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# Food Storage



# Actionable Area

Enhancing usage of high quality, scientific storage infrastructure to reduce foodgrain losses.

## Issue

- Despite India achieving food sufficiency by producing a record 292 million tonnes of food grains in 2019-20, a substantial amount of food grains is being damaged after harvest due to a lack of adequate storage and processing facilities. Grains must be stored throughout the year to satisfy the demand for a plentiful supply of cereals and legumes. But post-harvest losses account for about 10% of total food grains due to unscientific storage, insects, rodents, micro-organisms, etc. Annual storage losses have been estimated to be 14 million tonnes worth Rs. 7,000 crore in which insects alone account for nearly Rs. 1,300 crore.
- Post-harvest losses due to inefficient storage are in 4 categories-
  - a. **Quantitative loss:** This is the loss in weight caused by direct feeding by insects and pests.
  - b. **Qualitative loss:** This is the loss caused due to chemical changes in grain due to infestation, such as the spreading of pathogenic micro-organisms.
  - c. **Loss of seed viability:** Infestation causes a seed to become unviable. In the case of paddy, insects were found to cause the loss of viability of seeds to the extent of 41%.
  - d. **Damage to storage structures:** Insects like Lesser grain borer have the capability to destroy the wooden storage structures, containers, polythene lined bags, etc., which causes direct and indirect losses.

## Foodgrain storage losses in India



\*Second advanced estimates, 2019-20

Source: Department of Agriculture, Cooperation & Farmer's

Welfare: National Academy of Agricultural Sciences

# Status

- In India, most foodgrains are stored in bulk (open) storage structures as it is easier for loading/unloading and is cheaper than storage in containers like gunnies. However, these structures lack efficiency and are prone to food loss by the infestation.
- The most common storage structures used for foodgrains and the respective challenges they face are -

Structure	Commodity Stored	Challenge
Bamboo Structures	Paddy, wheat and sorghum	Weight loss due to insect attack is 5% in paddy and 15% in sorghum
Mud and earthen structures	Paddy, wheat, sorghum, oil seeds and pulses	During rainy season this develops cracks leading to moisture absorption followed by insect and mould infestation
Wooden structures	Paddy	The structures are neither airtight nor moisture proof.
Brick structures	Paddy, sorghum and wheat	High initial cost. Not insect and moisture proof

Source: Indian Grain Storage Management & Research Institute

- Bulk storage capacity in silos presently is just around 2-3 MMT, which needs to be ramped up aggressively. Due to the lack of storage facilities, farmers often have to sell their surplus produce at below-market prices.
- Even the Food Corporation of India faces the challenge of the lack of storage space. It has food reserves well above the buffer norms, which further leads to food loss during storage. As of December 2019, FCI held 56 MMT of rice and wheat and 26 MMT of paddy (rice equivalent of 17 MMT) in its facilities. For instance, FCI's rice stocks were at 21 MMT in January 2020 compared to a buffer requirement of just 7.6 MMT.
- This, coupled with the rising cost of storage, has led to the FCI being compelled to use temporary storage facilities like cover & plinth (CAP) or take warehouses on lease. In 2019, 8.79 MMT of wheat was estimated to be kept in such temporary storage facilities in Punjab alone.
- Going forward, minimising post-harvest losses of food need to be approached through multiple lenses of type of storage, reducing overdependence on FCI/CWC, liquidation of surplus stocks, transportation issues, and lack of interest of the private sector. There needs to be a rapid scale-up in the usage of efficient silos of global standards. Storing grains in silos is a widely accepted method to ensure better and more scientific handling of grains. Countries such as the USA and Australia have advanced silo practices that help with post-harvest grain losses.



- Several best practices are available for sealed, unsealed, and aerated silos. For example, painting the silo white after installation on the pad is a useful management tool. A white-painted silo can be 4°C cooler than a weathered galvanised unit, leading to several advantages such as longer seed germination percentage, reduced moisture migration, reduced insect breeding, etc.
- However, large silos will not serve the needs of Indian small farmers whose production is often in the range of just 20-30 quintals. For this, village level/panchayat level scientific storage units need to be set up, which can be used by the farmers on a pay-per-use basis. Furthermore, apart from the storage of wheat in silos, the focus must also be on the proper storage of other grains such as rice, maize, and pulses.
- India needs to move away from the strategy of centralisation of storage and overdependence on the FCI. The recent steps taken by the government under the Pradhan Mantri Garib Kalyan Ann Yojana (PMGKAY) would help reduce excess stocks with the FCI. The government could also facilitate better uptake of PPP models for storage, thus bringing in competition and reducing costs.

### Government Initiatives

- The government is promoting the Agricultural Marketing Infrastructure (AMI) scheme, which is a part of the Integrated Scheme for Agricultural Marketing (ISAM), under which assistance is provided for the construction/ renovation of godowns/ warehouses in the rural areas to enhance the storage capacity and promote scientific storage. AMI is a demand-driven scheme. In addition to the above, the

Warehouse Infrastructure Fund (WIF) of the National Bank for Agriculture and Rural Development (NABARD) envisages the extension of low-cost loans to public and private sectors for construction/modernization of warehouses silos, etc.

- The government has also approved a new central sector scheme for the financial facility under the Agriculture Infrastructure Fund of Rs.1,00,000 Crore. The scheme provides a medium-long term debt financing facility for investment in viable projects for post-harvest market infrastructure (including warehousing facility and community farming assets) through interest subvention and financial support.

## Vision 2030

- **Reduce foodgrain losses from the current 2-4% to <0.5%.**
- **Shift from open storage to fully scientific storage to reduce grain contamination and wastage.**
- **At least 50% of the foodgrain being transported should be in bulk instead of bags towards reducing pilferage.**

# Pathways



**Towards moving from a bag to bulk approach** for grain transport, it is critical to leverage railways by bulk cargo wagons or by installing roll-on-roll-off systems where entire trucks can be transported through rail.

**Promote scientific temporary storage technologies** such as silo bags, bulk flat storage, etc., towards reducing cover & plinth (CAP) storage.

**Milled flour in sealed bags may be supplied** into the PDS instead of wheat. This will increase transparency and reduce pilferages in the system.

**Create state-of-the-art mandis** with mechanised infrastructure such as mechanical driers, cleaners, automated weighers, packaging infrastructure, high-tech labs, etc.

**Promote good storage practices** among operators of small warehouses towards standardisation.

**Enable pre-processing of grains** (pulses, oilseeds) before storage to ensure homogeneous quality. This will reduce storage losses.

**To reduce storage pressure** on FCI and prevent the farmer from distress sale, farmers should be facilitated to store harvested grains at the farm gate for extended periods (6-8 months) until FCI procures it. This will be successful only if a warehouse receipt system is in place, certifying that the grains are FCI grade and giving the farmer some credit until final procurement at MSP by FCI.

# Pathways

## POLICY



**The Agri Infra Fund will enable the creation of farmgate infrastructure.** However, it is crucial to ensure commercial viability for the uptake of the scheme. Integrated farm gate storage models, including dry storage, mini silos, cold storage, milk collection centers, etc., should be promoted and encouraged.

**The upper limit of Rs. 2 crore capital investment** in creating farmgate infrastructure to avail interest subvention may be increased for promoting integrated storage facilities.

**Enable access to long-term finance** towards promoting private investments into storage infrastructure.

**Enable standardisation of warehouse infrastructure** towards a warehouse-based market mechanism. This will include standardisation of the warehouse structure through BIS, CWC certifications, verified financial status, credit ratings, etc.

**Towards reducing food grain losses,** the scientific silos under FCI should be connected by railways.