, waste recedes, and prosperity reigns.

**Let's embark on this frozen journey #ColdChainOdyssey together, shall we?**

**Stay frosty,  
Ravi Gulgulia**

*Setting Sail on an Icy Odyssey*  
**Unraveling the Cold Chain's  
8 Puzzles**

# Cooling for Tomorrow

## Sustainable Solutions for Indian Cold Chain Infrastructure

The cold chain, a complex network of storage, transportation, and distribution, plays a vital role in preserving and delivering temperature-sensitive products like pharmaceuticals, vaccines, and food products. As the global demand for perishable goods increases, it becomes important to address the environmental impact of the cold chain industry. Sustainable practices in this sector are not only critical for reducing conserving resources and greenhouse gas emissions but also for ensuring long-term viability and resilience. This article explores the significance of sustainability in the cold chain industry and highlights various initiatives and innovations that can lead to a sustainable future.

The Indian cold chain industry is a rapidly growing market, with a size of INR 1,814.9 billion in 2022. It is expected to reach INR 3,798.7 billion by 2028, growing at a CAGR of 13% during 2023-2028.

**The growth of the Indian cold chain industry is driven by a number of factors, including:**

- The increasing demand for perishable food products, such as fruits, vegetables, meat, and dairy.

- The growth of the organized retail sector, which is demanding better cold chain infrastructure.
- The government's focus on food processing and export, which requires cold chain facilities.
- The rising disposable income of consumers, leading to an increase in demand for processed food products.

### Environmental Challenges in the Cold Chain

**The cold chain's environmental challenges are multifaceted.**

**High energy consumption and carbon footprint:** One of the primary concerns is the tremendous energy consumption associated with refrigeration and freezing processes associated with the cold chain industry. Cold storage facilities, display in retail outlets, and refrigerated transportation require substantial amounts of electricity, that too often sourced from fossil fuels. This contributes to carbon dioxide emissions, exacerbating climate change and global warming.

**Use of refrigerant Gases:** The cold chain industry also uses a variety of refrigerants, some of which are harmful to the environment. Inefficient, and irresponsible refrigeration systems can lead to the release of



Investing in energy-efficient refrigeration technologies is a critical step in reducing the carbon footprint caused by cold chain. The adoption of high-performance refrigeration systems, and advanced insulation materials can substantially decrease energy consumption and greenhouse gas emissions.



### ABOUT THE AUTHORS

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hydrofluorocarbons (HFCs), potent greenhouse gases that have a much higher global warming potential than carbon dioxide.

**Recycling Challenges:** Another key challenge is the improper disposal of cold chain equipment and packaging materials. Refrigeration units and insulation materials often contain harmful substances, posing a risk to the environment and human health if not managed properly.

**Non-Uniform Infrastructure:** Inadequate and non-uniform infrastructure in India leads to inefficient transportation routes, longer travel distances, and increased energy use.

**Single-Use Packaging:** Temperature-sensitive goods often require disposable packaging materials that can contribute to plastic waste, unless eco-friendly alternatives are adopted.

**Water Usage:** Some cooling systems in cold storage facilities consume significant amounts of water, which can strain local water resources in water-scarce regions.

**Land Use Impact:** Expanding cold storage facilities may lead to land-use changes and deforestation, affecting local ecosystems.

**The 'Panchamrit':** Five Nectar Elements for Sustainable Future  
During the COP26 climate summit held in Glasgow in November 2021, Prime Minister Narendra Modi presented a visionary plan to combat the challenges of climate change, emphasizing the concept of 'Panchamrit' or five nectar elements.

**The 'Panchamrit' presented by Prime Minister Narendra Modi at the climate summit consists of the following key components:**

- **Non-Fossil Energy Capacity:** India aims to achieve a remarkable non-fossil energy capacity of 500 GW by the year 2030.
- **Renewable Energy Adoption:** With a strong focus on renewable energy, India pledges to meet 50 percent of its energy requirements from renewable sources by 2030.
- **Carbon Emission Reduction:** India commits to reducing





The location of cold chain facilities can also have an impact on their environment. Cold chain facilities should be located in areas that have access to renewable energy and that have good waste disposal infrastructure

its total projected carbon emissions by an impressive one billion tonnes by 2030.

