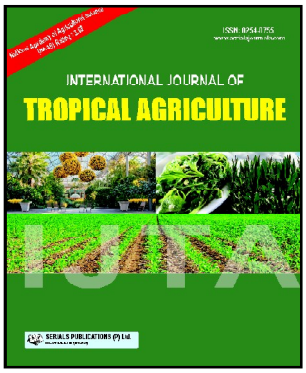

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Economics of Paddy Seed Production in Four Major Paddy Growing Districts of West Bengal

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Abstract: Rice is staple food of more than 60% of Indian population. It accounts for about 43% of total food grain production and 46% of total cereal production in the country. In order to meet the domestic demand of the increasing population the present day production of 99 million tons (2008) of milled rice has to be increased to 125 million tons by the year 2030. Since the yield of high yielding varieties (HYVs) of rice is plateauing, it is rather difficult to achieve this target with the present day inbred varieties. Therefore, to sustain the self-sufficiency in rice, additional production of 1.5 million tons is needed every year. Human labour, manures and fertilizers, machine labour and irrigation are noted the main items of prime cost in case of wintertime seed production of paddy while these four items jointly accounts for about 86 per cent of prime cost during the summer time paddy seed production also. In winter, the irrigation cost is comparatively higher in seed production because the paddy growers generally irrigate the non-seed winter paddy as life saving or protecting the crops or in rainfed system only. At present ,the seed producer get subsidized price of seed as an tie up arrangement with the local traders for further multiplication in their field from the local companies and the cost associated to 3.62 and 4.46 percent of prime cost for both winter and summer time paddy respectively. An overwhelming predominance of human labour to cost structure has demonstrated in the cost analysis for both season seed production in the selected area.

Key words: Paddy, seed production, economics, prime cost.

INTRODUCTION

In developing countries like India, acceleration of growth in agricultural production to meet the increased demand of food grains for the ever-increasing population in the coming years would depend on more productivity per unit of land than from horizontal expansion of area under cultivation. The quality seed when combined with other complementary inputs such as fertilizers and irrigation does make higher contribution to increased production and income to the farming community. Seed, as the full career of new technology for higher crop yields, is a critical input for sustained growth of agriculture. It is the most vital input because agricultural productivity and production has linked with the overall quality and quantity of seeds.

However, all the scientific research and technological improvement in agriculture would be of little or no meaning to farmers unless they get high quality seeds. That means, the seed is genetically pure (true to the type), geographically adopted, and has high germination ability, capable of producing vigorous seedlings and free from diseases and weeds. The availability of quality seed is the foundation of food production as well as productivity and a precursor to crop and food diversification. Efforts to improve the performance of the agricultural sector should include seed production as well as delivery systems. To improve the quality of seed and its distribution in the country some sporadic attempts had made in the pre-Independence period while it get momentum only in the post-Independence era. Various policy mechanisms have been introduced to promote the activity as an industry. The All India Coordinated Project on Maize (1957), the establishment of National Seed Corporation (1963), implementation of the Seed Act (1966), launching of the National Seed Programme (NSP) in1975 with World Bank assistance, the New Policy on Seed (1988) are some of the major breakthrough activities in the evolution of the seed industry in our country.

Simultaneously, the private sector was also encouraged by government for providing breeder and foundation seed of public bred varieties after 1988. Special grant in aid was available under NSP for investment in research, processing and storage facilities for Indian seed (GOI, 1975 and 1978). A population growth in India is far in excess of its growth in agricultural production warranting continued inputs to achieve a steady increase in food production. The root to increase in production lies through improved agronomic practices and availability of high quality seed (Heijbroek and Schutter, 1996). Agriculture contributed approximately 30 per cent of the GDP and the livelihood for over 70 per cent of the country's population. Having the largest arable area (170 million ha), India ranks second only after USA in sheer size of agriculture. By virtue of its large arable land area, sizeable irrigated area, rich agri-biodiversity, diverse agro climate and well developed research system, the country has all the potential to emerge as a global position in agriculture.

