



Post-Harvest Farm Operation Losses in Wheat-A Case Study of Kathua District

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ABSTRACT

The post-harvest losses have been estimated at different stages in wheat in Kathua district. The losses have been estimated using the survey data collected from 120 farmers. Tabular analysis has been used to estimate the post-harvest losses at different stages. The study brought out that about 82 per cent of the wheat area was harvested manually using sickle and the rest about 18 per cent with harvest-combine. The harvesting loss was high in case of sickle harvesting. For wheat, the harvesting loss with sickle was about 21 kgs per acre whereas this figure was about 6 kgs per acre with harvest-combine. The threshing loss of wheat was about 21 kgs per acre. The study brought out that storage of wheat in kohl was the most common followed by bharola and metal bin. The storage loss of wheat for family consumption and seed was 4.62 per cent and 3.38 per cent respectively. The marketing loss of wheat was 0.46 per cent of the quantity sold.

1. Introduction

Agricultural commodities produced on the farm field have to undergo a series of operations such as harvesting, threshing, storage, processing and marketing before they reach the consumer, and there are appreciable losses in crop output at all these stages. A recent estimate by the ministry of Food and civil supplies, Government of India, puts the total preventable post-harvest losses of food grains at 10 per cent of the total production of about 20 Mt, which is equivalent to the total food grains produced in Australia annually. In a country where 20 percent of the population is undernourished, post-harvest losses of 20 Mt annually is a substantial avoidable waste. It has been estimated by Saran (1999) that food grain wastage at various stages is 9.33 per cent of the production. The total wastage was about 19 million tonnes, which could be fed to 1400 million people for a month. According to a world bank study (1999), post-harvest losses of food grains in India are 7-10 per cent of the total production from farm to market level and 4-5 percent at market and distribution levels. For the system as a whole, such losses have been worked out to be

11-15 Mt tonnes of foodgrains annually, which include 3-4 Mt of wheat. With an average per capita consumption of about 15 kg of food grains per month, these losses would be enough to feed about 70-100 million peoples, *i.e.* about 1/3rd of India poor or the entire population of the states of Bihar and Haryana together for about one year. Thus, the post-harvest losses have impact at both the micro and macro level of the economy. The study was conducted in the Kathua district. Wheat crop was studied because this crop had 42 per cent of the net sown area of Kathua district during the year 2007-08.

The study on post-harvest losses in food grains at different stage would help to assess the extent and magnitude of losses and identify the factors responsible for such losses. This in turn would help develop proper measures to reduce these losses. The specific objective of the present study were:

1. To estimate the losses of wheat during harvesting and threshing operations;
2. To examine various types of storage structures used by the farmers for wheat and their storage losses; and
3. To study the loss during marketing by the farmers.

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2. Methodology

The design of the study was three stage stratified random sampling with block at the first stage sampling unit, village at the second stage and finally farmers at the final stage of sampling unit. Further, three blocks were randomly selected and from each block four villages were randomly selected. The farmers from these blocks were categorised using cumulative cube root frequency method, viz. small (upto 4.3 acres), medium (4.32 to 9.90) and large (above 9.90). A sample of 120 farmers of different sizes was selected by probability proportional to size method. The primary data was collected on specially structured pre-tested interview schedule through personal interview method pertained to the year 2010-11. Statistical techniques like frequencies, simple averages, weighted averages and percentages were applied to analyze the collected data.

3. Results and Discussion

Size of operational holdings

The average size of operational holding of the sample farmers was 5.38 acres during 2010-2011, out of which owned land occupied 5.12 acres (95.17%) and the remaining 0.26 acre (4.83%) were leased in. The small farmers operated on an average operational holding of 2.73 acres, while the same was 6.55 and 17.75 acres for medium and large farmers. The large farmers had more leased in area both in absolute and percentage terms *i.e.* 2.17 acres and 12.23 per cent as compared to medium and small farmers. None of the farmers leased out land.

Harvesting of wheat

The harvesting of wheat is mainly done manually using sickle and a little area by combine-harvester. Area under

wheat and its harvesting by manually and harvest- combine is given in Table 2. The farmers of Kathua district generally did not use combine harvester due to small operational land holdings. The analysis showed that the average area under wheat for all the selected holdings worked out to be 4.36 acres out of which 3.56 (81.65%) acres were harvested manually and only 0.80 acre (18.35%) were harvested with harvest-combine. It was found that only the large sized farmers used the facility of harvest-combine. The small and medium farmer harvested the produce manually.

Per farm and per acre harvesting losses of wheat

In Kathua district, wheat was mainly harvested with sickle and small area with combine harvest. The losses at the time of harvesting have been worked out with the sickle and harvest-combine and the same are presented in Table 3. While harvesting wheat, either ears scattered or grains fell on the ground due to shattering. On an average farm, the per farm loss of wheat through scattered ears worked at 0.54 qtl, while this loss was 0.32, 0.75 and 1.14 qtls per farm on small, medium and large farms respectively. The loss due to shattering came to be 0.22 qtl per farm which was 0.12 qtl on small farms, 0.30 qtl on medium farms and 0.45 qtl on large farms in the district. In this way, the total loss of wheat during harvesting with sickle worked out at 0.76 qtl. Only 0.05 qtl was lost during harvesting with combine harvester.