- **Carbon Intensity Reduction:** Recognizing the importance of economic growth without compromising the environment, India aims to decrease the carbon intensity of its economy to less than 45 percent by 2030.
- **Net Zero Emissions by 2070:** PM Modi's announcement of India achieving net zero emissions by 2070 sets a long-term vision for the country's environmental sustainability.

The pledges articulated by the Prime Minister are exerting a tangible influence on the Indian Cold Chain Sector. The sector is anticipated to undertake measures aimed at curtailing its overall emissions, achieving a substantial 45 percent reduction in emission intensity, and advancing progressively toward the overarching objective of attaining carbon neutrality.

#### Sustainable Solutions in the Cold Chain

Following are some of the solutions which can be practiced by cold chain sector to reduce their emissions.

**Energy-efficient Technologies:** Investing in energy-efficient refrigeration technologies is a critical step in reducing the carbon footprint caused by cold chain. The adoption of high-performance refrigeration systems, and advanced insulation materials can substantially decrease energy consumption and greenhouse gas emissions.

**Energy Management Systems:** Implementing energy management systems that monitor and optimize energy usage in real-time can help facilities operate more efficiently. These systems can identify energy wastage, predict maintenance needs, and adjust temperature settings according to demand.

**Renewable Energy Integration:** Shifting to renewable energy sources, such as solar and wind for cold chain operations can significantly reduce reliance on fossil fuels and minimize the carbon footprint. Manufacturing and logistic companies can install solar panels on their facilities, warehouses, and transportation vehicles to generate clean energy, making their operations more sustainable.



**Green Building Design:** Constructing cold storage facilities with green building principles can lead to significant energy savings. Incorporating energy-efficient insulation, natural ventilation, and passive cooling techniques can reduce the reliance on mechanical refrigeration systems.

**Eco-friendly refrigerants:** The use of alternate and natural refrigerants, such as Hydrofluoroolefins, Hydrocarbons (HCs) Ammonia and CO2, can help to reduce the environmental impact of the cold chain industry. These refrigerants are less harmful to the environment than HCFC and HFCs.

**Green Logistics:** Efficient transportation plays a key role in ensuring sustainability. Employing fuel-efficient vehicles and optimizing transportation routes can reduce fuel consumption and associated emissions. Utilizing intermodal transportation and promoting collaboration among multiple stakeholders in the cold chain can further reduce the overall environmental impact.

**Location of cold chain facilities:** The location of cold chain facilities can also have an impact on their environmental impact. Cold chain facilities should be located in areas that have access to renewable energy and that have good waste disposal infrastructure.

**Reduced waste and recycling:** The cold chain industry can reduce waste by using reusable packaging materials and by recycling equipment components. This can help to reduce the amount of waste that goes to landfills and incinerators.

**Certifications and Standards:** The government can make it mandatory for adhering to environmental certifications and impose industry standards for sustainable cold chain operations.

**Education and Training:** Training personnel on sustainable practices and the importance of reducing environmental impact.

**Government Incentives:** Leveraging government incentives and subsidies for adopting green technologies and sustainable practices.

**Collaborative Initiatives:** Collaborating with supply chain partners, government bodies, and NGOs to promote sustainability in the cold chain ecosystem.

**Research and Development:** Investing in research and development to develop innovative, sustainable solutions for the cold chain industry.

Sustainability in the cold chain is not merely a buzzword, rather it is a pressing necessity for the future of industry and the planet. As the demand for perishable goods continues to grow, so does the need for responsible and eco-friendly practices. By implementing energy-efficient technologies, transitioning to renewable energy sources, and adopting circular economy principles, the cold chain industry can significantly reduce its environmental impact and pave the way for a greener future.

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For businesses to thrive and survive affordability is always a big question. Whether we talk of domestic cold chains or international cold chains, due to its niche nature the cost of leveraging this technology is still very high. The only way to bring costs down is when democratization of cold chain industry along with fixed standards



# COLD CHAIN CONNECT

## LEVERAGING THE ADVANTAGES IN THE NEW MILLENNIUM

It would be reasonable to call cold chain as the back bone of all the businesses that are either into Pharma, Dairy, Horticulture, Floriculture, Meat and Poultry. Each of these industries have their own unique set of requirements when using cold chain in their business model.