The impressive growth registered in agricultural production in general and food grains in particular during the last 30 years has made the country self-sufficient in cereals with exportable surplus especially by rice. Even today, in terms of level of per capita consumption of food, the country has to add another 40 million tons by 2010 (Joshi, 1999). Paddy has thus mingled with the art, culture and literature of Bengal-life striving to stay in harmony with nature. The paddy has cultivated throughout the seasons *viz*; *Aus, Aman* and *Boro* of West Bengal where, *Boro* rice has a major contribution to the percentage share of total rice production in the state. One-fourth the total rice area contributes one-third of total rice production of the state during *Boro* season. On the other hand, two-third of the total production of the state have achieved by three-fourth of the total rice area during both *Aus* and *Aman* together. Therefore, the objective of present study is to compare the economics of paddy seed production in major four paddy producing districts of West Bengal.

MATERIALS AND METHODS

Study Area

The present study has been carried out in Bardhaman, Nadia, Hooghly and Murshidabad districts of West Bengal. These four districts have selected purposively on the grounds of higher cropping intensity and their situation in lower Indo-gangetic basins of West Bengal.

Nature and Sources of Data

For the purpose of present study relevant data for four districts, namely Bardhaman, Nadia, Hooghly and Murshidabad of West Bengal have been collected from primary sources. Survey methods have been used for collection of data from individual farmers producing crops practicing seed and non-seed production. The data collection has been done with the help of pre-tested schedule and questionnaire through personal interview. Secondary information has been collected from different sources, internet, government documents, published materials and relevant literature reports available in this field.

Sampling Design

Selection of blocks and villages

Based on the objectives of the study, the eight blocks from four district namely, Kalana and Katawa from Bardhaman; Chakadah and Haringhata from Nadia; Arambagh and Pandua from Hooghly and remaining two blocks, Khargram and Kandi from Murshidabad district has been selected in consultation with the government officials. Two villages based on the concentration of seed production from each block of respective district have been selected. In addition to that the local traders, those who are engaged in assembling the seed growers, namely, Polly Mongal Samity in Bardhaman, Gontra Samavaya Krishi Unnayan Samity in Nadia and Laxmi Agro Industries ltd. and Kalimata Seed Farm of Hoogly has also been consulted.

Selection of sample farmers

Total 200 sample farmers are selected from these four districts of West Bengal following simple random sampling without replacement (SRSWOR) and presented in the Table 1. The distribution of samples is made on the basis of higher net cropped area of a particular district and accordingly samples have been distributed on the basis of simple percentage method.

It is being seen from the table that 66 sample farmers from Bardhaman district and consequently Nadia, Hooghly and Murshidabad having 44, 32 and 58 sample farmers respectively. Therefore, total 200 sample farmers constitute the total sample size of the present study. The data related to costs and returns in seed and non-seed cultivation of different crops are taken from sample farmers. The selected growers engaged in cultivation of so many crops but for seed purposes they confined only Paddy and potato in their fields. Except vegetables, for other

Table 1
Selection and distribution of sample farmers

Districts	*Net cropped area (Ha)*	*No. of farmers (200)*	*Blocks*	*Villages*
Bardhaman	457797	66	Kalana, Katawa	Sargoria, Dhatrigram, Bandhmora, Bishnupur
Hooghly	219726	32	Arambagh, Pandua	Salepur, Ratanpur, Boichee, Boinchigram
Nadia	299941	44	Chakdah, Haringhata	Gontra, Ghetugachi, Jahirapara, Chandirampur
Murshidabad	404572	58	Khargram, Kandi	Jhilli, Kaspur, Purandarpur, Manoharpur

crops they mainly used farm saved seeds or purchased seeds from the markets. The farmers generally retain some portion of general production from their selected parcel as seed purposes. For this reason the general cost of cultivation of some other prominent crops are included as an appendix table. Apart from the collection of data from the selected samples with prescribed schedule and questionnaire, interview and group discussion has been conducted among the scientist government officials, and the local traders with a view to assemble the qualitative information on seed production and distribution possibilities for different crops in the selected region. The first group consists of farmers with operational holding size up to 1 hectares, farmers fall into 1 to 2 hectare comprise the second farm size group, sample farmers having operational holding size 2 to 4 hectare and 4 to 10 hectare constitute third and fourth farm size groups. These farm size groups of farmers are designated as marginal, small, semi-medium and medium size of operational holding (Agricultural Census). This classification based on this standard is difficult for West Bengal due to absence of large farmers and predominance of marginal and small farmers with small average size of holdings.