Singh and Sidhu (2003) brought out the harvesting loss to wheat with sickle was 21.54 kg per acre and with combine-harvest, the loss was 5.95 kgs per acre in Punjab. The data showed that overall per acre loss during harvesting with sickle worked out to be 21.25 kgs in Kathua district. While comparing the loss per acre with different categories of the farms, it turned to be highest for large category, *i.e.* 21.63 kgs per acre followed by medium category *i.e.* 20.89 kgs per acre and then by small category *i.e.* 20.24 kgs per acre.

Table 1. Size of operational holdings with the selected farmers in Kathua District, 2010-11 (Area in acres)

Particulars	Small	Medium	Large	Overall
Owned Land	2.72 (99.63)	6.44 (98.32)	15.58 (87.72)	5.12 (95.17)
Leased in	0.01 (0.37)	0.11 (1.68)	2.17 (12.23)	0.26 (4.83)
Operational	2.73 (100.00)	6.55 (100.00)	17.75 (100.00)	5.38 (100.00)

Figures in parentheses are percentage

Table 2. Harvesting of wheat with sickle and harvest-combine with the selected farmers in Kathua district, 2010-11 (Area in acres)

Wheat	Small	Medium	Large	Overall
Area under wheat	2.19	5.03	15.33	4.36
Harvested with sickle	2.19 (100.00)	5.03 (100.00)	7.33 (47.81)	3.56 (81.65)
Harvested with combine	-	-	8.00 (52.19)	0.80 (18.35)

Figures in parentheses are percentage

Per farm and per acre threshing losses of wheat

The loss of wheat during threshing came to be 0.76 qtl per farm in the Kathua district Table 4. The farm category wise loss of wheat during threshing came to be 0.53, 0.72 and 1.02 qtls per farm on small, medium and large farms respectively. The overall threshing loss on account of grains passed into the straw was 0.43 qtl per farm. It was 0.32, 0.44 and 0.56 qtl for small, medium and large farms respectively. The loss due to grains passed into the straw was more as compared to the grains left at the floor. It was found that overall threshing loss of wheat was about 21 kgs per acre with the selected farmers. It was 24.20, 14.32 and 13.92 kgs per acre with the small, medium and large farmers respectively. The threshing loss consisted of the grains left at the floor and grains passed into the straw.

Storage structures used for wheat and paddy

Both quantitative and qualitative losses occur to the stored food grain due to various factors like physical (temperature and moisture), biological (insects, microorganism, rodents, birds mites), chemical breakdown of produce and also pesticides and engineering factors. It is estimated that 10 percent of the foodgrain is lost due to conventional means of storage at the farm level. Therefore proper storage of foodgrain is important in the present day context of food problem (Singla, 2000). Another study conducted at PAU had revealed that loose storage accounted for about 54 percent of the total farmers, bag storage was done by about 34 per cent, metallic bins about 28 percent, the other structures accounted for about 3 to 4 percent with the sample farmers (Gill *et al.*, 1984). The study revealed that food grain storage in kohl was the most common followed by bharola and metal bin. It was found that 90 per cent of the total farmers used kohl for storage of wheat and paddy. This was followed by bharola which was used by 25.83 percent, metal bin by 24.17 per cent and gunny bags by 18.33 per cent of the farmers.

Table 3. Harvesting loss to wheat with sickle and harvest-combine with the selected farmers in Kathua district, 2010-11

Particulars	Small	Medium	Large	Overall
Loss with sickle (qtl/farm)				
Scattered ears	0.32	0.75	1.14	0.54
Shattering of grains	0.12	0.30	0.45	0.22
Total loss with sickle	0.44	1.05	1.59	0.76
Loss with combine	-	-	0.50	0.05
Loss with sickle (kgs/acre)				
Scattered ears	14.52	14.93	15.50	15.16
Shattering of grains	5.62	5.96	6.13	6.09
Total loss with sickle	20.24	20.89	21.63	21.25
Loss with combine	-	-	6.28	6.28

Table 4. Threshing loss to wheat with the selected farmers in Kathua district, 2010-2011

Particulars	Small	Medium	Large	Overall
Quantity of the grain (qtls/farm)				
Left at the floor	0.21	0.28	0.46	0.32
Passed into straw	0.32	0.44	0.56	0.43
Total loss	0.53	0.72	1.02	0.76
Quantity of the grain (kgs/acre)				
Left at the floor	9.59	5.57	6.28	8.99
Passed into straw	14.61	8.75	7.64	12.08
Total loss	24.20	14.32	13.92	21.07

Storage losses to wheat

The data given in the table 6 indicated the storage loss to wheat during the year 2010-11. The study brought that the average quantity of wheat stored by the sample farmers was 10.31 qtls for family consumption and 1.74 qtls for seed purpose. A farmer falling in small category stored 9.31 qtls for home consumption and 88 kgs for seed purpose. The corresponding figure for medium category were 11.29 qtls and 2.01 qtls while for the large category, these figures were 13.36 qtls and 6.14 qtls respectively. On an average, per holding loss to wheat stored for family consumption turned to be 47 kgs and for seed purpose about 6 kgs. The loss as percentage to the total quantity store for family consumption in case of wheat turned to be 4.62 per cent, while for seed, this loss was 3.38 per cent. The higher loss for family consumption was natural because wheat for home consumption was stored through out the year, whereas for seed purpose, this was utilised by the middle of November in most of the cases. It was reported that rats, insects, dampness, birds *etc.* caused loss to wheat during storage.

