Indigenous grain storage structures of South Tamil Nadu

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Received 17.11.2009; revised 09.04.2010

Modernization of Indian agriculture has caused extinction of several Indigenous agricultural practices which once played a vital role in bringing down the dependency of our farmers. Preservation of food grains through indigenous methods is considered as one of the most important traditional ways in our Indian agriculture from time immemorial. The objective of the paper is to rejuvenate the vanished grain storage structures which have been in vogue until recent times, as one of the measures to meet out the challenges posed by globalization.

Keywords: Indigenous knowledge, Indigenous grain storage, Kulumai, Kudhir, Kaambara, Modappanai

IPC Int. Cl.3: A01F25/00

It has been estimated that storage losses alone contribute to the loss of 20% of total food grains produced in India1. Even after their strenuous efforts for producing crops, the farmers are struggling hard to protect their grains from various conditions causing damage to them. With the era of Green Revolution, many improved techniques and methods along with poisonous chemical protectants entered Indian agriculture not only for producing crops but also for storing grains. Until then, the farmers might have been possessing excellent storage structures and practicing indigenous storage techniques. Man had entered into a purposeful fight against the continuous losses of the crops and grains in store even ten thousand years ago2. Some of the farmers are even now storing their produce in indigenous storage structures and containers such as kulumai, pattarai, pots, gunny bags, etc. These structures protect the stored grains, do not cause health hazards apart from being eco-friendly, cheaper and locally available3. However, they have become obsolete among a majority of the farming community due to various other reasons. Hence, a study was undertaken to collect and document the details of various indigenous grain storage structures available among the farmers so as to preserve and propagate them for use by the future generations.

Methodology

Dindigul district of Tamil Nadu was purposively selected for the study. Of the 14 blocks of Dindigul district, which lies between 77°30'' E and 78°20'' E of longitudes and 10°05'' N and 10°09'' N of latitudes, Reddiarchatram block was selected as it possessed all the three major farming systems of the study area, viz. wet land, garden land and dry land farming systems in higher proportions as compared to other blocks. Appropriate importance was attributed to major grain crops like paddy in wet land; sorghum and maize in garden land and pearl millet, foxtail millet and finger millet in dry land systems. By applying the same criteria, three villages, viz. Mangarai, Kunjanampatty and Nettapiatty were selected for the study in that block. Ten aged and experienced farmers were selected from each of the above villages and in turn total 30 farmers were contacted. An informal village level workshop was conducted at Nettapiatty village involving all the selected 30 farmers for collecting and documenting the information on various indigenous grain storage structures, which they had already used regularly or have been using rarely. The information comprised of descriptions about their fabrication, durability, methods of maintenance, use and special features.

Results

Five indigenous storage structures which had been in vogue were elucidated from the workshop with
detailed information on their structural description, fabrication, use, maintenance, advantages and photographic presentations.

Kulumai

Kulumai (Fig.1) is an important indigenous storage structure for storing various food grains, especially paddy grains (Oryza sativa). It is indigenously fabricated with a poultice made up of tank silt, rice bran and paddy straw. Step by step process of preparing the poultice has been shown (Figs.6-11). Initially, tank silt is powdered, mixed with water and made as a paste. Then, the paddy straw and rice bran are mixed with this tank silt paste at a ratio of 15:15:70 and kept as a heap, for two days, covered with wet gunny clothes to facilitate fermentation. By this process, the bran and silt get cemented together and become a homogeneous mixture. Then, the poultice is moulded by hands to form ring like structures with a dimension of 0.75 - 1 m diameter, 30-40 cm height and 2.5-3.0 cm thickness. The ring to be placed at the bottom of kulumai will have a tapering end and form into a vat like structure. A top lid with narrow mouth is also fabricated for kulumai by using the same poultice material.

After moulding, the rings are charred in a brick kiln for two days or sun dried for 4-5 days. The former process is better than the latter one. Optimal dryness of rings is indicated by the metallic sound produced on tapping. Then the dried rings are smeared with cow dung solution and lime washed. The rings are then arranged one over another to make a kulumai with a height of 1.5-2.0 m. Coating with lime solution is done once in a year. An outlet hole is provided at the bottommost ring and usually plugged with gunny clothes or wooden lids. Optimum season for fabricating kulumai is April-May, since it enables easy, uniform and proper drying. Rice bran and paddy straw are used to give stability and strength to the structure and to prevent easy entry of pests and pathogens. Kulumai, an indoor storage structure, protects the grains from pests and diseases and even from rats and rodents. Paddy grains stored in the structure will have a keeping quality for about 3 yrs without much deterioration in quality, and no other modern structure will exhibit same performance. In general, total storage capacity of the kulumai is about 600-700 kg but varies with the size and number of rings. After filling the grains, kulumai is covered with its lid. Kulumai is almost a stationary structure and is not frequently moved. Dismantling of each ring is possible to enable easy and quicker filling of grains inside the kulumai.