Analytical tools used for study

In analyzing data different methods are employed keeping in view the stated objectives of the study. Simple technique of tabular and percentage analyses are applied in case of annual crops and for input-output relations the following statistical tools are considered for the present investigation.

1. Multiple Linear Regressions.
2. Linear-Log (Damodar N. Gujarathi, 2004)
3. Cobb-Douglass (Heady and Dillon 1963)
4. The Multiple Linear Discriminant Function (Dillon and Goldstein, 1984)

Details of concepts have been explained in chapter VI.

Present worth of cost and return over time period

Estimation of present worth of cost and return incorporating the time as an element the economics for seed processing unit of Paddy are calculated with the help of following formula (Gittinger 1981):

$$Yw = \sum_{t=1}^{P} Dt\ Yt$$

Where

$$Dt = \frac{1}{\sum_{t=1_t}^{nt} (1+r)^{nit}}$$

r = discounting rate

l_t = lower discount rate of time period

nt = highest discount rate of time period

B/C ratio and Annual constant inflow and outflow of rice processing unit has been calculated by

$$\text{B/C ratio} = Y\,wR/Y\,wC.$$

$$\frac{YwR - YwC}{\frac{1-V^x}{r}}$$

Ywr = Present worth of discounted benefit or financial return over period of time

Ywc = Present worth of discounted cost or financial cost over period of time.

$$\left.\begin{matrix} a \\ n \end{matrix}\right| = \frac{1-V^x}{r}$$

= Present worth of an annuity factor

$$V^x = \text{Discount factor} = \frac{1}{(1+r)^x}$$

= Present worth of an amount of 1 at the end of life.

$\left.\begin{matrix} a \\ n \end{matrix}\right|$ is the present worth of a sequence of n payments of 1 per year; each payment being made at the end of the respective year; and

n = years of life of rice processing unit.

Pricing per hours of run = Present worth of cost/ present worth of annuity factror × Total running hours.

RESULT AND DISCUSSION

Cost and Return Structure

The objectives of this study is to estimate the socio economic status, the cost and return structure and the relative profitability of seed production and multiplication of paddy crop comparing with its general cultivation. For the purpose of the study, selected households has been grouped into four categories like, marginal (below 1 ha.), small (1-2 ha.), semi medium (2-4 ha.) and medium (4-10 ha.) farmers based on the agricultural census of our country. The West Bengal agriculture is mainly dominated by marginal and small farmers.

Costs and Input Intensity of Paddy Seed Production

The objective of this section is to estimate the item wise cost of paddy seed production for winter and summer season. Attempt has also been made on the intensity of input application in different seasons of paddy seed production both in district and aggregate level in the high cropping intensity zones namely, Bardhaman, Hoogly, Nadia and Murshidabad of West Bengal.

Prime Cost and Structure of Paddy seed Production in Winter Season

Component wise break up of Prime Cost of Winter Paddy Seed Production combining the four districts in high cropping zones of West Bengal and district wise variation of prime cost are presented in Table 2 and Table 2.1 considering the crop year of 2010-11. For the purpose of analysis the total selected households has been grouped mainly as Marginal, Small, Semi-Medium and Medium size of operational holding based on the usual notation in Agricultural Census. In West Bengal agriculture, the semi-Medium and the Medium groups may be considered as the large farmers.