Marketing losses to wheat

Large arrivals in the peak season causes congestion in the market yard and result in admixtures, pilferage and wastage. Handling becomes difficult and daily bidding cannot be completed in some cases (Singh and Mann, 2000). Thus, weighing is postponed to next day and the farmers have to stay back with their animals, carts, and tractors (Ibid). Such problems in the market cause marketing loss to the farm produce. The information presented in the table 7 showed that the small, medium and large categories of farmers sold about 3.07, 23.70 and 106.53 qtls of wheat during the year 2010-11. On an average, each sample farmer sold about 19.63 qtls of

wheat. In the market during the cleaning operations some grains passed on along with the foreign matter. Some grains were mixed with dust and dirt. The marketing loss turned out to be 9 kgs per farmer *i.e.* 0.46 per cent of the wheat sold by the selected farmers got lost in the market. This loss as percentage to total produce sold turned out to be highest on large holdings. This was natural because large lots in the market were to be spread on a wider space and loss turned to be higher.

Conclusion

The result of the study showed that the harvesting loss with sickle was 21.25 kgs per acre with the selected farmers whereas this figure was 6.28 kgs per acre with combine-harvest. A comparison of harvesting loss by sickle and combine revealed that the loss was high in case of sickle harvesting. The loss of wheat during threshing came to be 0.76 qtl per farm in Kathua district. The farm category wise loss of wheat during threshing came to be 0.53, 0.72 and 1.02 qtl per farm on small, medium and large farms respectively. The threshing loss at the small farm was low as compared to the medium and large farms. The threshing loss was about 21 kgs per acre in case of wheat with the selected farmers. The study brought out that storage of wheat in kohl was the most common followed by bharola and metal bin. The study revealed that the loss as percentage of the quantity stored for family consumption in case of wheat turned to be 4.62 per cent, while for seed, this loss was 3.38 per cent. The higher loss for family consumption was natural because wheat for home consumption was stored throughout the year, whereas for seed purpose, this was utilized by middle of November in most of the cases. The study brought out that each selected farmer sold 19.63 qtl of wheat and the marketing loss turned out to be 9 kgs, *i.e.* 0.46 per cent of wheat sold was lost in the market. This loss was high in percentage terms in case of large farmers as compared to small and medium farmers.

Table 5. Per holding storage loss to wheat with the selected farmers in Kathua district, 2010-2011 (qtls)

Farm category	Quantity stored for		Loss to the produced stored for		Loss as percentage to the grain stored for	
	Family consumption	Seed	Family consumption	Seed	Family consumption	Seed
Small	9.31	0.88	0.44	0.03	4.80	3.52
Medium	11.29	2.01	0.52	0.06	4.59	3.36
Large	13.36	6.14	0.60	0.20	4.48	3.26
Average	10.31	1.74	0.47	0.06	4.62	3.38

Table 6. Per holding loss to wheat suffered by the selected farmers during sale in the market, 2010-2011 (Figures in qtls.)

Farm category	Marketed surplus	Marketing loss	Percentage of marketed surplus lost
Small	3.07	0.01	0.45
Medium	23.70	0.10	0.44
Large	106.53	0.54	0.51
Average	19.63	0.09	0.46

Policy implication and suggestions

Jammu and Kashmir is a deficit state in food grains and the requirements of the state are fulfilled by the surplus states like Punjab, Haryana *etc.* The losses to the food grains are a matter of concern in developing country like India where about 27.5 percent of the population live below poverty line.

There is no doubt that loss to wheat and paddy at the farm level cannot be brought at zero level under any circumstances. However the following suggestions will help in reducing the quantity of loss at the farm level to wheat and paddy crops.

- i) The extension agencies may advice the farmers to harvest their cereal crops like paddy and wheat at appropriate time.
- ii) At present, the threshers used by the farmers are not of ISI standards in most of the cases. It is suggested that threshers of high quality may be used by the farmers for threshing of wheat.
- iii) The farmers may be advised to use metal bins for storage of foodgrain because it is the most safe method of storage. Proper chemical treatment may also be provided to the grains during storage. The grains may be dried in the sun for 3-4 days before storage.
- iv) The auction platforms may be made pucca with cement flooring in the grain markets in Jammu and Kashmir. Cover sheds may also be built in the grain market.
- v) The Agricultural Produce Market Act (APMC) has not been passed by the legislature so far. With the enactment of the APMC Act, the modern market infrastructure can be built because more financial resources will be available for the development of markets. Such a measure will reduce marketing.

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