Kaambara

Kaambara, locally called as Kalangiyam is a permanent masonry structure built on a corner or on one side of a room (Fig.2). This is built with bricks pasted with a mixture of diluted lime and sand called, lime mortar. Kaambara may have a dimension of 3x2x2 m or more. Kaambara is given lime washing once in 2-3 yrs. It is used for storing large quantity (about 2-3 metric tonnes) of food grains, with a facility to fill in or drain out the grains at any time. Before filling the grains, the inner walls of kaambara are lined with palmyra leaf mats to provide a moist proof environment. Small wooden stands are given on one side of the inner wall to place castor oil lamps for lighting, while working inside the structure. Small wooden step is provided at the outer wall of kaambara for easy climbing and entering into it.

Kudhir

It is the biggest grain storage structure built by using calcareous soil containing clay particles to some extent (Fig.3). Soil made into a paste like consistency by adding water is used for building the kudhir. Kudhir is built into a circular fashion in a phased manner. Each phase having a height of 0.75-1.00 m is allowed to dry for 2 or 3 days, and then another phase of circular structure are built over the dried one. The process is repeated until the kudhir reaches a required height of 3-4 m. The entire structure is built on a platform created by arranging 4 or 5 rectangular stone blocks of 3x1x0.1 m dimension each, which are rested on laid down stone pillars in such a way to provide an elevation thereby creating a moist proof and rodent free environment at the base of kudhir. After complete drying, both inner and outer walls are coated with cow dung slurry and finally outer wall is washed with lime solution. Lime washing is done periodically. Roof for kudhir is erected to protect the structure from direct sunlight and rainfall. Roof is made up of criss-cross wooden planks and country tiles. Grains are filled into the kudhir through its open top by using bamboo ladders and covered with gunny clothes and dried palmyra leaf mats. An outlet hole is provided at the bottom of kudhir to drain out the grains as and when needed. The hole is usually plugged with gunny clothes or wooden lids.
Modappanai

This is simply a mud pot, but bigger in size (Fig.4). Modappanai is fabricated with clay soil by using a specialized wheel. Then the wet clay pot is charred in the brick kiln for its hardening. Unlike kulumai, it is smaller, easily movable and used for storing the food grains for household consumption. Grocery items like tamarind, chillies, coriander seeds, etc. are also stored. The storage capacity of each modappanai varies from 25-30 kg. Both

Fig. 1—Kulamai for grain storage; Fig. 2—Kalangiyam for grain storage; Fig. 3—Kudhir for grain storage; Fig. 4—Modappanai for grain storage; Fig.5—The pit, dug beneath the ground; Fig.6—Tank bed silt; Fig.7—Powdering the soil; Fig.8—Making into paste; Fig.9—Mixing rice bran; silt & paddy straw; Fig. 10—Puddling the mix and Fig.11—Final stage of poultice
**Indigenous storage structures**

Indigenous grain storage structures provide excellent moist proof environment to the stored grains thereby avoiding the occurrence of pests and diseases rather than controlling them after their attack. Apart from insects and diseases, these structures also prevent the damage by rats, rodents, etc. These structures are very cheap in both fabrication and maintenance than the modern storage units. Since it had already been tested over centuries of use, they are very much adapted to our local agro-climatic conditions. Since they are fabricated with organic materials, they do not cause any problem of environmental pollution. Grains stored in these structures are safe for the health of both human beings and animals. As these structures require only the locally available materials and technologies for their fabrication and maintenance, dependence on urban centres is reduced. Common people get easily familiarized with their fabrication, use and maintenance. Longevity of the seeds stored in these structures is protected for a period of 2-3 yrs. These structures are amenable for alteration in their size and shape, while fabrication is done according to the requirement of users.

**Conclusion**

If these indigenous grain storage structures are conserved and propagated for use among the farming community, they would definitely lead to the endogenous development of rural areas thereby providing a basis for self-sufficiency and self-determination of the common rural clientele.

**Acknowledgement**

Authors are highly thankful to the farmers of the study villages for having shared the valuable knowledge and expertise on the indigenous grain storage structures and for the photographs of the storage structures.

**References**