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EXTENT OF POST-HARVEST LOSSES IN DIFFERENT STAGES OF WHEAT PRODUCTION IN MADHYA PRADESH

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ABSTRACT

The present study has been carried out to estimate the extent of losses occurring different stages of wheat production. The relevant primary data has been collected during the year 2012 - 13 from 160 wheat growers from two major wheat producing districts i.e. Hoshangabad & Vidisha of Central Narmada Valley and Vindhyan Plateau Agro climatic regions of Madhya Pradesh, respectively. It is observed from the data that the harvest losses was found more in mid varieties (2.84 kg/q) as compared to early varieties (2.79kg/q) of wheat. The quantity loss during threshing and winnowing was 0.34kg/q. The average loss during transportation was found to be 0.21 kg/q and found more in tractor trolley (0.23 kg/q) as compared to the bullock-cart (0.19 kg/q) mode of transportation. The quantity lost during storage of grains was found to be maximum in rodents as compared to fungus. In total post harvest losses the maximum quantity loss was found in storage (59%) followed by harvest (30%), handling (5 %), threshing & winnowing (4%) and transportation (2%) stages of production. There were remarkable post harvest losses occurred in different stages of wheat production and the majority of respondents have lack of technical knowhow about post harvest technology. For this reason, efforts should be made for capacity building by providing training and technical advice to post-harvest handling, storage practice, drying and proper use of insecticides that can significantly reduce these losses.

KEY WORDS: Agro-Climatic Region, Different Stages, Madhya Pradesh, post-harvest losses, Wheat.

INTRODUCTION

Cereals are the staple food for millions of poor people in India. It is thus important to maintain their quality and value along the entire supply chain to ensure that consumers have access to food that is safe and nutritious. However, significant amounts of food crops produced in India are lost, aggravating food insecurity. The causes of post-harvest losses are manifold. They include poor storage practices that allow attack by insect and rodents, and contamination with mycotoxins. Crops also lose value due to damage from inappropriate tools, rough handling and spillage during harvesting, loading, packing and transportation.

Food losses contribute to high food prices by removing part of the supply from the market. They also impact on environmental degradation, climate change as land, water, labour and non-renewable resources such as fertilizer and energy are used to produce, process, handle and transport food that no one consumes.

Production in agriculture is seasonal and exposed to the natural environment, causing post-production operations to play an important role in providing stability in the food supply chain in the long run on the continuous basis. According to a World Bank study (1999) post-harvest losses of food grains in India reported to be 7-10 per cent of the total production from farm to market level and 4-5 per cent at market and distribution level. Given the total food grains production of around 240 million tonnes at present, the total losses worked out to be 15-25 million tonnes. With the given per capita requirement of food-grains consumption in India, the above grains lost would be sufficient to feed more than ten crore people. Losses in food crops occur during harvesting, threshing, drying, storage, transportation, processing and marketing.

According to FAO study, about 70 percent of the farm produce is stored by farmers for their consumption, seed, feed and other purposes in India. Farmers store grain in bulk using different types of storage structures made up of locally available materials. It is necessary to clean and dry the grain to increase its life during storage and by that increasing the keeping quality for the long time for the better storage. In addition, storage structure, design and its construction also play a vital role in reducing /increasing the losses during storage. Meena *et al* (2011), Susana G. Castro (2006), Alam *et al* (2003) and Anonymous (2001) have estimated the magnitude of harvest and post harvest losses in different size of farm from 16.33 kg/q to 25.49 kg/q.

As per the available data, the crop losses caused by pests and diseases are huge. But, the knowledge of the crop loss at the farm level is very much limited. In addition to losses that occur during the growth period of the crop, quantity of grains lost during the process of harvesting, threshing, transportation and storage were found to be huge. The yield and quality of food grains are highly affected by pre and post-harvest Management. The farmers in most cases are ignorant of this fact that affects the productivity and quality of food grains (Maiti, 2010).for this reason, the present study has been conducted to makes comprehensive attempt for estimating the dimension of losses occurring during different post-harvest stages of wheat production.

MATERIALS AND METHODS

A multistage sampling technique has been used for selection of respondents of the study. At first stage Hoshangabad and Vidisha districts from Central Narmada Valley and Vindhyan Plateau have been selected respectively, as these districts have remarkable position in area and production of wheat in M.P in these Agro-climatic regions as well as in the state.

Further, 3 villages situated near by regulated market (in radius of 10 KM) and 3 villages situated away from the regulated market (>10 Km from regulated market) have been selected for the study (Table 1).

A list of all the farmers of the selected village has been prepared and classified into in marginal (below 2 ha), small (2- 4 ha), medium (4-10 ha) and large (above 10 ha) categories according to their size of operational holdings and 20 farmers were selected randomly from each category for the study, therefore 80 farmers per district constituting overall sample of 160 farmers (Table 2).

The primary data were collected from the selected respondents of the study area by survey method with the help of personal interview. The collected data have been classified, tabulated and analyzed in the light of stated objectives of the study using suitable statistical tools.