Cold Chain in India has evolved and come a long way from what started as network of cold storage depots in the early 1950s as a part of the first plan to NCCD (A task force established to develop cold chain technology in India) to the current scenario where we have a decent cold storage infrastructure. GOI has been proactively tracking post-harvest food losses through various studies which it regularly conducts with latest one in 2022.

### Need For Stronger Ecosystem

The declining trend in all categories whether its fruits, vegetables, poultry etc. is a positive development. But there is a lot more which needs to be done and is desired. Significant developments have been done in the fixed infrastructure of cold chain in current decade. Things are enormously lacking in the moving infrastructure (Transportation/Trucking Platform) primarily because of the ecosystem behind it. Majority of the Insulated body truck manufacturers are a part of SME industry.

Therefore there are limited innovations and R&D being done by them in the field. These players are primarily dependent upon the Frozen/chilling unit provider for any technological advancements. Due to absence of major OEM Refer truck manufacturers trucking solutions available for final consumers are not alike in terms of payload, cooling capacity, per km running costs etc.

### Lack Of Standard Solutions

These operational nuances and lack of standard solutions have been one of the most forthcoming challenges which supply chain managers continue to deal with till date. There is always a strong

possibility that two refrigerated trucks on the same chassis may not have the same capacity/load ability. This is simply because the cooling unit capacity in both the vehicles may vary or due to the tare weight of the insulated container body on the vehicle. This leads to erratic running costs thereby impacting business margins.

Luckily things are more evolved and sorted on the international supply chain side. For shipping via air airlines tend to offer multiple solutions to take care of temperature sensitive cargo for all the relevant customers. These solutions vary from storing products in conventional LD3/LD 6 containers inside the aircraft under low temperatures ideal for fruits, vegetables, meat, poultry etc.

Insulated LD3/LD6 containers with provision of maintaining frozen subzero temperatures for the whole duration of the flight are more commonly usable for pharma and medical companies. Shipping lines have also standardized their refrigerated shipping containers.

### Affordability Is A Key Concern

There are two types of refer containers available 20 feet and 40 feet refers. Depending upon your volume load shippers can use either of these equipment's to ship their products.

Each of these containers have the capability to maintain temperatures from -30.C to 35.C with all the necessary settings like temp control, vent settings, data logger tracking available in the same unit. For cargo requiring temperature ranges below -30C specialized super freezer containers are also available on request.

