

7. SEED STORAGE

Importance of Storage

The Cereals, pulses, oilseeds etc. are very important products for storage. A safe storage place must be provided for the grain produced until it is needed for consumption and multiplication purposes. Since grain production is seasonal, and consumption is continuous, safe storage must maintain grain quality and quantity. This means that grains have to be protected from weather, molds and other microorganisms, moisture, destructively huge temperatures, insects, rodents, birds, objectionable odours and contamination, and from unauthorized distribution.

Kinds of Storage Facilities:

- 1. On The Ground:** Grain is piled on the ground unprotected only between harvest and the availability of transport equipment with which it can be moved to a safer place. Losses are small for short periods because a smooth-surface pile of grain sheds rain down its slopes quite well, permitting it to penetrate only an inch or two. But with time, depressions develop in the surface, allowing rain to soak downward and destroy columns of grain. The floor of the pile absorbs moisture from the ground, and surface water creeps under the edges of the pile. The grain is exposed to rodents, birds, insects and wind so that losses become severe within a few weeks.

Before the grain is threshed, the harvested crop is stacked near the threshing yard in such a way that any down pour of rain does not get an entry into the stacking, but runs down the stack



by virtue of the slope provided without affecting the quality of grains. By this method the raw grain also attains good shape and shining colour that would be appealing to the user.

Many a times the farmers erect a storage bin made of paddy straw by twisting a bundle of the straw to a rope like structure and then laying it in circular fashion to get a bin like structure. Paddy



grains after they are fairly dried are put into this structure again covered with paddy straw tightly in the shape of a cone, so that the grains are well stored inside the structure. Before putting

the grains, the ground surface also is well covered with the paddy straw.

Temporary crib for field storage: This structure of sticks and heavy twine is used for crops like corn and rough rice. The shifting agriculture practiced in this tropical lowland often results in fields being far from the farmstead. The corn will be transferred as needed to the house. This large box has been used for many years for storing beans and threshed corn. It is elevated on stones to facilitate inspection for signs of rodent activity.

2. Temporary Corn Storage:

Field storage of corn is accomplished on platforms. The stack of un-peeled ears is covered by a cap of partially woven grasses.



3. Underground: Underground storage was probably the principal method used to accumulate surpluses in primitive societies, and it can still be found in our time. Its advantages are the grain's protection from seasonal and daily temperature fluctuations, inhibition of insects and molds by a tendency towards low oxygen and high carbon dioxide contents in the inter seed air,

and simple construction methods. Its principal drawback is the high cost of grain handling.

4. Bagged: Bags of grain may be piled under any convenient shelter away from weather and predators.

5. Farm Bins: Farm storage space is needed for three reasons; to hold the crop immediately after harvest, until it can be moved to better storage space or to market. Grain stored in bins maintains quality better in smaller than in larger lots. Farm storage tends to maintain the original condition of grain better than elevator storage, provided grain is not exposed to any moisture increase or to rodents birds or insects. The farmers have developed the oriental bins by using burnt clay which are in use by the farm families from time immemorial.

Seed Storage

Only well-dried seeds should be stored. Seeds with moisture in them become damp, moldy and vulnerable to insect attacks. For drying, lay the seeds under the sun on a mat and spread them thinly. Mix and turn the seeds 4 to 5 times in a day. Repeat the process for about 2 to 3 days. On a hot sunny day, the seeds spread on a mat in the morning should be heaped for some time and again spread frequently to avoid sun-burn and damage of the embryo.

After drying the seeds well, them to remove all stones, malformed, broken, undersized and diseased seeds, weed seeds, other crop seeds, chaff and other rubbish. These seeds must now be stored properly. To store seeds use containers that are airtight and moisture-proof. Earthen pots of burnt clay are used for the storage in traditional agricultural practices.



Storing seeds in a cool dry environment keeps them viable for longer. Seeds have a tendency to absorb moisture. To maintain dryness, the storage containers could be filled to a quarter capacity with either dry wood ash or dry charcoal. If the seeds are to be put directly into the earthen pot then cover the dry ash with a layer. In case the



container is opened frequently, change the wood ash or charcoal every time it is opened.

The viability and quality of seeds depend on how well they are protected from insects and pests. There are simple ways of protecting seeds from insects. Farmers have been using various indigenous methods of seed storage for ages. Generally the seeds to be stored are smeared with neem / castor oil which checks the pest attack.

Grains are usually stored in clay vessels or gunnysacks. These containers are coated with a paste of neem leaf or dry Neem cake powder. The floor and room in which the seeds are stored is plastered with cow dung to keep pests away. These are just a few very commonly used traditional seed storage practices

Storage Structures

1. Pits storage: Pits are usually excavated to be wide at the bottom and taper to a small opening at the top; more hygroscopic than the grain, tends to hold soil moisture away from grain mass.

