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Editorial

How safe Is … food grains stored under natural condition in India ?

Poor food grain storage and the resultant wastage are considered a perpetual problem in India. According to Food Corporation of India (FCI), in reply to an activist question in 2014 as much as 1.95 MT of food grains was wasted in India between 2005 and 2013. Of this loss, around 84% was rice and 14% wheat. According to FAO, grains worth US $ 14 billion is damaged annually at one hand and on the other hand million goes hungry in India every day. Procurement of farm produce increases with the government announcement of minimum support price (MSP) for grains and farmers try to increase production of food crop.Unfortunately, such increased production is not accompanied by increased post harvest storage facilities. There is a big gap between the required another existing storage capacity. Food Corporation of India (FCI) a central government agency entrusted with procurement and storage of grains for Public Distribution System (PDS) has a storage capacity of only 32 WT of which half is hired. While in recent years, government buys in excess of BOMT, an additional storage capacity required exceeds 50 MT. As a consequence, at any given time a major portion of grains (about 69%) are stored in traditional structures of farmers in villages. These structures arc not suitable for long period of storage.

Natural contamination of good grains is greatly influenced by environmental factors such as temperature, moisture, debris etc. as well as health of grains. During storage, quantitative as well as qualitative issues occur due to activities of rodents, insects and micro organisms . Of the total post harvest losses in two major food grains, rice and wheat 75% occur at term level and 25% at market level. Post harvest losses of food grains in India, when World Bank estimated could feed one third of India's poor. The monetary value of these losses amount to more than Rs.50000 Crores/year.

Hot and humid climate prevailing almost throughout India in most part of the year, is considered not congenial for long storage. Grains are generally dried to a safe moisture level before these are stored, but, grains being hygroscopic release or absorb moisture depending on grain moisture and inter grain relative humidity of the air until an equilibrium is reached. Besides grains and seeds show differential water absorption indicating thereby that the critical moisture content varies in different types under identical storage condition. Beeds containing higher oil content show low, with higher protein content intermediate and abundant starch show highest as regards their ability to absorb moisture. The relative humidity(RH) of inter seed air is directly related to the grain moisture and it moves to an equilibrium with surprising rapidity. Naturally stored grains also become damaged due to presence of debris (broken seeds, leaf and stem portions dust etc as well as microbe). As such, clean grains show longer storability than uncleaned ones.Debris being higher moisture absortive and higher moisture retentive than healthy grains, create condition favourable for activities of particularly storage fungi present in a grain bulk. Around debris, microbes grow,produce heat and release moisture thus creating ' hot spot'.Even some Xerophytic storage fungi viz.,*Aspergillus halosphilicus*, *A. restrictus* are capable of attacking dry grains with moisture level close to safe level. Their activities also raise grain moisture and temperature thus, creating 'hot spot. Heated inter grain air from hot spot travel upwards in the grain lot carrying moisture, heat and fungal spores, thus, spreading the activities. With gradual rise in masture and heat, a succession of the storage fungiviz., *A.flavus*, *A.glaucus*, *A.candidus* etc appear, thereby perpetuating toward total destruction.Some kind of grain infecting insects viz. weevils in which larvae and pupae grow inside karnals carrying large number of spores of storage fungi. Thus, a developing infestation provide both heat and moisture to promote microbial growth. Both metabolic water released by the insects and Metabolic heat generated by them in localized infestation spread then in the grain lot thereby starting a self perpetuating process of spoilage.

The problem of grain storage in many temperate countries like Sweden Is not as grave as in tropical countries like India, because of low humidity and cooler environment for most part of the year. In those countries, long winter with very low prevailing temperature prevent survival of many microbes in nature. Moreover, modern storage facilities in advanced countries are more or less adequate for safe grain storage,

Indian farmers should give equal emphasis to crop production and crop storage. It is high time that both the Central and State governments should think about the severity of the problem of storage loss and built to modern store houses as quickly as possible, it should be kept in mind that 'one grain saved from loss is one grain produced'. The establishment of small size cold storage units in the production centres would help in reducing storage loss. In this direction: zero energy cool chambers technology developed by the Indian Council of Agricultural Research needs to be popularized. Finally, educating and training the farmers of post harvest operations and apprising them with advancements in the area regularly, would greatly help to reduce the post harvest loss.

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