

## To Ascertain Factors Contributing to the Grain Loss during Storage in Different Methods in Tikamgarh Block of Tikamgarh District

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### ABSTRACT

Agriculture is one of the strong holds of the Indian economy and accounted for 12.9 per cent of the country's gross domestic product (GDP) in 2014-2015, according to the central organizations (CSO) estimates. During storage, quantitative as well as qualitative losses occur due to factors like insects, rodents, and micro-organisms. A large number of insect pests have been reported to be associated with stored grains. The occurrence and numbers of stored grain insect pests are directly related to geographical and climatic conditions. Keeping this fact in view the study's aim out at evaluation of grain storage method which was carried out in six villages of Tikamgarh block of Tikamgarh district of Madhya Pradesh. Farmers from each village were selected by proportionate random sampling to make sample size of 120. Pre structured interview schedule was used for data collection by using personal interview method. The study revealed that main causes for rat damage were burrows on mud floor (18.33%) followed by oily nature of food grains (15.00%) and external entry through burrows (13.33%). Whereas, 16.67 per cent, insect damage to food grains was caused by excess moisture in grains followed by improper drying (11.67%), improper ventilation (10.00%) and very few damage is due to access aeration (6.67%), lack of cleanliness (5.83%) and ventilation (5.00%). About 8.33 per cent of the respondents did not indicate any specific cause for damage to food grains due to insects. Hence this study highlights the groups in need of help with control.

**Key words:** Block, Storage, Food grains, Losses, Insects

### INTRODUCTION

Agriculture is one of the strong holds of the Indian economy and accounted for 12.9 per cent of the country's gross domestic product (GDP) in 2014-2015, according to the central organizations (CSO) estimates. As a result of strategic approach followed after

independence, the food grain production which remained at 51 million tonnes in 1951 has impressively gone upto 234 million tonnes in 2008-2009<sup>1</sup>. The per capita availability of food grains which remained less than 400 gm/day in the past has reached beyond 500gm/day in recent peak production years.

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It is evident that food grain production growth so far is competitive with the population growth in the country. The bulk of these losses occur during storage for most of the commodities. The storage losses are due to biotic factors such as rodents, insects and pests; micro biological factors such as fungi and bacteria. Chemical factors resulting in loss of colour, flavour, texture and nutrient value and most importantly abiotic or mechanical factors due to faulty storage structures grain production growth so far is competitive with the population growth in the country During storage, quantitative as well as qualitative losses occur due to insects, rodents, and micro-organisms. A large number of insect pests have been reported to be associated with stored grains. The occurrence and numbers of stored grain insect pests are directly related to geographical and climatic conditions. Almost all species have remarkably high rates of multiplication and, within one season, may destroy 10-15% of the grain and contaminate the rest with undesirable odors and flavors. Insect pests also play a pivotal role in transportation of storage fungi<sup>6</sup>. The major pests of stored grains include beetles (*Callosobrunchus sp*, *Trogoderma granarium* and *Tribolium confusum*), weevils (*Acanthoscel idesobtectus*), moth (*Corcyra cephalonica*) and rodents. The control measures include two types of treatment – prophylactic and curative. The prophylactic treatment involves the use of pesticides like Malathion (50% EC), DDVP (76% EC) and Deltamethrin (2.5% WP). Curative treatment involves use of fumigant Aluminium phosphide to control infested stock or godown in airtight condition. For controlling rodents rat cages, poison baits and use of rat borrow fumigation is recommended<sup>3</sup>. The post-harvest losses in India account to 12 to 16 million metric tons of food grains each year, an amount that the World Bank stipulates could feed one-third of India's poor. The monetary value of these losses amounts to more than Rs 50,000 crores per year<sup>5</sup>. Natural contamination of food grains is greatly influenced by environmental factors such as type of storage

structure, temperature, pH, moisture, etc<sup>4</sup>. Types of structure used, length and purpose of storage, grain treatment (eg. parboiling) and pre-storage practices are all important variables affecting storage losses. The importance of these regional and crop variations immediately determines certain necessary characteristics of crop storage research<sup>2</sup>.