From the tables it is clear that for the paddy seed production the main cost items are the human and machine labour, seeds and irrigation and plant

Table 2
Component wise Prime Cost of Winter Paddy Seed Production in selected areas of West Bengal during 2010-11 (In percentage)

Size Group	*Seed*	*Manure*	*Fertilizer*	*Irrigation*	*Animal labour*	*Machine labour*	*Hired labour*	*Family Labour*	*PPCL*	*Misc**	*Prime Cost (Rs/ha)*
Marginal	3.80	3.32	9.39	4.51	2.07	6.26	21.96	42.39	3.30	3.00	100.00 (24309.02)
Small	3.78	4.60	9.15	6.19	2.44	6.89	22.06	38.92	3.06	2.90	100.00 (25615.30)
Semi Medium	3.55	2.77	8.22	4.63	2.74	7.03	45.73	19.13	2.81	3.40	100.00 (27864.08)
Medium	3.44	4.81	8.97	5.53	2.45	7.67	36.07	25.75	2.96	2.35	100.00 (24870.18)
Combined	3.62	3.92	8.79	5.37	2.52	7.08	33.73	29.04	2.96	2.96	100.00 (26090.52)

Figures within parenthesis indicate Absolute Cost.

*Miscellaneous including rate of interest on working capital and excluding land revenue and cesses.

Table 2.1
Prime Cost and structure of Paddy seed production 2.1 Inter district Variation of Prime Cost of Winter Paddy Seed Production during 2010-11 (In Percentage).

Size Group	*Seed*	*Manure*	*Fertilizer*	*Irrigation*	*Animal labour*	*Machine labour*	*Hired labour*	*Family Labour*	*PPCL*	*Misc**	*Prime Cost (Rs/ha)*
Bardhaman	3.61	3.68	9.02	5.02	2.39	8.53	35.04	27.09	3.01	2.62	100.00 (24461.45)
Hoogly	3.74	3.50	8.50	6.16	2.57	7.43	27.52	33.10	2.99	4.49	100.00 (25480.17)
Nadia	4.24	4.93	9.90	6.33	2.65	5.70	23.50	36.27	3.46	3.03	100.00 (24783.92)
Murshidabad	3.73	4.58	9.25	5.74	3.12	6.24	32.10	29.69	2.98	2.57	100.00 (26489.94)
Combined	3.62	3.92	8.79	5.37	2.52	7.08	33.73	29.04	2.96	2.96	100.00 (26090.52)

Figures within parenthesis indicate Absolute Cost.

*Miscellaneous including rate of interest on working capital and excluding land revenue and cesses.

nutrients. The item like cost of hired human labour constitutes 33.73 per cent of Prime Cost, family labours; fertilizer and machine labour contribute 29.04, 8.79 and 7.08 per cent to prime cost respectively when farmers of various farm size classes are taken together. Inter-farm variation of prime cost discerns positive relationship between farm size and magnitude of prime costs. Cost of hired human labour, machine labour, animal labour and irrigation, increases with the increase in farm size whereas the imputed value of family labour, cost of seed and plant protection chemicals shows an inverse relation with the increase in holding size. In case of other cost components, such as manures and miscellaneous items etc, no such definite association can be ascertained in winter paddy seed production in aggregate level of four districts. It is important to note that the cost of seed item even in seed production system constitute only 3.62 percent of prime cost. Now the question come to the fore that is there any variation of cost structure may exist in the district level. To answer this question the district wise prime cost structure has been worked out and represented in Table 2.1 where the inter district variations are recorded. One remarkable situation is that there are no large farmers among the selected households and for this reason it may be safely concluded that the seed production mainly dominated by small and marginal farmers. Inter district variation of component wise break up of prime cost has been summarized in Table 2.1 to elicit whether there are any differences in input use or not, for winter paddy seed production. The facts revealed that the prime cost per hectare Rs. 24461 Rs. 25480 Rs. 24784 and Rs. 26490 for Bardhaman, Hooghly, Nadia and Murshidabad district respectively. Marginally higher prime cost per hectare belonging to Murshidabad district and lower to Bardhaman district. Bardhaman district is well known as rice bowl of the West Bengal State. Here, the combined hired human labour embrace 35.04 and 32.10 percent of prime cost respectively for Bardhaman and Murshidabad district while, Nadia and Hooghly district contributes highest 36.27 and 33.10 percent cost of imputed value of family labours to the respective prime cost. Both Murshidabad and Bardhaman districts represent higher contribution of hired human labour while Hooghly and Nadia districts represent higher contribution of imputed value of family labours to the respective prime cost.