RESULTS AND DISCUSSION

The assessment of post harvest losses, *viz*. quantity lost at different stages of harvest i.e. threshing, winnowing, transportation & handling, and storage at farmers' field in different size of farms and different Agro climatic regions were analyzed.

a) Harvest losses

The cultivators of study area were found to prefer early (78.04%) and mid (21.96%) verities of wheat. All the HHs sown mid varieties used to prefer manually harvesting while HHs sown early varieties of wheat prefer both manual (73.61%) and mechanical (26.39%) method of harvesting. Losses reported by HHs were found to be 48.75 & 51.25 per cent and 40.62 & 59.38 per cent under the medium and low categories in early and medium varieties respectively. The

losses estimated were found to be more in mid varieties (2.84kg/q) as compared to early varieties (2.79kg/q) of wheat (Table 3).

b) Threshing & winnowing losses

The quantity lost during threshing and winnowing has been presented in table. It is observed from the data that all the HHs of the study area threshed their harvested produce through mechanical thresher cum winnower. The quantity lost during threshing and winnowing reported to be 0.34kg/q. The most of the farmers reported losses at low level (77%) while only 23 per cent farmers reported losses at medium level (Table 4).

c) Transportation and handling losses

The quantity lost during transportation and handling has been presented in Table 5. The majority of HHs preferred tractor trolley (49.44%) followed by bullock cart (14.56%) to transport and handling their wheat from threshing floor to market and ranked their losses during transportation in low category (84%) followed by medium (12%) and high (4%). The average loss during transportation was found to be 0.18kg/q and observed more in the bullock cart (0.23kg/q) as compared to tractor trolley (0.19kg/q). The average loss during handling of grains of wheat has been found to be 0.40kg/q which was found more in tractor trolley (0.42kg/q) as compared to bullock cart (0.37 kg/q) (Table 5).

d) Storage losses

The data related to the quantity lost during storage for wheat has been presented in Table 6. It is observed from the data that the HHs of the study area used to store grains in *Kachha* and *Pucca* house only. Out of total quantity (42.14q/farm) stored for wheat, the maximum was found to be stored in *Kachha* house (30.14q/farm) as compared to *Pucca* house (12.00q/farm). The maximum quantity of grains was found to be stored in *Kothi* /bin *Kachha, Pucca*, followed by Gunny bags / Plastic bags, and open space in the study area.

An average HH of the study area used to store the grains approximately for the period of 190 days. All the HHs reported the loss at low level. The quantity lost by rodent (8.46 kg/q) during the storage was found to be maximum followed by fungus (1.13 kg/q). The average cost of storage to prevent post harvest losses was found to be Rs. 4.19 per quintal in the study area.

e) Total post harvest losses

The total post harvest losses per quintal of grains at different size of farms in wheat have been presented in Table 7. It is observed from the data that on an average 8.61 kg/q grains were lost. The maximum quantity of loss was recorded in storage (56%) followed by harvest (33%), handling (5%) threshing & winnowing (4%), and transportation (2%) of grains in wheat (Fig. 1). The data also revealed that the quantity lost in wheat grains was found to be more in large (9.78 kg/q), followed by small (8.46 kg/q), medium (8.10 kg/q), and marginal (8.09 kg/q) farms.

CONCLUSIONS AND SUGGESTIONS

As it is clear from the above findings that there were remarkable losses occurred at harvest and post-harvest stages of production and it is identified during the course of investigation that the majority of respondents had lack of technical knowhow of post harvest technology specially storage techniques. They never found to be followed sun drying, admixing with ash, smoking and other pest control measures in their storage structure. Even they were not found to be followed rat guard and removed infested grain from their storage grain. Hence, efforts must be made to provide training and technical advice in post-harvest handling, storage practice, drying and proper use of insecticides, which can significantly reduce these losses. Time to time appraisals of post-harvest systems must be conducted to identify gaps and enable appropriate solutions thereby improving traditional technologies and introduce new techniques in the post-harvest handling and storage of crops to stabilize the prices at consumer level and to ensure the access of good quality of food grains at reasonable prices.

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Table 1: Selected Districts and villages for the study

Selected crops	Agro-climatic Regions	Selected districts	Selected villages	
			In radius of 10 km from market	> 10 km from market
Wheat	Central Narmada Valley	Hoshangabad	Bekour	Pipariya Chhatrsal
			Bagalkhedi	Mahua kheda
			Samakeshli	Baskhapa
	Vindhyan Plateau	Vidisha	Mirzapur	Adampur
			Rangai	Bhatni
			Davar	Bhairowkhedi

Table2: Number of respondents in different categories of farms in selected districts

Selected crops	Selected districts	Size of farms				
		Marginal	Small	Medium	Large	Total
Wheat	Hoshangabad	20	20	20	20	80
	Vidisha	20	20	20	20	80
	Total	40	40	40	40	160

Table 3: Quantity lost at different stages of harvest (%)