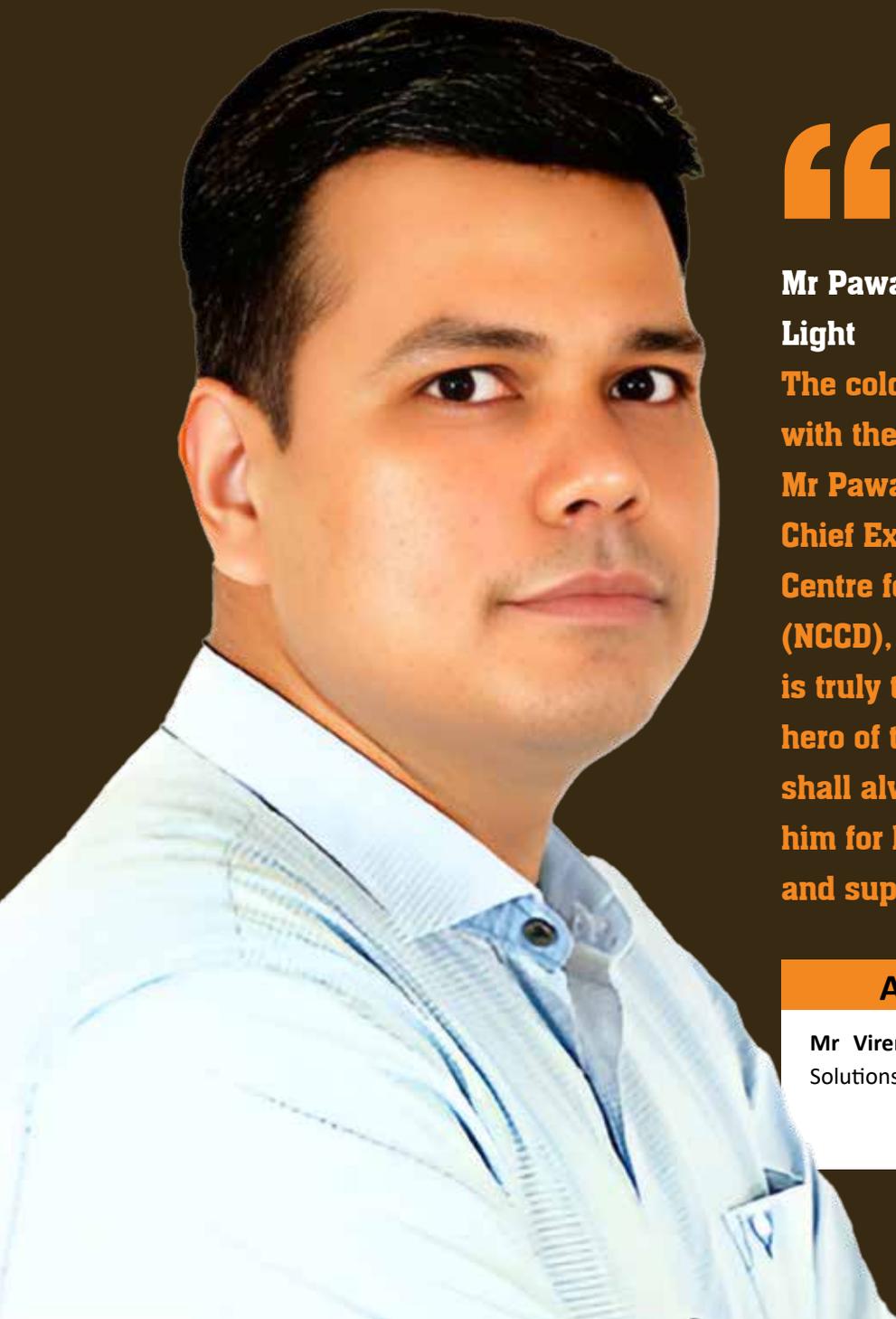
For businesses to thrive and survive affordability is always a big question. Whether we talk of domestic cold chains or international cold chains, due to its niche nature the cost of leveraging this technology is still very high. The only way to bring costs down is when democratization of cold chain industry along with fixed standards. This would lead to more players entering this domain thereby creating a win-win market for suppliers and its customers.

### ABOUT THE AUTHOR

Mr Vaibhav Sarin is (DGM-EXIM), Varun Beverages Limited, Gurgaon

# Subsidy Support To Cold Chain Sector

GOI Must Ensure Strict Compliance To Subsidy Objectives



**Mr Pawanexh Kohli – The Guiding Light**

**The cold chain sector will grow with the right vision and push.**

**Mr Pawanexh Kohli, the founding Chief Executive of India's National Centre for Cold-chain Development (NCCD), is one such visionary. He is truly the guiding light and the hero of the cold chain sector. I shall always remain indebted to him for his visionary leadership and support to this sector.**

## ABOUT THE AUTHOR

**Mr Virendra Chaudhary**, Algor Supply Chain Solutions, Mumbai



I have been in the cold chain sector for ten years. There are many industries working in this sector. I find that most of them are focused on the processed food industry. They are not providing cold chain support to the farmers directly.

Cold chain is a major infrastructure sector. It includes transportation plus warehousing. It can support farmers from the pre-harvest stage. With focused vision and growth, this sector can contribute significantly to the development of the nation.

Cold chains can be a major instrument to achieve farmer prosperity. They can be a huge value addition to the farmer for every crop. When well-linked cold chain support is available, farmers can explore new markets with higher remunerative returns. Their produce does not go waste and they do not have to face a glut scenario.