It means Hooghly and Nadia have more emphasis on family labours than hired human labours and so their having more contribution to the respective prime cost. All districts have noticed that utilization of fertilizer followed by machine labour the most prominent aspect in the cost. Nadia district only has more impact on irrigation after fertilizer to the prime cost. It has been noticed that winter paddy seed production incurs extreme intensity of utilization of inputs like human labours, fertilizer and machine labours. Therefore, the respective cost of above mentioned inputs having drastic contribution to the prime cost of respective districts. Among the four districts, the Bardhaman and Nadia are comparatively favorable for the winter paddy seed production. Nadia district also incurred higher percentage of seed, irrigation, fertilizers and plant protection chemicals during the seed production.

Prime Cost and Structure of Paddy Seed Production in Summer Season

It is well known fact that as and when an area converted into assured irrigation from supplementary or unirrigated situation, the farmers shifted the area in high water consuming crops like paddy cultivation during the water crises months in summer season. So the demands for seed in case of paddy are ever increasing. And now the paddy cultivation in summer season is the main important commercial crop in West Bengal and one fourth of the net sown area are being occupied by summer season which generally called as summer paddy. The area occupied by the summer paddy in West Bengal ranges up to 25 per cent of net cropped area and Bardhaman, Hoogly, Nadia, and Murshidabad contributes 46, 44, 51 and 32 per cent of their respective areas (Nandi and Giri). Break up of prime cost in percentage form for the West Bengal and the selected four districts are presented in Table 3 and table 3.1 for the districts.

The cost of hired human labour constitutes 30.45 percent of prime cost, imputed value of family labour; irrigation and fertilizer contribute about 26.39, 10.37 and 9.72 percent to prime cost respectively in the aggregate level of summer paddy seed production revealed by Table 3. Cost of hired human labour increases with the increase in farm size followed by seed, manure, miscellaneous and machine labour up to certain extent. While, imputed value of family labours, fertilizers, irrigation and plant protection chemicals are negatively correlated with

Table 3
Component wise Prime Cost of Summer Paddy Seed Production in selected areas of West Bengal during 2010-11 (In Percentage).

Size Group	*Seed*	*Manure*	*Fertilizer*	*Irrigation*	*Animal labour*	*Machine labour*	*Hired labour*	*Family Labour*	*PPCL*	*Misc**	*Prime Cost (Rs/ha)*
Marginal	4.19	3.00	11.66	13.01	2.05	5.77	17.74	36.81	2.75	3.03	100.00 (31184.08)
Small	4.62	3.33	10.19	10.60	1.76	7.55	18.56	37.16	3.00	3.22	100.00 (31438.96)
Semi Medium	4.96	2.94	9.31	10.24	2.49	6.57	39.07	18.32	2.69	3.42	100.00 (30592.71)
Medium	3.60	5.05	9.09	9.52	2.60	6.77	39.25	19.06	2.65	2.41	100.00 (30946.72)
Combined	4.46	3.59	9.72	10.37	2.23	6.92	30.45	26.39	2.80	3.08	100.00 (31013.11)

Figures within parenthesis indicate Absolute Cost.

*Miscellaneous including rate of interest on working capital and excluding land revenue and cesses.

Table 3.1
Inter district Variation of Prime Cost of Summer Paddy Seed Production during 2010-11 (In Percentage).

Size Group	*Seed*	*Manure*	*Fertilizer*	*Irrigation*	*Animal labour*	*Machine labour*	*Hired labour*	*Family Labour*	*PPCL*	*Misc**	*Prime Cost (Rs/ha)*
Bardhaman	3.80	3.80	9.02	9.88	2.23	6.91	36.10	22.83	2.80	2.63	100.00 (31139.25)
Hoogly	6.06	2.68	9.98	12.98	2.27	7.17	23.93	28.75	2.11	4.07	100.00 (32270.13)
Nadia	4.33	4.06	11.12	8.64	2.17	6.64	23.65	32.45	3.54	3.40	100.00 (29510.90)
Murshidabad	–	–	–	–	–	–	–	–	–	–	–
Combined	4.46	3.59	9.72	10.37	2.23	6.92	30.45	26.39	2.80	3.08	100.00 (31013.11)

Figures within parenthesis indicate Absolute Cost.

