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Research Note

Sources, Replacement and Management of Paddy Seed by Farmers in Punjab[1]

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Abstract

The study has reported different sources of paddy seed, seed replacement rate of paddy growers, and management of paddy seed by the farmers in two selected districts of Punjab. Amongst different sources of paddy seed, the share of private seed dealers has been found maximum (H" 48 per cent), followed by authorized seed dealer (H" 19 per cent), self-retained (11.5 per cent) and commission agents (H" 11 per cent).The share of other sources like fellow farmers, relatives and friends, PAU, village shopkeeper, state agriculture department, etc. has been found only 1-2 per cent each. The overall seed replacement rate has been found to be about 24 per cent. The farm category-wise analysis has revealed a direct relationship between seed replacement rate and farm size. The seed rate has been found almost equal to the recommended level in the Ludhiana district while in Patiala district, it is much below the recommended value. Amongst determinants of quality of seeds, experience of the farmers has been reported at the first place, followed by advice of fellow farmers, reputation of institute, etc. Regarding linkages, the large farmers have more contacts with different seed agencies. The study has suggested that extension agencies should educate the farmers about the usefulness of quality seeds and their replacement with the seed procured form reliable sources like PAU, PUNSEED, Department of Agriculture, etc.

Introduction

Seed being the fundamental input in crop production, its high quality forms the basis of high productivity. Although seed accounts for a minor portion of the total costs in a majority of crops, on this vital input depends the returns one obtains from land using other costly inputs like farm machinery, irrigation, chemical fertilizers, pesticides, labour, etc. Much of the efforts and investment would be unfructuous if one does not use quality seeds. The quality seed production is a specialized activity. The general farm produce retained for seed cannot be substituted for quality seed as it generally lacks genetic vigour and has poor germination (Singh *et al*., 1990). One of the reasons for low replacement of certified seed could be its high price and non-availability at proper place in time. It is particularly true in the case of small farmers who generally have low availability of cash money. It may be mentioned that seed replacement rate (SRR) of paddy is low (24.35 per cent) in India (http.seednet.gov.in). The seed renewal period as recommended by the National Commission on Agriculture (1976), is four years in paddy. The SRR in most crops is below the scientifically desirable level of 25 per cent in respect to self- pollinated crops (Kapoor, 2006). Keeping in view all these facts, the present investigation has been undertaken to study the following aspects:

- Different sources of paddy seed of the farmers,
- Seed replacement rate of paddy growers, and
- Management of paddy seed by the farmers in Punjab.

Methodology

The data used in this paper were taken from the Ph.D. thesis of the first author. Paddy is the main *kharif*

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[1] The paper is based on the Ph.D. thesis entitled, 'An Economic Analysis of Production and Marketing of Wheat and Paddy Seeds in Punjab', of the first author completed under the supervision of the second author and approved by PAU, Ludhiana in April, 2008.

crop in Punjab where it occupied 2.6 M ha land during 2004-05. For the present study, two districts, viz. Ludhiana and Patiala, were selected where paddy was found to be the major *kharif* crop occupying about 41 per cent and 43 per cent of the total cropped area, respectively during the year 2004-05. One development block from each district and two villages from each block were again selected randomly. From each selected village, data were collected from twenty randomly selected farmers on the basis of probability proportional to the total number of farmers in each farm category. The farmers were categorized into small, medium and large categories on the basis of their size of operational holdings by using cube-root frequency method. The ultimate sample was consisted of 88 small, 52 medium and 20 large farmers (total sample of 160 farmers).

The information was collected from the selected farmers on the size of their operational holdings, source of draught power and irrigation, and cropping pattern being followed by them. Information concerning variety-wise area under paddy crop, sources of seed, seed rate, time of sowing and harvesting, SRRs, chemical treatment, seed treatment, extension contacts, etc. was also collected.

The SRR for paddy crop was worked out for certified seeds using Equation (1):

$$SRR = \frac{C \times 100}{A \times K} \quad \ldots(1)$$

where,

SRR = Seed replacement rate for the paddy crop,

C = Certified seeds used by the farmers,

A = Area under the paddy crop, and

K = Seed rate per unit of area.

Results and Discussion

Cereal farmers in developing countries often have three major sources of seed, viz. seed purchased from a formal seed industry, seed obtained from other farmers and self-retained seed from the previous year's crop (Tetley *et al.,* 1991). In India, more than 85 per cent of the seed used in farming is produced by the farmer himself (Banerjee, 1984).