Cold chain support gives high profits to farmers. It makes farmers grow. Farmers can realize the full benefit of cold chains if the farming activity in any region is well planned. Farmers should be aware of the potential of each crop for marketing, and the regions where they will get the maximum profit.

### Costing

Costing is a very important factor for growth in the cold chain sector. For example, a cold chain truck may cost Rs 25 lakh, while a normal truck of the same size may cost Rs 10 lakh.

Government subsidy with strict compliance can play a vital role in the growth of this sector. The government is providing subsidies to the cold chain sector. There are beneficiaries who have taken subsidies to provide cold chain support to the agriculture sector. But they divert their subsidy to the processed food sector.

The government must ensure strict compliance so that the subsidy beneficiary provides infrastructure support to the farmers.

I feel extremely sad when I see that farmers are forced to throw their produce on the roads. This dire situation can be avoided if farmers are connected to the right markets. The government should make farmers aware of the prices for every kind of agricultural produce across the country. This information should be available even at the village and taluka level.

### Close Watch On Production, Consumption Patterns

The agricultural produce of our nation has huge export potential. The government should keep close track of the production potential of each sector, and also of the consumption patterns. The excess production should be moved to the export market to benefit all stakeholders in the agriculture sector.

We say that India is an agricultural nation. But are we actually achieving our true potential and drawing all benefits from being an agricultural nation? Why are our farmers poor?

The poverty of the farmers can be removed through focused and sustained planning. The government must study the potential of every sector. Which produce has high demand abroad? This should be examined, and farmers can be encouraged to grow it.

For example, in the Gulf there is good demand for yellow watermelon. If we encourage our farmers to grow yellow watermelons, they can earn a huge profit from it. In Karnataka, a farmer has grown yellow watermelon and he has found good demand for his produce.

Hence the major factors to be examined at the level of each district are production, consumption, global demand and the potential to produce the specific product in our country. Our trade can be through our agricultural produce. This will enable our nation to save hugely on foreign exchange.

### More FPOs Is A Win-Win For All

More FPOs should be formed. Farmer income shall increase. They will be able to command prices in the market. FPOs can mobilize farmers to move into the export sectors.

FPOs can guide farmers on the best options for cultivation, the best yield. Every product has great potential for export. We can achieve it with cold chain and other logistics support.

The mobilization of farmers at taluka level is very important. FPOs need to be boosted and strengthened. Indian almonds rank among the best globally. Why should we import almonds from outside? These are potential growth areas for farmers and need 360 degree support.

Freshness of fruits and vegetables is a huge factor for consumers. Sadly, wastage is very high. Mandis should be designed with cold chain zones. Mandi should have space for cold chain warehousing space so that farmers can store their produce if required, and mandi rates don't crash. If cold chain warehousing support is provided to the farmers, they won't have to resort to distress sale.

Policy decisions should be taken with both short term and long term vision. If we are able to boost our agriculture sector and the export market, it's a win win for all.

For example, farmers in Maharashtra and Karnataka have immensely benefited from cold chain support for coriander. We enable farmers to sell their products thousands of kilometers away. We save them from distress sale.

The commission agent cannot be allowed to determine the price of any particular product. Price must be decided by market forces. The more the cold chain sector develops, the more our farmers will gain.



# The Next Techno-Agri Revolution

How VST Tractor and Tiller is Empowering Farmers with Innovative Technology and bringing new multi-Purpose Farm Machinery technology to farmers worldwide

## In a significant stride towards

revolutionizing India's agricultural landscape, **VST Tillers Tractors Ltd.**, a trailblazing brand renowned for its commitment to farm mechanization, has introduced its groundbreaking **Series 9 Range of Compact Tractors**. With a legacy spanning over 55 years, VST Tillers Tractors Ltd. has been at the forefront of empowering Indian farmers guided with a clear focus and vision to enable them with Advance, Versatile and Cutting-Edge Innovative Farm Machinery while leading the Power Tiller segment with >70 % Market share.

## VST Tractor Manufacturing Plan

VST proudly introduces, The Series 9 Range, featuring six models ranging from 18 to 36 Horsepower (HP), which is set to reshape the way farming operations are conducted, catering to orchards, horticulture, traditional agriculture, and beyond.