*Miscellaneous including rate of interest on working capital and excluding land revenue and cesses.

the increase in farm size. In case of other cost component *i.e.* animal labour shows mixed approach with the increase in holding size. When compared both winter and summer season paddy seed production and in comprising four districts of West Bengal as a whole, it is observed that the cost of hired human labour 33.73 and 30.45 percentages and fertilizers 8.07 and 10.37 percentages respectively plays major common contribution of prime cost. Though the winter paddy mainly the rainfed in nature and summer paddy are in irrigated situation but the farmers irrigate the winter paddy for the adjustment of second crop in their field for continuous submergence and better yield. So the cost variation is natural for seed production also and it plays major role in both seasons of paddy seed production. The costs of seed, fertilizers, irrigation and miscellaneous are greater in case of summer paddy seed production than winter paddy seed production, whereas intensity of costs of manure,animal labour, machine labour, hired human labour, imputed value of family labour and plant protection chemicals is greater in winter paddy seed production as revealed from the Table 3 and Table 3.1.

To observe the inter farm variation in district level item wise Prime Cost of seed production in summer season paddy are presented from Table 3.1 for the selected districts. It is important to note that the farmers those who are engaged in seed production in winter they are not devote the area for seed production during summer in case of Murshidabad district, but they are interested in grain production during summer time. Therefore, only three districts have been considered for the aggregate level of West Bengal. Inter district variation in prime cost on different cost items has been presented in Table 3.1 for paddy seed production in summer except Murshidabad district. Bardhaman district involved highest 36.10 percent cost of hired human labour as against Hooghly and Nadia district. Imputed value of family labours contributes 28.75 and 32.45 percent respectively to the prime cost of summer paddy seed production in Hooghly and Nadia districts. Here, the Nadia district has an advantage over other two districts and Hoogly district ranked second in respect of total prime cost. All the three districts, apart from human labour, irrigation and fertilizers contribute higher intensity of costs to the respective prime cost. It means, irrigation and fertilizer after human labours appears to have relevance for a summer paddy seed production with an objective of comparing the production economics of the crop grown in three distinct areas under consideration. Seed production both in winter and

summer has their influences on fertilizer and irrigation after human labour to the prime cost. In winter season, Murshidabad district possesses higher prime cost followed by Hooghly district and Hooghly district represents higher prime cost followed by Bardhaman district in summer time seed production. As, Murshidabad is out of competition due to not having paddy seed production in summer season therefore, Hooghly district represents higher prime cost both in winter and summer paddy seed production among all those districts described by Table 3 and Table 3.1. The only component *i.e.* reasonable utilization of fertilizer and highly irrigation among other inputs after human labour encounter the further probable change to the prime cost in summer as against winter time seed production.

Cost of Cultivation of Paddy Seed in Both Season

Cost of Cultivation of paddy seed both in winter and summer over different cost concepts in the selected areas of West Bengal have been estimated in Table 4. It is clear from table that cost of cultivation of winter time paddy seed *i.e.* Cost C for West Bengal per hectare are Rs. 43908.44 for marginal farms, Rs. 43285.39 for small farmers, Rs. 48269.24 for semi medium farmers, Rs. 45325.13

Table 4
Cost of Cultivation and production of paddy seed both in winter and summer over different cost concepts in the selected areas of West Bengal during 2010-11.

