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## STORAGE TECHNIQUES FOR CEREAL GRAINS

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Seeds are suitably saved for proper and balanced public distribution throughout the year. It is perceived that around 10% post harvest losses of grains in our country are estimated. Cereal grains are most important alimentary, nutritional and energy sources for humans. They must be stored, transported and conveyed using methods that preserve their quality. Storage of different types of foodgrains varies with the period of time ranging from short-term storage on farm for drying to the long-term storage for strategic reserves. Storage can occur on farm or at large commercial facilities (Bucklin *et al.*, 2013). Loss in stored grains is nearly 20% of the whole production due to population increases globally, a huge demand for the cereals and improper storage conditions (Miller, 2016 and Said and Pradhan, 2014).

### Types of Storage Techniques

**1. Bulk Storage** - Different types of grains are stored and preserved as bulk or mass in both vertical and horizontal warehouses (Kemaloglu and Baran, 2011). In this method surface of bulk stacked cereals (eg.wheat, barley, rye, oat, corn, chickpea and lentil) is leveled properly. It has also various advantage such that in this it is possible to store more grain on unit area. Moreover, It also facilitates the control of grain samples easily, has less labor cost i.e. less laborious, cost effective and time-saving.

**2. Storage Underground** - Storage underground pits of this method are claimed to keep or preserve grain without damage or mutilate for multitude years. The pits or underground storage structure keeps the mass of grain cool, and some of them are comparatively airtight. This underground storage technique provides the grain a sealed or shut tight condition. (Bhardwaj, 2014).

**3. Storage in Bag** – If the moisture content percentage in cereal is increased, the number of sacks or bags in cereal stock is decreased. Besides, reduced or less amount of cereals are stored on per unit area when compared to the bulk storage technique. This method is more exorbitant or expensive due to high labor cost, time-consuming also also causes more rodent damages in comparison to other methods.

**4. Storage in Warehouse (Sheds)** – Sheds or storage in warehouse itself are consistently used by bulk handling companies, but need vigilant site preparation, labour for handling sizeable tarp covers and also machinery to move different types of grain on and off the grain stack. Effective treatment of insect infestation is tough task in sheds and bunkers. For on-farm sheds storage, foodgrain in bags may be a worthy and best short-term alternative. For storing grains in warehouse, the determination of location, control of moisture content percentage and supplement of adequate aeration of cereals are important strands of consideration. The damage from insects is the most customary problem in warehouses.

**5. Storage in Silo structure** - The most fancied and choosen storage technique in plants is to store the grain in silos structure. It has many advantages due to less labour cost, less time-consuming depending on easy discharge of grains and conveying different type of cereals and keeping hygienic conditions during these whole processes. As the silos structure are vertical, more products can be stored on the per unit area. There are three types of silos structure made up of wood, concrete and steel. Wood silos structure are not suitable for preservation, as they are susceptible to fire and most favorable for the insect surviving. Concrete silos are ideal to store different type of cereals, as they required less labor cost and less time for storage. Steel silos structure and galvanized silos structure are the most prevailing and accepted used in stores, because they are most resistant and easier controlled when compared with the others silo structure.

### **The Requirement of Good Grain Storage Structure**

- The different type of grains produced should be thoroughly cleaned and graded.
- Storage structures should be constructed in the coolest portion of the farm or house.
- The grain storage structure should be able to take the load of seeds stored and should not allow any exchange of humid air.
- The seed storage structure should be cleaned, disinfected and sanitized.
- For the purpose of a safe storage period of 6 to 12 months, dried seds to the safe moisture level( for cereals is 10-12%).

- structures should provide the security from floor moisture, rain, rats, birds, molds, rodents, ants, insects, *etc.*
- They need to be constructed in such a way that it may present the necessary facility for inspection & infection, loading and unloading, cleaning, and reconditioning.
- The storage structure should be constructed in such a way that it can protect grain from excessive moisture content or humidity and temperature.

### Advantages of Grain Storage Structures

- More control and planning over crops and transportation.
- Improvement in quality of grains in origin.
- More control of weight and quality of shipment.
- Pricing can be done multiple times after harvest.
- Reducing the cost of arbitration.

### Conclusion

Storage of grains is a very important aspect of agriculture as it is necessary to protect the grains from insects, rodents, *etc.* After harvesting they are often consumed and preserved for a longer period in grain storage structures. The choice of the most suitable and economical storage method has great importance on storage period of cereals to prevent deterioration caused by physical, chemicals and biological factors. In cereal industry, among the main storage methods (bulk storage, storage underground, storage in bags, storage in sheds), the most preferred storage technique is to store in silo, especially made from galvanized steel due to less labour cost, time-saving, easy discharge, storing more products on unit area, conveying of cereals under hygienic conditions during the processes and also easy transportation.

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