**The launch of the new Series 9 Tractors is in line with VST's commitment towards farm mechanization of multiple crops and enriching the lives of Indian farmers. With the Indian farming community embracing newer technologies which are innovative and efficient, our Series 9 Range will be the most advanced and versatile tractor offering in its segment and is developed to deliver a winning formula of Extra Power – Extra Saving – Extra Comfort, for better earnings by farmers across the Globe."**

**- Antony Cherukara, CEO, in the company's press release.**



## Official Series 9 Logo

The Series 9 Range stands as a testament to VST's dedication to innovation and excellence. Each model brings something unique to the table, meeting the diverse requirements of orchard farming, horticulture, traditional agriculture, and non-agricultural applications.

## The models included in the Series 9 Range are:

- **VST 918 (18.5 HP)**
- **VST 922 (22 HP)**
- **VST 927 (24 HP)**
- **VST 929 (28 HP)**
- **VST 932 (30 HP)**
- **VST 939 (36 HP)**

In its core, the Series 9 tractors are meticulously engineered, and have the best-in-class engine that combines power, torque, and remarkable mileage. The tractors design and dimensions establish them as the true embodiment of a Real Light Weight Compact Tractor, exemplifying how efficiency and power can harmoniously coexist.

**What sets the Series 9 Range apart** is its multitude of pioneering features that redefine the very essence of modern agriculture. It is equipped with several segment-first features like,

- **Independent PTO:** Empowering farmers with the flexibility to engage power take-off without interrupting other operations.
- **MID PTO:** Enabling power transfer to mid-mounted implements, enhancing versatility.
- **Reverse PTO:** A groundbreaking feature facilitating reversible implements for efficient operations.



- **Fully Synchronesh Gearbox:** A seamless gear shifting experience, boosting operational efficiency.
- **Electro-Hydraulic Controls (EHC):** Revolutionary controls that streamline implement management with the ease of a button press.
- **Dual Track Width Option:** Select models offer the choice of different track widths, allowing farmers to navigate narrow spaces easily while working with different crops enhancing manoeuvrability and reducing crop damage.
- **Real Light Weight and truly Aerodynamic:** Optimal aerodynamic dimensions coupled with a state-of-the-art design to create a lightweight compact tractor that's easy to navigate and operate.

This modern design ethos permeates through to features like elevated platforms, projector headlamps, and a user-friendly instrument cluster, collectively enhancing the overall user experience. The addition of a deluxe seat and a short turning radius reinforces VST's dedication to simplifying operation, solidifying the Series 9 as the epitome of versatility and advancement among compact tractors in its category.

## Discovering Excellence in Farm Mechanization: The VST Tillers Tractor's Journey

The pages of agricultural history witnessed a momentous event in 1967 when the VST Group of companies laid the foundation for VST Tillers Tractors Limited. With a heritage stretching across more than fifty years, VST has remained resolute in its dedication to drive farm mechanization and uplift Indian farmers. In the present day, VST Tillers Tractors Ltd emerges as a towering presence among the rapidly advancing brands in the agricultural domain, celebrated for its evolutionary high-tech innovation.

At the heart of VST's success story lies its undisputed leadership in the power tiller domain, boasting a staggering market share those eclipses 70%. Not stopping at this milestone, the company has pioneered advancements in the 4WD compact tractors segment, setting new standards for modern farming practices with its Global Series 9 Tractors

VST's contributions extend far beyond power tillers and compact tractors. As a trailblazer in the agricultural landscape, the company

has firmly entrenched itself as a premier producer of a diverse range of machinery. From tractors that redefine performance to engines that power progress, transmissions that enable precision, power reapers that streamline harvesting, and precision components that underpin efficiency as well as EV solutions towards sustainability drive – VST Tillers Tractors Ltd embraces the entire spectrum.

## Presence and Expansion in International Markets

VST's journey of excellence reaches across borders, with it proudly exporting its cutting-edge products to the European, Asian, and African markets.

