Factors responsible for post harvest losses of paddy in Rewa district in Madhya Pradesh

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ABSTRACT

Rice is the staple food and main source of income for million people of the country. The crop is being grown in diverse ecosystem ranging the productivity from 1 to 7 ton/ha. At present post harvest losses are becoming a major threat for its cultivation and storage which may be caused due to biotic and a biotic stresses. If the post harvest losses are reduced the world supply can be increased by 30-40% without cultivating additional land or increasing any additional expenditure on seed, fertilizer, irrigation and plant protection measure to grow the crop. Keeping these facts in view, the presentation is therefore undertaken to study the post harvest losses of paddy in Madhya Pradesh in 2009. among the major factors responsible for causing losses in manual and bullock operated farms , maximum losses reported in harvesting (7.68kg/q) followed by threshing and winnowing (3.66kg/q), transportation (1.47kg/q), storage (1.10kg/q) and other activities (2.51kg/q). In machine operated farm (22.60kg/q) losses found under different categories. The magnitude of harvest and post harvest losses in small, medium and large size of farm were (16.33kg/q), (21.5kg/q) respectively. Susana G. castro (2006) also reported these findings.

Key words: Post harvest losses, eco-system, traditional, Madhaya Pradesh.

Traditionally, rice has been the staple food and main source of income for millions of people and it will continue to be a main stay of life for future generations. In many countries, essential development efforts are concentrated on rice to domestic need for food. In the developing countries rice is an important item of exportation. Post harvest losses present one of the main problems not only in rice but also in all grain production. Losses in food crops occurring during harvesting, Threshing, Drying, Storage, Transportation, Etc. have been estimated to be between 30 to 40 % of all food crops in developing countries. If post harvest losses are reduced the world supply can be increased by 30-40% without cultivating additional hectares of land or increasing any additional expenditure on seed, Fertilizer, Irrigation and plant protection measure to grow the crop (Agricultural Resources Center, Egypt 2004). The specific of objectives of the study are:

i) To assess the extent and nature of post harvest losses of paddy at different stages of handling in different size of farm.

ii) To examine the factors responsible for post harvest losses of paddy.

iii) To identify the constraints of proper handling of paddy.

iv) To suggest the ways and policy implication of minimization of post harvest losses of paddy.

MATERIALS AND METHODS

The study area: - the study is confined to one of the major paddy producing district of M.P. i.e. Rewa. Rewa district has nine blocks viz, Raipur Karchuliyan, Mauganj, Hanumana, Naigarhi, Teonthar, Jawa, Sirmour and Gangeo. Out of which Hanumana block was purposively selected as it has maximum area and production of paddy and also due to ongoing rice research activities of college of Agriculture, Rewa (M.P.).

The study was mainly based on primary data. The requisite primary data were collected from the selected paddy growers through well structured and pre- tested schedule by personal interview method. Multi-stage sampling procedure was adopted in selecting paddy growers. In the first stage, Rewa district was purposively selected because the proportion of higher the area and production of paddy in the district was 126527ha & 2994252tones. In the second stage, out of nine blocks in the Rewa district, Hanumana block was purposively selected. From selected block, eight villages a list of paddy growers selected at random in the third stage. lastly, from each sample village a list of paddy growers was prepared in ascending order of their size of holding and were grouped into small (up to 2 ha.), medium (2-5 ha.) and large (above 5 ha) categories from cash selected village. In all, the sample consisted of 80 paddy growers across eight villages in he selected block of Rewa district In M.P.

Analytical tools:

Classification and tabulation of data were done in light of stated objectives. Suitable statistical tools such as weighted average and percentage were used. The data were processed using tabular analysis. Multiple linear regression models.

$$y = a+b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 x_6 + b_7 x_7$$

Where,

y = post harvest losses

a = constant

b_1 to b_7 = regression coefficient

x_1 = area under paddy

x_2 = yield of paddy

x_3 = time of storage

x_4 = marketed surplus

x_5 = type of storage

x_6 = methods of storage

x_7 = literacy

The different losses will be calculated using the following relations:

(i) Transportation losses

$$\text{Transportation losses (\%)} = \frac{wt}{w+wt} \times 100$$

(ii) Threshing losses

$$\text{Threshing Losses (\%)} = \frac{wn}{wn+wh} \times 100$$

(iii) Winnowing losses

$$\text{Winnowing Losses (\%)} = \frac{ww}{wh+ww} \times 100$$

(iv) Storage losses

$$\text{Storage losses (\%)} = \frac{w'}{ws+wr'} \times 100$$

Where,
W = quantum of threshed produce
WN = quantum of threshing losses
WH = threshed produce
WW= grain in bhusa (Straw)
WS = weight at the time of storage
WR= weight at the time of use
SL = loss in weight = (WS-SR)
WT = quantum of grain fallen while transportation

RESULTS AND DISCUSSION

Table1.Total harvest and post harvest losses of paddy (kg/q) in manual & bullock operated farm as compared to machine operated farms.