Particulars		Varieties	
		Early HYV	Mid HYV
Area harvested per HH (acres)		8.28	2.33
Percentage area harvested (early, mid and late)		78.04	21.96
Area manually harvested (%)		73.61	100.00
Area mechanically harvested (%)		26.39	-
Rank of loss (% of households)	High	0.00	0.00
	Medium	48.75	40.62
	Low	51.25	59.38
Quantity lost during harvest	Kg per acre of harvest	38.66	39.46
	Kg per quintal of harvest	2.79	2.84
	Loss % of harvest amount	2.79	2.84

Table 4: Quantity lost during threshing and winnowing (%)

Particulars		Variety	
		Local	HYV
Area/quantity mechanically threshed (percentage of HH)		-	100.00
Rank of loss (percentage of households)	High	-	0.00
	Medium	-	23.13
	Low	-	76.88
Quantity lost during threshing	Average loss (Kg per acre)	-	4.68
	Average loss (Kg per qt.)	-	0.34
	Loss % of threshed amount	-	0.34

Table 5: Quantity lost during transportation and handling

Particulars		Mode of transportation		
		Bullock cart	Trolley	Overall
Average quantity transported (qt. per HH)		14.56	49.44	64.00
Average distance covered (kms)		12.04	12.04	12.04
Transportation cost (Rs. per quintal)		9.34	15.00	12.17
Rank of loss (percentage of HH)	High	4.76	3.87	4.32
	Medium	16.08	7.10	11.59
	Low	79.16	89.03	84.10
Quantity lost during transport	Average loss (Kg per qt. of amount transported)	0.23	0.19	0.21
	% of amount transported	1.58	0.38	0.92
Quantity lost during handling	Average loss (Kg per qt. of amount handled)	0.37	0.42	0.40
	% of amount handled	0.03	0.01	0.02

Table 6: Quantity lost during storage

Particulars		Place of storage	
		Kachha House	Pucca House
Mode of storage (percentage of the amount stored	Open	13.40	11.24
	Gunny/plastic bag	24.64	18.95
	Kothi/bin kuchha, Pucca	61.96	69.81
	Steel drums	0.00	0.00
	Others	0.00	0.00
quantity stored (Qt. per HH)		30.14	12.00
Percentage of HH who dried before storing		0.00	0.00
Average number of days stored (per HH)		192.00	186.00
Rank of loss in storage	High	0.00	0.00
	Medium	0.00	0.00
	Low	100.00	100.00
Quantity lost during storage (kg per quintal of storage)	Due to weight loss	0.00	0.00
	Due to rodents	9.00	7.92
	Due to fungus	1.58	0.68
Storage cost Rs per quintal		4.82	3.56

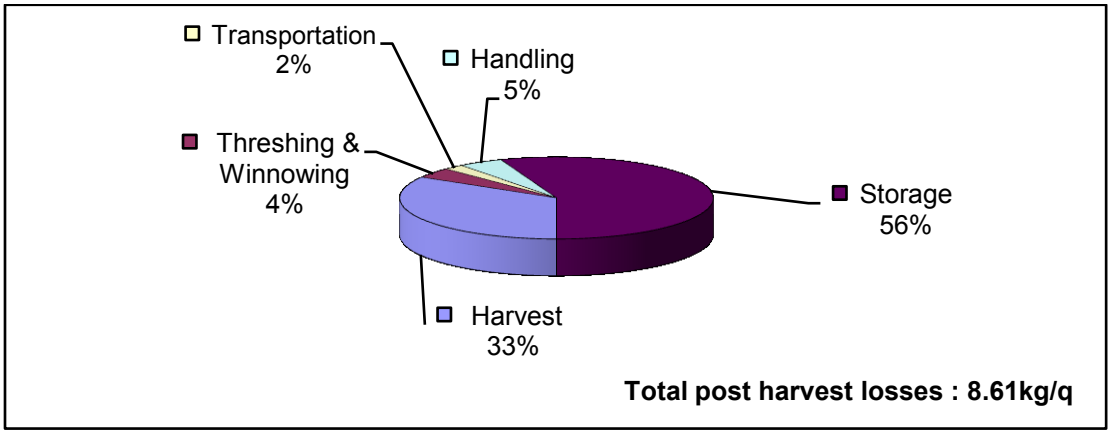

Fig 1: Percentage Post harvest losses in different stages of wheat production.

Table 7: Total post harvest losses kg per quintal by farm size

Particulars	Size of Farms				
	Marginal	Small	Medium	Large	Overall
Harvest	2.59	2.78	2.42	3.73	2.88
Threshing & winnowing	0.28	0.32	0.29	0.51	0.35
Transportation	0.16	0.18	0.18	0.21	0.18
Handling	0.36	0.38	0.40	0.44	0.40
Storage	4.68	4.77	4.79	4.90	4.79
Total post harvest loss (kg per qt.)	8.09	8.46	8.10	9.78	8.61
Total post harvest loss (kg per ha)*	284.15	295.09	323.17	265.48	291.97

Note: *Post harvest loss per ha is calculated by multiplying losses in kg per quintal by the productivity per ha.