## MATERIAL AND METHODS

Tikamgarh district comprises of six blocks i.e. Tikamgarh, Niwari, Prithvipur, Baldeogarh, Palera, and Jatara. Out of 6 blocks one block namely Tikamgarh is selected for the study purpose because the information on various grain storage methods have already been disseminated among farmers of different villages of the block by the KVK scientists through organized training programmes. A village wise list of farmers was prepared. They were considered as respondents. The farmers from each village were selected by proportionate random sampling method to make a sample size of 120. Twenty farmers from each village is selected

## RESULT AND DISCUSSION

### Ascertain factors contributing to the grain loss during storage

**Factors contributing to the grain loss during storage methods:** - The results presented in Table No. 1 showed that the main causes for rat damage as expressed by respondents were burrows on mud floor (18.33%) followed by oily nature of food grains(15.00%) and external entry through burrows (13.33%). Whereas, 16.67 per cent of respondents expressed that insect damage to food grains was caused by excess moisture in grains followed by improper drying (11.67%), improper ventilation (10.00%) and very few of the respondents expressed that damage is due to access aeration(6.67%), lack of cleanliness (5.83%) and ventilation (5.00%). About 8.33 per cent of the respondents did not indicate any specific cause for damage to food grains due to insects. While very few of the respondents opinioned that the main causes for

bandicoots damage were burrows on mud floor (5.00%), oily nature of food grains (3.33%) external entry through burrows (2.50%). About two per cent of respondents indicated that moisture damage was due to wet floor, excess rain and improper drying. It was observed from the results that the type of loss due to insects was mostly in the form of powder formation (39.17%), chaffy seeds (20.83%) and development of holes on seeds (8.33%) and aggregate formation (1.67%). In case of rats and bandicoots the loss was in the form of broken grains (20.50% and 3.33%), whole grains eaten by rats (21.67% and 5.83%) and mix the grains with soil (2.5% and 1.67%), respectively. The loss due to moisture had resulted in colour change (1.67%), black mould development (1.5%) and aggregate formation (1.67%).

#### Factors contributing during grain loss during storage

The results presented in Table showed that the main causes for rat damage as expressed by respondents were burrows on mud floor (18.33%) followed by oily nature of food grains (15.00%) and external entry through burrows (13.33%). Whereas, 16.67 per cent of respondents expressed that insect damage to food grains was caused by excess moisture in grains followed by improper drying (11.67%),

improper ventilation (10.00%) and very few of the respondents expressed that damage is due to access aeration (6.67%), lack of cleanliness (5.83%) and ventilation (5.00%). About 8.33 per cent of the respondents did not indicate any specific cause for damage to food grains due to insects. While very few of the respondents opined that the main causes for bandicoots damage were burrows on mud floor (5.00%), oily nature of food grains (3.33%) external entry through burrows (2.50%). About two per cent of respondents indicated that moisture damage was due to wet floor, excess rain and improper drying.

It was observed from the results that the type of loss due to insects was mostly in the form of powder formation (39.17%), chaffy seeds (20.83%) and development of holes on seeds (8.33%) and aggregate formation (1.67%). In case of rats (8.33%) and aggregate formation (1.67%). In case of rats and bandicoots the loss was in the form of broken grains (20.50% and 3.33%), whole grains eaten by rats (21.67% and 5.83%) and mix the grains with soil (2.5% and 1.67%), respectively. The loss due to moisture had resulted in colour change (1.67%), black mould development (1.5%) and aggregate formation (1.67%).

**Table No.1: Factors contributing to the grain loss during storage methods**

Factors	Causes	No.	%	Type of loss	No.	%
Insect	Excess moisture	20	16.67			
	Improper ventilation	12	10.00	Powder formation	47	39.17
	Improper drying	14	11.67	Chaffy seeds	25	20.83
	Climatic variation	6	5.00	Development of holes on	10	8.33
	Access aeration	8	6.67	seed	2	1.67
	Long term storage	5	4.17	Aggregate formation		
	Lack of cleanliness	7	5.83			
	Attack from outside	2	1.67			
	No cause	10	8.33			
Rats	Burrows on mud floor	22	18.33	Broken grains	27	22.50
	External entry through burrows	16	13.33	Whole grains eaten by rats	26	21.67
	Only nature of food grains	18	15.00	Mix the grain with soil	3	2.50
Moisture	Moisture from wet floor	3	2.50	Colour change	2	1.67
	Excess rain	2	1.67	Black mould development	3	2.50
	Improper drying	2	1.67	Aggregate formation	2	1.67
Bandicoots	Burrow on mud floor	6	5.00	Broken grain	4	3.33
	External entry through burrows	3	2.50	Whole grain eaten by rats	7	5.83
	Only nature of food grains	4	3.33	Mix the grain with soil	2	1.67

### CONCLUSION

The grains are affected by insects, pests, rats, bandicoots during storage. Therefore, there is need to organize awareness campaign and educate farmers on effective grain storage method.

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