Particulars	Size of farms						Weighted average	
	Small		Medium		Large			
	Bullock operated farms	Machine operated farms	Bullock operated farms	Machine operated farms	Bullock operated farms	Machine operated farms	Bullock operated farms	Machine operated farms
Harvesting	5.93 (45.01)	11.53	8.52 (47.51)	14.88	10.97 (48.51)	17.69	7.68 (46.76)	15.67
Threshing & winnowing	2.88 (7.86)	(70.61)	4.03 (22.49)	(69.06)	5.14 (22.71)	(69.39)	3.66 (22.30)	(69.32)
Storage	1.04 (7.86)	1.10 (6.71)	1.12 (6.23)	1.52 (7.05)	1.27 (5.62)	1.64 (6.43)	1.10 (6.72)	1.52 (8.58)
Transportation	1.35 (10.25)	1.33 (8.11)	1.51 (8.44)	1.90 (8.81)	1.72 (7.59)	2.15 (8.41)	1.47 (8.94)	1.94
Other activities (Drying, cleaning, weighing, handling)	1.98 (15.03)	2.38 (14.57)	2.75 (15.34)	3.25 (15.08)	3.52 (15.57)	4.02 (15.77)	2.51 (15.27)	3.47 (15.36)
Total losses (quantity)	13.18 (100.00)	16.33 (100.00)	17.93 (100.00)	21.55 (100.00)	22.61 (100.00)	35.49 (100.00)	16.43 (100.00)	22.60 (100.00)

Total harvest and post harvest losses of paddy (kg/q) in manual & bullock operated farm as compared to machine operated farms.

Table 1 shows that in manual & bullock operated farms there was found 16.43 kg/q total losses in different harvest and post harvest activities amongst all these activities the highest losses was observed in harvesting (7.68 kg/q.) followed by threshing and winnowing (3.66 kg/q.), transportation (1.47 kg/q), storage (1.10 kg/q) and other activities (2.51 kg/q). As the size of holding increase the harvest and post harvest losses in small, medium and large size of farms were 13.81kg/q, 17.93kg/q and 22.61kg/q respectively. Similarly in machine operated farm was found 22.60 kg/q total losses in different activities. Amongst all these activities the higher losses were observed in harvesting, threshing & winnowing (15.67kg/q) followed by transportation (1.94kg/q), storage (1.52 kg/q) and other activities (3.47 kg/q). Hence, the total harvest & post harvest losses and size of farms both are positively related to each other. The magnitude of harvest & post harvest losses 25.49 kg/q respectively. Anonymous (2001) and Alam *et al.* (2003) also confirmed these findings.

It is clear that there were more harvest & post harvest losses on machine operated farms (22.60 kg/q) as compared to manual & bullock operated farms (16.43 kg/q).

Factors affecting harvest & post harvest losses:

The linear regression equation explained 89.81 percent share in harvest and post harvest losses due to inclusion of due seven independent factors. The F- ratio (90.698%) indicates good fit of one linear regression line.

To examine the factors which affected the harvest & post harvest losses of paddy, a multiple liner regression model was used and following equation was fitted:

The result of the regression analysis clearly indicates that the area under paddy crop, Yield of paddy, time of storage, Type of storage, methods of storage and literacy influenced the harvest & post harvest losses positively. Among the stated factors field of paddy and time of storage affected the harvest and post harvest losses positively and highly significant. An increase of 0.389q in harvest and post harvest losses was observed with an increase of one quintal increase in yield of paddy. This loss was examined maximum amongst all the losses. Similarly an amount of 0.092 q loss was noted with one quintal of paddy under the grain is too important. The area of paddy was also found positively significant affecting due harvest & post harvest losses. Hence, there is a necessity to promote post harvest

technologies among the farmers so that they can avail the advantage of the time utilities in the marketing of paddy. The type of storage from kaccha to pakka, methods of storage from bulk to bags and number of years of schooling also positively related with harvest and post harvest losses. Marketed surplus negatively related with harvest & post harvest losses. Hence, the extra attention should be given by policy makers towards these parameters. (**Table2**).