Apart from the self-retained seed, other sources for paddy seed were: fellow farmers, relatives, PAU, Punjab State Seeds Corporation (PUNSEED), State Department of Agriculture and authorized and unauthorized seed dealers. The use of paddy seed and different sources of seed patronized by the selected farmers during 2004-05 have been depicted in Table 1. The study revealed that the sample farmers used 67.77 quintals of paddy seed of which about 48 per cent was met from the private seed dealers. It could be due to good contacts between selected farmers and private seed dealers. It was also observed that the private seed dealers sold the seed of unrecommended and unnotified varieties. Pusa 44 was the major paddy variety adopted by the selected farmers.

It was easily available with the private seed dealers. On the other hand, the institutional sources could not sell such seeds. The next important source of seed was self-retained seed. The selected farmers used 7.79 quintals (11.49 per cent) of the seed procured from this source. The study further revealed that the farmers obtained 7.47 quintals of paddy seed used (11.02 per cent) from the commission agents. The selected farmers purchased 2.18 per cent of the paddy seed from relatives and friends, 1.95 per cent from fellow farmers and 0.89 per cent from the village shop keepers. All this indicated that the selected farmers did not prefer to use self-retained seed or seed obtained at cheaper rates or free of cost from fellow farmers and relatives. Another factor responsible was harvesting and threshing of paddy by combines, wherein the percentage of broken grains/ seeds was higher than in manual operations. Moreover, storage of seed for use in the next crop was not preferred as breaking of outer cover of grain was noticed during storage which deteriorated the seed quality. Also, village shop keepers did not appear to be a preferred seed source for paddy, as the farmers purchased only 0.60 per cent of the total paddy seed from them. The main reason for this was low seed rate used for paddy, 6-8 kg/ acre.

It was found that different institutional seed agencies together contributed about 24 per cent to paddy seed requirements of the farmers. Among them, the most preferred was authorized seed dealer who provided maximum quantity (about 19 per cent) of the seed required, followed by PUNSEED (2.33 per cent), PAU (2.13 per cent) and State Department of Agriculture (0.81 per cent).

The farm category-wise analysis indicated that all categories of farmers preferred to procure paddy seed

Table 1. Sources of paddy seed of selected farmers in Punjab: 2004-05

(in quintals)

Farm category/ Source of seed	Self-retained	Fellow farmers	Relatives and friends	PAU	PUNSEED	State Deptt of Agriculture	Authorized seed dealer	Private seed dealer	Village shop keeper	Commission agent	Total
Ludhiana district											
Small	0.94	0.44	0.04	0.12	0.32	0.10	1.28	3.00	0.28	1.50	8.02
	(11.72)	(5.49)	(0.50)	(1.49)	(3.99)	(1.25)	(15.96)	(37.41)	(3.49)	(18.70)	(100.00)
Medium	1.42	-	-	0.64	0.72	0.15	2.32	10.07	-	0.64	15.96
	(8.90)			(4.01)	(4.51)	(0.94)	(14.54)	(63.09)		(4.01)	(100.00)
Large	2.01	-	-	0.56	0.26	0.20	3.90	7.82	-	1.00	15.75
	(12.76)			(3.56)	(1.65)	(1.27)	(24.76)	(49.65)		(6.35)	(100.00)
Sub-total	4.37	0.44	0.04	1.32	1.30	0.45	7.50	20.89	0.28	3.14	39.73
	(11.00)	(1.11)	(0.10)	(3.32)	(3.27)	(1.13)	(18.88)	(52.58)	(0.71)	(7.90)	(100.00)
Patiala district											
Small	1.00	0.48	0.79	-	0.08	-	1.11	3.91	0.32	1.00	8.69
	(11.51)	(5.52)	(9.09)		(0.92)		(12.77)	(45.00)	(3.68)	(11.51)	(100.00)
Medium	0.72	0.40	0.50	-	0.10	0.10	2.03	6.00	-	2.25	12.10
	(5.95)	(3.30)	(4.13)		(0.83)	(0.83)	(16.78)	(49.59)		(18.59)	(100.00)
Large	1.70	-	0.15	0.12	0.10	-	2.10	2.00	-	1.08	7.25
	(23.45)		(2.07)	(1.65)	(1.38)		(28.96)	(27.59)		(14.90)	(100.00)
Sub-total	3.42	0.88	1.44	0.12	0.28	0.10	5.24	11.91	0.32	4.33	28.04
	(12.20)	(3.14)	(5.13)	(0.43)	(1.00)	(0.36)	(18.69)	(42.47)	(1.14)	(15.44)	(100.00)
Overall											
Small	1.94	0.92	0.83	0.12	0.40	0.10	2.39	6.91	0.60	2.50	16.71
	(11.61)	(5.51)	(4.97)	(0.72)	(2.39)	(0.60)	(14.30)	(41.35)	(3.59)	(14.96)	(100.00)
Medium	2.14	0.40	0.50	0.64	0.82	0.25	4.35	16.07	-	2.89	28.06
	(7.63)	(1.43)	(1.78)	(2.28)	(2.92)	(0.89)	(15.50)	(57.27)		(10.30)	(100.00)
Large	3.71	-	0.15	0.68	0.36	0.20	6.00	9.82	-	2.08	23.00
	(16.13)		(0.65)	(2.96)	(1.57)	(0.87)	(26.09)	(42.69)		(9.04)	(100.00)
Grand total	7.79	1.32	1.48	1.44	1.58	0.55	12.74	32.80	0.60	7.47	67.77
	(11.49)	(1.95)	(2.18)	(2.13)	(2.33)	(0.81)	(18.80)	(48.40)	(0.89)	(11.02)	(100.00)

