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How India's agriculture warehousing can scale to sustain India's agricultural growth

Warehousing needs to evolve from a fragmented network of conventional godowns into a resilient ecosystem

By Sandeep Sabharwal
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The Indian agriculture sector is entering a decade where storage capability and quality will decisively shape how far production gains translate into real economic value. With output projected to grow faster than domestic demand, the system faces a widening gap between what is harvested and what can be scientifically stored, stabilized, and channeled to markets.

Robust agricultural warehousing has therefore moved from a peripheral logistics concern to a central pillar of food security, price stability, and export competitiveness. These dynamics were recently underscored by NITI Aayog member Ramesh Chand at a PHDCCI event, where he noted that India's farm output can grow at around 4 per cent annually over the next ten years, even as demand for agricultural products rises at roughly 2.5 per cent.

Foodgrain production has already touched record levels of 354 million tonnes in 2024–25 and is projected to reach about 368 million tonnes by 2030–31, while several independent assessments point to a potential storage deficit of close to 69 million tonnes if capacity creation does not keep pace. In this context, warehousing and post-harvest management are no longer adjuncts to production; they are the infrastructure that determines whether surplus turns into strength or into waste.

Scientific warehousing plays three critical roles in the current environment. First, it underpins buffer stocks that shield vulnerable households during supply shocks and enable calibrated market interventions during periods of volatility. Second, it moderates inter-year and intra-year price swings, preventing distress sales by farmers at harvest and reducing inflationary spikes for consumers in lean months. Third, it reduces preventable post-harvest losses arising from spillage, spoilage, pests, and poor handling, with modern systems capable of bringing losses in well-managed commodities down from double-digit levels to low single digits.

The nature of India's crop basket magnifies the importance of appropriate, crop-specific storage solutions. Sugar, cereals, pulses, and oilseeds all have distinct requirements for moisture, ventilation, stacking, and fumigation, which generic godown storage practices often fails to meet. As the country moves further into value-added processing and export-oriented supply chains, warehousing networks must evolve into a more granular, distributed, and climate-resilient system rather than a narrow backbone of central silos.

Despite significant public investment, the system still faces pronounced capacity and quality gaps. Quantitatively, storage infrastructure in many producing regions lags behind rising procurement volumes, leading to ad hoc arrangements such as open-yard storage or long-distance movement purely to access space. Qualitatively, ageing facilities with inadequate flooring, ventilation, and scientific pest management continue to compromise grain quality and shorten shelf life. For small and marginal farmers, physical distance to compliant warehouses and the costs of aggregation often remain barriers to meaningful access.

Institutional and regulatory frictions add another layer of constraint. Land acquisition, clearances, and fragmented local regulations slow down new capacity creation, especially in smaller towns and rural growth centres where warehouses are most needed. Variations between central and state-level norms, as well as overlapping standards, mean that not all storage assets are easily usable for formal procurement, trade, or finance. In addition, uncertainty around stock limits and interventions under legacy laws has historically dampened investor appetite for large, long-gestation projects, although there have been efforts to reduce the frequency of such interventions in recent years.

Technology is emerging as the most powerful lever to transform warehouses from static storage spaces into 'Phygital Infrastructure'—where robust physical assets are seamlessly augmented by digital intelligence. Sensor-based systems for temperature, humidity, and pest risk monitoring enable real-time control over storage conditions, substantially reducing qualitative losses and improving predictability for buyers. Enterprise resource planning platforms integrated across locations provide end-to-end visibility on inventory, ownership, and movement, helping to standardise processes and audits. Such digital backbones also facilitate seamless integration with logistics providers, exchanges, and agri-market platforms.

The growth of negotiable warehouse receipts, electronic warehouse receipts and collateral management model backed by Bank financing has created an important bridge between warehousing and rural finance. When commodities are stored in accredited facilities and documented through traceable receipts, they become usable collateral for banks and non-bank lenders. This mechanism allows farmers, traders, and processors to avoid distress sales by borrowing against stored stock and timing market participation more strategically. For lenders, receipts linked to professionally managed warehouses by competent Collateral managers lower operational risk and provide comfort on both quantity and quality.

Artificial intelligence is beginning to influence daily warehousing practices as well. Predictive analytics can anticipate spoilage risks or capacity bottlenecks, while optimisation algorithms refine stacking, fumigation schedules, and dispatch planning. Over time, integration of AI with remote sensing, market data, and logistics information is likely to support more dynamic allocation of capacity, directing commodities to the most efficient storage and consumption nodes. These tools, combined with robust on-ground processes, can substantially improve the resilience of post-harvest systems against climate and market shocks.

Public–private partnerships will play a decisive role in closing the remaining gaps at speed and scale. Models that blend private sector capabilities in design, technology, and operations with public support in the form of land, viability gap funding, or long-term offtake commitments can unlock investments in underserved districts. Partnerships with farmer-producer organisations (FPOs) and cooperatives can further extend scientific storage and allied services to smallholders who would otherwise remain excluded from formal infrastructure. Such collaborative frameworks also provide a platform for integrating warehousing with collateral management, quality testing, and market linkage services.

The direction of travel is clear: agricultural warehousing in India needs to evolve from a fragmented network of conventional godowns into a resilient ecosystem that underwrites the next phase of agricultural growth. If policy stability, targeted financing, and technology deployment continue to advance in tandem, the system can convert rising production into sustained gains for farmers, consumers, and the wider economy. Over the coming decade, the strength of India's warehousing and post-harvest architecture will be as important as the output from its fields in determining the true trajectory of the farm sector.

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