Table2. Factors affecting harvest & post harvest losses:

Harvest & post harvest losses		Area under paddy	Yield	Time of storage	Marketed surplus	Types of storage	Method of storage	Literacy
y	a	x_1	x_2	x_3	x_4	x_5	x_6	x_7
	15.53	0.283*	0.389*	0.0929	-0.1309*	0.0413*	0.0162*	0.0835
F-Ration	90.698							
R^2	89.81							

Note: *significant at 5 per cent level

Table3. Constraints of proper handling of paddy during harvest and post harvest activities:

Particulars	Size of farms			Total(n=80)
	Small	Medium	large	
Shortage of labour at the time of harvesting	22 (55)	18 (72)	9 (60)	49 (61.25)
Lack of skilled labour at the time of harvesting &winnowing	26 (65)	12 (48)	10 (66.67)	48 (60)
Unfavorable weather with at the time of harvesting	30 (75)	12 (48)	9 (60)	51 (63.75)
Unavailable of matching at the time of harvesting	-	11 (44)	7 (46.67)	18 (22.5)
Detoriation in quality of grains when combiner in used	-	14 (56)	10 (66.67)	24 (30)
Lack of technical knowledge	32 (80)	11 (44)	6 (40)	49 (61.25)
Shortage of power supply	35 (87.5)	21 (84)	10 (66.67)	66 (82.5)
Unavailability of machine at the time of threshing and winnowing	15 (37.5)	12 (48)	4 (26.67)	31 (38.75)
Lack of road facilities	18 (45)	14 (56)	8 (53.33)	40 (50)
Lack of storage facilities	32 (80)	12 (48)	4 (26.67)	48 (60)
Lack of suitable site floor for drying	22 (55)	15 (60)	6 (40)	41 (51.25)
Lack of capital	22 (55)	18 (72)	6 (40)	46 (57.5)

Constraints of proper handling of paddy during harvest and post harvest activities:

There is enough scope for reducing harvest and post harvest losses of paddy grain in the study area. an attempt was also undertaken to find out the various constraints, which came across in proper handling of paddy grains during post harvest activities and are presented in the table the majority of paddy growers reported shortage of power supply in peak operation period (82.5%), followed by unfavorable weather condition at the time of harvesting (63.75%), shortage of labours at the time of harvesting (61.25%), lack of tech. knowledge (61.25%), lack of skilled labour at the time of harvesting & winnowing (60.0%), unavailability of machines at the time of threshing & winnowing (38.75%) and lack of storage facility (60%)

The cultivators also reported the constraints as lack of capital (57.5%) lack of suitable site/ floor for drying crops residues (51.25%), lack of all weather roads (50%), detoriation in quality of grains when combine is used (30%) and unavailable of machine at the time of harvesting (22.50%) in proper handling of paddy during post harvest activities. Hence, for reducing post harvest losses proper implementation post harvest technology at the farmer's level is necessary to take advantage of marketing technology, so that they can reduce their post harvest losses. There is also need of skill oriental training demonstration for these harvest and post harvest technologies at farmer's farm. So that they can get advantage to maximize their production by reducing their losses. This ultimately added may be best method of extension of technologies. Now, there is necessity to increase extension post harvest technology in the area. As these not only minimized losses but increase yield of the farmers added additional value in their product (**Table3.**).

Suggestions:

1. Paddy crops should be harvested at proper stage to minimize harvesting losses. During harvesting there grain moisture content should be 8-10% (wb).
2. Proper planning and management of short medium and long duration varieties many result in minimum harvesting losses.
3. Highly shattering /logging resistant paddy variety should be involved by the research scientists.
4. The maximum harvest & post harvest losses (broken grains) occurred when farmers used machine. Thus, It is recommended that specialized paddy machine be evolved and popularized among the paddy produces at present the common machine are used by the paddy producers after some adjustment, which are also
5. Storage facilities should be proper and sufficient to avoid losses due to rodents etc. scientific methods of storage should be used to prevent such losses.

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