Note: Figures within the parentheses indicate percentages of their respective totals.

from the private seed dealers. The percentage share of seed purchased from private seed dealers was about 41, 57 and 43 in case of small, medium and large farmers, respectively. Only small and medium categories of farmers obtained about five per cent and one per cent of the seeds from the fellow farmers, respectively, while the large farmers did not follow this seed route. Similarly, small, medium and large farmers procured about five per cent, two per cent and one per cent of required seeds from relatives and friends, respectively. The dependence on the authorized seed dealers for paddy seed requirements was maximum of large farmers (26 percent), followed by medium (15 per cent) and small (14 per cent) farmers. This could be due to better contacts of large farmers with the authorized seed dealers who also provide them facilities like home delivery, latest knowledge about usage of seeds, etc. Due to their better economic status, large farmers also purchased seed from the institutional sources more than by medium and small farmers.

The district-wise analysis indicated that farmers in the Patiala district preferred the seed agencies in the unorganized sector more than their counterparts in the Ludhiana district. It was due to poor seed distribution facilities in the Patiala district than Ludhiana district. The study has revealed that public seed agencies supply only a negligible percentage of seed in its requirement.

Seed Replacement Rates

The number of generations up to which the seed could be used from the previous crop is another important aspect, vital for the maintenance of crop productivity. Deterioration in seed quality may occur due to physical admixtures as well as loss of genetic vigour and germination power. Admixture may occur in the field, at the threshing yard or even during storage when seeds of other crops get mixed with the variety. Further, the germination power may go down due to physical damage to seed through insect and fungal infestation, moisture, breakage of grains and death of embryo due to ageing or prolonged exposure of seed to adverse environment. Deteriorated seed quality results in loss of productivity per unit of area. This deterioration is slow in self-pollinated crops like wheat and paddy.

The SRRs were worked out for certified paddy seed in the study area and have been presented in Table 2. The overall value of SRR was found to be 24.05 per cent. The farm category-wise analysis revealed a direct relationship between SRR and farm-size; it was highest for large farmers (31.5 per cent), followed by medium (21.6 per cent) and small (18.0 per cent) farmers. It was due to better economic condition of large farmers to buy seed from institutional sources and their higher awareness about the quality of seed. It was found that about seven per cent of the area was under Govinda variety (locally called *Sathi*) of paddy and the farmers growing it were usually also cultivating potato, which necessitated early harvesting of paddy, thereby depriving the farmers of good self-retained seed (Verma, 2008). This factor was also responsible for the early seed replacement by the farmers of Patiala district, who were growing Govinda variety.

Table 2. Seed replacement rates for paddy of the selected farmers: 2004-05

Farm category	Seed replacement rate (%)
Ludhiana district	
Small	22.69
Medium	24.00
Large	31.24
Average	26.60
Patiala district	
Small	13.69
Medium	18.43
Large	32.02
Average	20.47
Overall	
Small	18.01
Medium	21.60
Large	31.48
Overall average	24.05

The district-wise analysis indicated higher values of SRRs for farmers of all the three categories in the Ludhiana district than those of Patiala district. It was largely due to the existence of PAU in Ludhiana, which helped the farmers of Ludhiana district to obtain seeds of paddy crop easily.

Management of Paddy Seed

The response of farmers was obtained regarding the stages at which they chose the crop to be used as seed. About 11 per cent of the selected farmers paid

attention to the paddy crop at the time of harvesting and none preferred the selection of seeds at the time of threshing because of the prevalent trend of harvesting and threshing with combines in majority of cases in the state. The storage losses in paddy seed being negligible, pre-storage and post-storage losses were almost non-existent. Only about two per cent of the farmers paid attention to the crop at pre-storage time and about one per cent at post-storage time.

Storage of Seeds

The losses during storage could occur due to the types of storage structures used by farmers and the extent of care taken during the storage period (Gill, 1984). The study on seed storage practices being followed by the farmers in Punjab revealed the use of both modern as well as traditional methods. The wheat being a *rabi* crop and paddy a *kharif* crop, a majority of farmers (70 per cent) used the same metal bins for their storage. About 18 per cent of the farmers were used gunny bags for the storage purpose and about four per cent each used oil drums, both metal bins and gunny bags and all the three together. It was found that about 19 per cent of the farmers applied chemical treatment to paddy seed during storage.