2. Stone, brick, or mud warehouses have long been used for grain storage. The floor of the structure is generally covered with cow dung paste to avoid insect pests by its repellent action.



3. **For storing major grains like cereals and pulses,** mud and brick structures with double door system are constructed, one door being smaller than the other. The bigger door is seldom opened unless the entire quantity of stored grains are to be



shifted to market and the like. Small door is provided in such a way that only one man can enter the storage, take out the required quantity and close the same immediately without giving room for the larger quantity being affected by external factors.

4. **Corn ears tied and hanged on sticks or ropes:** Unhusked corn ears are hung with the tip downward to prevent moisture entry, a technique that is used almost throughout the world.



5. **Mud jar for threshed cereals and pulses:** This un-burnt mud vessel placed over stones contains threshed grains. The decorative design varies by zones within the country.



6. **Vegetable Seed Storage**

Method: The vegetable seeds are normally stored by women folk for their kitchen garden requirements by securing the seeds of different vegetables into knots tied around them in a white cloth. While doing so the seeds are mixed with woodash / dried neem leaf powder. After this these are conveniently put into



Bottleguard, sprinkled woodash on the top and closed the mouth of the bottleguard.

Safe Grain Storage Methods for Wheat, Pulses and Oilseeds

- a. After harvesting of Rabi crops like wheat, pulses and oilseeds, they are cleaned and put in an open place for sun drying. After drying, seed grains are packed in jute bags. A store room of 20'x15' size is used for keeping 50 to 80 qtls of seed. Spread wheat husk on the floor upto 1-2 feet, after which all bags are kept at a distance of one foot away from all the walls of the room. After one layer, spread again wheat husk of 6" layer, followed by wheat bags as done earlier. This process is repeated to accommodate maximum produce till the room is filled, after

which the room is closed. The door has to be opened only when needed, which helps to protect the seed/grain from insect pests and moisture.

b. Use of garlic for safe storage on cereals and pulses:

Take a container of one qtl. storage capacity. At the bottom of the container, about 200 gm of matured garlic are kept and then about 20 Kg of wheat poured into the container.

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Again a second layer of 200 gm of garlic and 20 kg of cereals poured into the container. It is repeated like this till the container is filled. This practice is also followed for safe storage of rice. But in case of rice, use turmeric instead of garlic. Ensure that the container is closed tightly. This is a low cost technology and can be easily practiced.

- c. The leaves, kernels and oil of neem (*Azadirachta indica*) have been found to be very effective against a wide variety of storage pests. Neem leaves are dried in shade and powdered. This powder is added to the bags or containers in which the grain is stored. Using neem oil is more efficient as the seeds have the maximum concentration of the active ingredients (*azadiragtim, salanin and malandriol*). The quantity of oil depends on the quantity of seeds used. Quantity of Neem oil should be one

percent by weight of seed. Grain stored for seed purpose can be treated with two percent by weight of seed (storing grains).

- d. For safe storage of bean seeds, to one kilogram of bean seed add 2 teaspoons of vegetable oil. Mix the oil with 250 gms of seed and put it into a clean container. Add the remaining seeds and mix till all the seeds are coated with oil. When coated well with oil the seeds appear shiny. Generally this method is used for vegetable seeds.

- e. Bamboo **grain**

storage structure plastered with cow dung slurry covered with a layer of paddy straw and a layer of dried leaves of '**neem**' at the bottom to store



paddy, reduces storage insect pests of paddy and prolongs storage life. Cow dung slurry acts as disinfectant while *neem* acts as an insect repellent.

The bamboo baskets are also used for **storing jaggery**. The inside surface is coated with woodash and red soil. However, the outer surface can be conveniently coated with cow dung and red earth slurry with little neem oil to drive away the insect pests.



- f. Using bamboo bins for storage: Paint the bamboo bins with the solution prepared from neem cake. To the dry neem cake powder water is added and a thick paste of this is painted all over the grain bin. If one wishes to store it for more than 4 months, the process should be repeated every 4 months.
- g. Treatment of gunny bags for storing grains: Prepare a 10% neem kernel solution. Once the solution is made, dip the gunny bag into this solution for 15 minutes. Dry the gunny bags under shade and this can be used for storing grains. The stored grain pests will be repelled by the action of neem. In case the gunny bags are new, they should be soaked for half an hour. For gunny bags with close meshes and small pores, thinner solution can be used. Make sure that the gunny bags are impregnated on all sides with this extract. If the seeds or grains are kept inside the house or in the godowns, there is no fluctuation in temperature and not much sunlight. As a result of this, longer, residual action of the neem product is obtained and the

repellent effect persists for 4 months. In store rooms, along with the cow dung that is used for cleaning the mud floor, neem cake or neem oil can be used straight away (in the same concentration as used for spraying purposes). The same could also be used for the mud walls. Neem cake solution or neem kernel extract could also be sprayed.