Under the banner of the 'FIELDTRAC' label, VST Tractors find their place in diverse corners of the European Union market, aligning seamlessly with the most current standards set by the EU. Additionally, the farm mechanization innovation company is on its track to enter the US markets by the year 2026.



## An Ambitious Vision for the Future

Under the ambit of VST's 5X Vision, the company's journey is poised for exponential growth. Having surpassed the milestone of Rs 1000 crore revenue during FY 2022-23, VST Tillers Tractors Ltd. is steadfastly charting a course to emerge as a Rs 3000 crore global brand by 2026. This vision encompasses strategic initiatives, global ventures, and transformative brand endeavours. With a focus on research and development, the company is steadfastly investing in continuous innovation, process improvements, and new product introductions under the new Global Technology Centre. The objective is towards exploring sustainable farm mechanization solutions with technological integration progressing with its Fast, Frugal and Future ready approach.

As the curtain rises on each day, VST Tillers Tractors Limited continues to script a narrative of innovation, reliability, and empowerment. Let us celebrate the journey of this company that ploughs the fields of progress, sowing seeds of transformation and brings new technologies closer to farmers worldwide.



**You've recently joined Gencrest as VP, Sales & Marketing. What's your top priority, to begin with?**

ANS-With 24 years of experience in Team building, Channel Management, Portfolio Management, Field Marketing, Business Development and a track record of creating brands and establishing business for organisations that I have worked for, my priority for a growing company like Gencrest is to establish a robust team with a strong distribution network and create impactful brands.

**What makes you take up this top job at Gencrest? What is it that pulled you here?**

ANS-One should believe in being unique in a crowd. The Gencrest green solutions for agriculture with many organic products that are in the pipeline, attracted me towards Gencrest. It aims to disrupt the status-quo in the industry by creating a company with a human first approach and not only look at profits. When I learnt that sustainability is the only way that Gencrest follows, the company's strong philosophy towards being sustainable resulted into my acceptance of this new job.

The opportunity at Gencrest came in at a time when any green pasture was welcome as it would be an opportunity for me to build and shape a new business. Change is the law of nature and hence I accepted this new challenge. The road may be rough or smooth, but I have decided to travel on this new route and on the way towards my destination I will not leave a single stone unturned to make Gencrest a mass brand.

**Could you please share Gencrest's future plans?**

Ans-Gencrest has invested in a biotech & Nano technology which converts waste to wealth and developing products like bio-fuel, bio-fertiliser, bio-gas and sustainable fibers are a few challenging areas that the company intends to be in.

**Not just agriculture, we've learnt that Gencrest also offers solutions to household care! Could you please throw some light on this for our readers?**

Ans-No, we do not have any solution for household care as of now. But to throw some more light on this, Gencrest has plans for nearly 25-30 products that would be in the space of agriculture & Urban farming.

**How many R&D facilities are there? And how do you work to reduce the chemical or toxic load for our farmers?**

Ans-We have two R&D facilities, one in Mumbai and the other in Bhusawal MH. Gencrest is a fully integrated, research and innovation-driven agri solution company. With its headquarters in Mumbai & manufacturing unit in Bhusawal, Maharashtra. The company's main focus is to create agro-value chain by up-cycling the agriculture waste and creating economic value for the farmer community.

Gencrest believes in developing green solutions for a better tomorrow and is on a mission to create sustainable solutions for everyday life.

To walk the vision, Gencrest has been driving path-breaking product innovations through enzymatic solutions. These are undertaken at the in-house R&D centre at Mumbai, Bhusawal and Bangalore in India. These research centres work in synergy with different leading institutes for designing and developing multiple, novel, sustainable products.

The extensive research has enabled the development of multiple products including but not limited to bio-nutrients, bio-fibre, bio-plastic, bio-gas, and many other bio-agri products with zero wastage. Key among them is the 'green solution for farmers' the biostimulant, Agrosatva, containing N, P, K, micro-nutrients, and growth hormones. "Agrosatva has been successfully tested on farmlands with principal benefits that include soil nourishment, increased bacterial growth, increased immunity, enhanced root development, growth and flowering / fruiting leading to significant improvement in yield with reduced farmer input costs. The most sustainable advantage being the core raw material agri-biomass.