Seed Rate

The seed rates used for crops depend upon the seed multiplication rate. The seed rate for paddy used by the farmers has been shown in Table 3.

For paddy, the seed rate recommended by PAU is 8 kg/ acre for all the varieties. The selected farmers were found using seed @ 7.18 kg/acre. The average seed rates used were found to be more (7.82 kg/acre) in Ludhiana than Patiala (6.43 kg/ acre) districts. The farmers in the Ludhiana district were following the recommendations made by PAU regarding the seed rate of paddy, while for the farmers in the Patiala district, the seed rate was lower as the Govinda variety of paddy used by them required only 6-7 kg /acre seed rate.

Chemical Treatment of Seeds

It was found that only about 11 per cent of the paddy farmers followed the PAU recommendations regarding seed treatment and a majority of them were large farmers only. The proportions of both small and medium farmers were lower on account of ignorance and cost involved on chemicals. The study has brought out that about 30 per cent of large farmers were following these recommendations whereas only about two per cent of small and about 19 per cent of the medium farmers were doing so.

Table 3. Farm category-wise seed rate in paddy used by farmers in Punjab: 2004-05

Farm category	Seed rate (kg/acre)
Ludhiana district	
Small	8.00
Medium	7.60
Large	7.95
Average	7.82
Patiala district	
Small	6.29
Medium	6.72
Large	6.14
Average	6.43
Overall	
Small	7.01
Medium	7.19
Large	7.28
Overall average	7.18

Determinants of Purity and Quality of Paddy Seeds

The study on identification of determinants of purity and quality of seed revealed that past experience of the farmers was the main determinant (in 77.50 per cent of the farmers), followed by other factors like advice of known person (47.50 per cent), reputation of the institute (28.75 per cent), tag of Punjab State Seed Certification Authority (11.25 per cent) and testing of seed by PSSCA (1.25 per cent) (Table 4). It was found that none of the small and medium farmers got the seed tested from PSSCA, as it is considered a mere wastage of money and time by them. However, about one per cent of the large farmers were getting the seed tested by PSSCA.

Farmers' Extension Contacts

The study brought out that about 49 per cent of the farmers had contact with different seed agencies like PAU, State Department of Agriculture, etc. Besides for the seed, the farmers visited these agencies for the latest knowledge about new varieties of various crops and other farm practices. It was noticed that number

Table 4. Determinants of purity and quality of paddy seed purchased by farmers in Punjab: 2004-05

Factor/ Farm category	Small	Medium	Large	Total
Past experience	58	47	19	124
	(65.91)	(90.38)	(95.00)	(77.50)
PSSCA's tag	3	9	6	18
	(3.41)	(17.31)	(30.00)	(11.25)
Repute of institute	14	23	9	46
	(15.91)	(44.23)	(45.00)	(28.75)
Testing by PSSCA	-	-	2	2
			(10.00)	(1.25)
Advice of known person	46	21	9	76
	(52.27)	(40.38)	(45.00)	(47.50)
Total	88	52	20	160

Notes: (i) Figures within the parentheses indicate percentages of their respective total.
(ii) Total of percentages is more than 100 because the sample farmers gave more than one response.

of large farmers in contact with either of the two agencies mentioned was more in the case of Ludhiana district than Patiala district, due to long distance of PAU from the Patiala district.

Conclusions

It has been found that amongst different sources of paddy seed about 48 per cent of the seed requirements of the farmers is met by private seed dealers only. It may be due to good personal contacts of the farmers with private seed dealers. Moreover, private seed dealers have been found selling the seed of unrecommended and unnotified varieties. The share of self-retained seed has been found about 12 per cent. The study further revealed that the farmers obtained 11.02 per cent (7.47 quintals) of paddy seed from the commission agents, 2.18 per cent from relatives and friends, 1.95 per cent from fellow farmers and 0.89 per cent from the village shop keepers. It has been found that different institutional seed agencies together contributed only about 24 per cent of the paddy seed requirements of the farmers. Among these, the most preferred is authorized seed dealer, providing about 19 per cent of the seed required, followed by PUNSEED, PAU and State Department of Agriculture which provided 2.33 per cent, 2.13 per cent and 0.81 per cent of the seed required, respectively. The study has suggested that the extension agencies should educate the farmers about the usefulness of quality seeds and their replacement from the seed taken from the reliable sources, like PAU, PUNSEED and Department of Agriculture, etc. Only about 11 per cent of the farmers have been found following recommended seed treatment practices and the majority among them are large farmers. The farmers may be educated to follow the package of practices and seed management practices as recommended by PAU.

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http.seednet.gov.in/Material/SeedReplacementrates.pdf - Similar pages