Size Group	*Cost A_1 (Rs/ha)*	*Rental value of own land*	*Cost B (Rs/ha)*	*Family labour (Rs/ha)*	*Cost C (Rs/ha)*	*Cost of Production (Rs/q)*
			Winter Paddy Seed			
Marginal	14059.66	19544.92 (58.16)	33604.58	10303.86 (23.47)	43908.44	903.69
Small	15699.53	17615.59 (52.88)	33315.12	9970.27 (23.03)	43285.39	884.02
Semi Medium	22588.44	20350.67 (47.39)	42939.11	5330.13 (11.04)	48269.24	1000.87
Medium	18519.66	20400.45 (52.42)	38920.11	6405.02 (14.13)	45325.13	914.02
Combined	18567.26	19280.70 (50.94)	37847.96	7577.76 (16.68)	45425.72	987.38
			Summer paddy Seed			
Marginal	19761.06	22837.25 (53.61)	42598.31	11477.52 (21.22)	54075.83	1080.57
Small	19810.33	22047.96 (52.67)	41858.30	11683.13 (21.82)	53541.43	1103.41
Semi Medium	25043.93	20737.59 (45.30)	45781.51	5603.28 (10.90)	51384.79	1093.15
Medium	25103.62	20217.06 (44.61)	45320.68	5897.60 (11.51)	51218.28	1113.62
Combined	22884.35	21204.66 (48.10)	44089.01	8183.26 (15.66)	52272.27	1100.80

Figures within parenthesis indicate percentage of total.

for medium farmers and Rs. 45425.72 when all farmers taken together. Whereas Cost of cultivation of summer paddy seed per hectare are Rs. 54075.83, Rs. 53541.43, Rs. 51384.79, Rs. 51218.28 and Rs. 52272.27 respectively for marginal, small, semi medium, medium and combine together. It has been seen that cost of cultivation in winter paddy seed production is rising with increase in holding size while in summer paddy seed production it is absolutely opposite *i.e.* declining with increase in size. It seems to be cost of cultivation in winter paddy seed production is inversely related with summer paddy seed production. It is also seen in both winter and summer paddy seed production that rental value of own land recorded the highest expenditure in case of marginal and small farmers, which accounted for 58.16 per cent (Rs. 19544.92), 53.61 per cent (Rs. 22837.25) and 52.88 per cent (Rs. 17615.59), 52.67 per cent (Rs. 22047.96) of total expenditure respectively. Mohandas and Thomas in 1997 also found that rental value of own land recorded the highest expenditure in case of marginal and small farmers in rice production of Kerala state. Imputed values of family labours per hectare in both winter and summer paddy seed production for combined four district of West Bengal are covered 23.47 per cent (Rs. 10304) and 21.22 per cent (Rs. 11478) for marginal farmers and 23.03 per cent (Rs. 9970.27) and 21.82 percentages (Rs.11683) for small farmers also traced highest expenditure after imputed rental

Table 4.1
Inter district variation of Cost of Production of Paddy Seed both in winter and summer over different cost concepts during 2010-11.

			Winter Paddy Seed			
Districts	*Cost A_1 (Rs/ha)*	*Rental value of own land*	*Cost B (Rs/ha)*	*Family labour (Rs/ha)*	*Cost C (Rs/ha)*	*Cost of Production (Rs/q)*
Bardhaman	17889.21	20387.82 (53.26)	38277.03	6626.73 (14.76)	44903.77	911.80
Hoogly	17101.56	20085.03 (54.01)	37186.59	8433.11 (18.49)	45619.70	969.07
Nadia	15849.27	20085.97 (55.89)	35935.25	8989.15 (20.01)	44924.39	909.77
Murshidabad	18678.44	21149.41 (53.10)	39827.85	7866.00 (16.49)	47693.85	976.85
Combined	18567.26	19280.70 (50.94)	37847.96	7577.76 (16.68)	45425.72	987.38
			Summer Paddy Seed			
Bardhaman	24084.55	20144.72 (45.55)	44229.27	7109.20 (13.85)	51338.46	1110.09
Hoogly	23045.73	21769.68 (48.58)	44815.41	6034.34 (17.15)	54094.30	1125.69
Nadia	19989.95	23092.87 (53.60)	43082.82	9575.45 (18.18)	52658.26	1058.05
Murshidabad	–	–	–	–	–	–
Combined	22884.35	21204.66 (48.10)	44089.01	8183.26 (15.66)	52272.27	1100.80

