

Traditional grain storage structures in Arunachal Pradesh

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Agriculture is perhaps the most common occupation among people all over the world. In India, more than 70 percent of people rely on agriculture for their livelihood (Jeevaet *al.* 2006). About 10 percent food grains are spoiling under post-harvest conditions due to lack of sufficient storage and processing facilities (Singh and Satapathy, 2003). Storage is the process of keeping grains for a short or long period of time to protect them from changing weather and pests attack. The healthy, clean and uniformly dried

grains are the basic prerequisite of a good storage practice.

A proper grain storage practices plays critical role in preventing losses caused primarily by weevils, beetles, moths and rodents (Kartikeyan *et al.* 2009). It is estimated that 60 to 70 percent of country's food grain production is stored at household level in indigenous storage structures that include various earthen structures to modern storage

bins (Mobolade *et al.* 2019). Apart from these, several grain storage containers were made from a variety of locally available materials varying in design, shape, size and functions (Kanwar and Sharma, 2003).

Traditional storage methods are a type of community knowledge that has evolved over the period and has been passed from generation to generation (Natarajan and Santha, 2006). Certain traditional grain storage practices are unique to the society's culture and vary across locals, communities, villages, and countries. These indigenous practices originate from the cultural connection with specific environmental conditions, and they are based on traditional societies' having intimate consciousness of their environment.

The storage practices and methods discussed in this article are comparatively cheap and constructed with readily available local materials, eco-friendly, impart significant high shelf life to stored food grains by

effectively reducing or suppressing insect infestation.

Traditional Grain Storage Practices

Paddy straw bin: Paddy straw is used for building straw bin storage structure (Fig 1). It is dried properly, specially prepared, kept straight and the dried straw is woven to form rope that is concentrically arranged over a large area with the bark of *Erythrina indica* Murr. and *E. variegata* Murr. placed alongside the straw. To store grains in this structure, they are mixed with sifted ash before being placed in the straw bin, and then the straw ropes are folded over the grains. Typically, this storage structure is suspended from the roof rafters (Jain *et al.* 2004). This design is

used because it is inexpensive and easy to manage through locally available materials which keep the grain cooler. Seed viability of grains stored in the straw bin can last for two years.

In Arunachal Pradesh, the paddy retained at farm level are stored structure such as granary, local made bamboo structures (mar, dully and pachi), ekkam patta (*Phrynium pubinerve*). The structures used by the locals protect the grains to a maximum extent from storage pests. The structures are low cost and constructed with use of locally available material of bamboos, ekkam patta and toko palm are most important.



Fig 1. Paddy straw bin and Supur (Bamboo basket as paddy grain storage structure in Nahu/Komsum)

storage structure commonly used by the resource-poor farmers in the different district of Arunachal Pradesh, India for

the storage of food grains such as rice, maize, millet, etc (Fig. 3, 4). The storage capacity of *Nahu* ranges from 5.0–8.0 t

and can hold 0.20–0.24 t for seed purpose, with durability for 20 years. These storage structures are built near residential areas in the village and are positioned apart to avoid a fire outbreak. The structure resembles a crib but is divided vertically into three compartments; the lowest compartment for firewood, the middle compartment remains empty, and the grains are stored in Supur (Fig. 1) after thoroughly drying by making airtight compartments at the top, made up of bamboo mats and *Livistona jenkinsiana* leaves. To create an airtight compartment for grain storage, finely woven bamboo mats are tightly set on the ground and the walls.



Fig 3: Nahu at village Padu, Upper Siang Arunachal Pradesh

After the grains are added to the store, it is tightly covered with a bamboo mat by keeping stones over it, leaving no space left for rodents entry. *L. jenkinsiana* used for roofing are replaced every five years (Sarangi *et al.* 2009). The majority of farmers in most rural farming communities stored food grains near the kitchen where the heat and smoke of burning firewood penetrates *Nahu* to keep the food grains free from insect pest infestation (Sarangi *et al.* 2009). When large quantities of grains to be stored, specially raised barns are built; a slow burning fire is lit and hot air is controlled to keep grains dry (Sarangi *et al.* 2009).



Fig 4: Nahu at village Ayeng, East Siang Arunachal Pradesh

Modified Nahu: In recent times during survey in Siang valley of Arunachal Pradesh, we have noticed the traditional storages structures are being constructed

using RCC columns in place of wood as they last longer than wooden columns. RCC columns run till plinth level and the main storage housing are

constructed using timber frame and walling are done using bamboo sheets. Timber panels are also used widely for walls. Roofing is constructed using timber frames and GI sheets for cover. GI sheets are more preferable as they are easy to install and longer than traditional



Fig 5: Modified Nahu at village Padu, Upper Siang, Arunachal Pradesh

thatch roof and toko palm as it have to change every two years (Fig. 5, 6). As per the opinion of farmers, the pitch roofs are most preferable structures as they allow quick and easy flow of rainwater and keep the storage space dry.



Fig 6: Modified Nahu at village Ayeng, East Siang, Arunachal Pradesh

Conclusion

The methods and procedures for storage covered in this article are relatively inexpensive, made from locally accessible materials, environmentally benign, and give stored food grains a significantly long shelf life. These traditional food grains

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storage and preservation practices can be improved upon or modified as needed to ensure safe grain storage and full realization of agricultural potential in order to meet the increasing food and energy needs, globally.

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