**What do you see Gencrest's contribution in the near future, in India's agri sector?**

Ans-Excessive use of chemicals would make it difficult to cultivate crops in the near future. Although we cannot completely eradicate chemicals from our lives, we may surely lessen their impact by modifying processes through incorporation of enzymatic technology. The environment-friendly brands—Vybrana, the conscious fibre and Agrosatva, the biostimulant—were developed with this goal in mind.

Today, trash really is a treasure. This reality has been recognised by scientists, academicians, sustainability experts, and intellectuals, who are now working hard to establish that agri-biomass is the new currency. Our innovations are capable of bringing about a revolution in the agri industry for organic space. We are educating the farmers and the masses the importance of cultivating and consuming pure food. Our customers and farmers are at the centre of our overall vision : Create Equilibrium between Humanity and Environment. We are ever grateful to them for being an integral part of our identity.

**Let's trust the sustainable choice of farmers to change the agricultural landscape and make India the food bowl of the world!**

Keeping the company's head above water and at the same time trying to keep the best employees from abandoning the ship is a challenge today for all the c-suite executives like me.

**Green Science for Greener Lives**

**Thanking You !**



Indian agriculture is highly dependent on the monsoon. A few days of delay in the monsoon can have a devastating impact on agriculture. Crops like cotton, rice, and pulses need the benefits of early rains. The Southwest monsoon that lasts from June to September contributes almost 75% of the rainfall in India, which mostly affects kharif crops like cotton, rice, and pulses.

However, it is to be taken into consideration that there must be enough infrastructure to harness or store the water when required. That's when the world-renowned farm equipment brand 'STIHL' comes into the picture. It provides products to meet the needs of the ever-increasing demand for technically advanced equipment. One such range of products is the splendid WP 300, WP 600, and WP 900 water pumps.

**What is the WP 300/600/900 Water Pumps?**

- This range of water pumps meets professional

requirements. They can be used by private users, farmers, and commercial growers.

- These are appropriate for farmers who find it difficult to transport water from lakes, rivers, wells, and other water reservoirs to their respective lands.

- WP 300, WP 600, and WP 900 offer high power, high head, and high discharge and are fuel-efficient with lesser emissions.

**Features of WP 300/600/900**

- A high head gives it a high pumping capacity and high LPM (water discharge capacity)
- It has a Euro V Engine with excellent power and robustness
- It is easy to carry and easy to start
- If the oil level is too low, the engine switches off automatically to prevent damage

- Its efficient ant-vibration system provides excellent vibration damping even at high engine speeds

- The water pumpers have a highly efficient cast iron impeller which makes it sturdy and ensures hassle-free working

- It has a water-flow range of 600-1500 L/Min, making it highly effective in handling larger water flows

- Before using the water pump, the user must ensure that the water source is clean and free of debris

- The water pump should also be placed in a location that is close to the water source and the crops that need to be irrigated.

**How to Use WP 300/600/900?**

- Once the water pump is at the appropriate place, it can be started by using the pull cord.

- To irrigate the crops, the water pump should be connected to a hose that is placed near the crops.

- The water should be directed towards the base of the plants, ensuring that the roots are adequately watered.

- It is important to monitor the water supply and adjust the flow rate as needed to avoid over or under-watering the crops.

The 'STIHL' Water pumps WP 300, WP 600, and WP 900 are authentic and efficient tools for cultivation in India. It ensures that crops are watered adequately and prepares the soil for planting.

**STIHL**

STIHL Company, with its center in Germany, has been devotedly working for farmers since 90 years. It is a leading manufacturer of farming equipment, both, nationally and internationally. Everywhere, it is taking the agricultural sector to new heights with its novel and innovative solutions.

Presently, STIHL Company is manufacturing farming equipment in 7 countries. It has its own marketing and sales centers in 41 countries. Other than this, the company has an operational network of 54,000 servicing dealers in more than 160 countries. The role of this network is to make farmers aware about new farming equipment and agricultural technologies.

**Website:** [www.stihl.in](http://www.stihl.in)

**Email:** [info@stihl.in](mailto:info@stihl.in)

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