Figures within parenthesis indicate percentage of total.

value of own land. Cost B in both paddy seed production does not performs any concrete association within the farmer's size group. Cost B in summer paddy seed production for combined group is Rs. 44089.01 and comparatively higher than that of winter paddy seed production which contributes Rs. 37847.96. Overall, per quintal cost in both winter and summer paddy seed production is estimated as Rs. 987 and Rs.1101 respectively. Inter district variation of cost of production of paddy seed in both winter and summer over different cost concepts have been presentedin the Table 4.1. The district wise comparison of different cost concepts indicates about winter and summer for paddy seed. In winter and summer, Bardhaman and Nadia pay more advantageous in their respective cost for paddy seed production. Hooghly and Murshidabad district holds bigger share of Cost C in winter as well as in summer time seed production except Murshidabad district. Both in winter and summer, Nadia (Rs. 910 and Rs. 1058 respectively) and Bardhaman (Rs. 912 and Rs. 1110) received lower cost of production as against Murshidabad and Hooghly districts. The table also shows the imputed rental value of own land has become lower in case of Murshidabad and Bardhaman district in winter and summer respectively to their respective Cost B. In both winter and summer, Nadia and Hooghly district has more emphasis on imputed value of family labours.

Gross Return from Paddy Seed Production

Gross return from paddy seed production in the selected areas during winter (Rs. 68211) is lower than summer (Rs. 70682) season. Small size group (Rs. 68714) and marginal size group (Rs. 76124) in winter and summer respectively possesses higher gross returns among respective size group of farmers. While, semi medium size group (Rs. 67836) and medium size group (Rs. 67930) among the respective size group of winter and summer pertaining lower gross returns (Table 5). Murshidabad and Bardhaman district get advantages from winter season, while the producer of Nadia and Hooghly grasps higher return in summer time from paddy seed cultivation.

Table 5
Estimation of Gross Return for Paddy Seed production both for winter and summer in the selected areas of West Bengal during 2010-11.

Winter Paddy Seed					
			Return (Rs/ha)		
Size Group	*Main Product (q/ha)*	*Price (Rs/q)*	*Main Product*	*By Product*	*Gross Total*
Marginal	48.59	1141.05	55441.11	12744.12	68185.23
Small	48.96	1152.89	56450.73	12262.79	68713.52
Semi Medium	48.23	1220.32	58852.91	8982.64	67835.55
Medium	49.59	1258.18	62391.44	5610.06	68001.51
Combined	46.01	1274.44	58632.22	9578.30	68210.51
Summer Paddy Seed					
Marginal	50.04	1250.00	62554.64	13569.52	76124.17
Small	48.52	1274.34	61835.99	11657.22	73493.21
Semi Medium	47.01	1287.88	60538.14	8587.15	69125.29
Medium	45.99	1352.69	62213.83	5176.38	67390.20
Combined	47.49	1295.62	61523.46	9158.75	70682.21

Table 5.1
Inter district variation on Estimation of Gross Return for Paddy Seed Production both for winter and summer during 2010-11.

Winter Paddy Seed					
			Return (Rs/ha)		
Districts	*Main Product(q/ha)*	*Price (Rs/q)*	*Main Product*	*By Product*	*Gross Total*
Bardhaman	49.25	1262.50	62175.03	5784.37	67959.41
Hoogly	47.08	1133.06	53339.87	13906.95	67246.82
Nadia	49.38	1059.21	52303.88	14649.37	66953.25
Murshidabad	48.82	1228.50	59980.43	10517.60	70498.03
Combined	46.01	1274.44	58632.22	9578.30	68210.51
Summer Paddy Seed					
Bardhaman	46.25	1341.83	62056.18	5092.88	67149.06
Hoogly	48.05	1239.76	59576.06	12989.53	72565.59
Nadia	49.77	1250.00	62211.39	14764.84	76976.22
Murshidabad	–	–	–	–	–
Combined	47.49	1295.62	61523.46	9158.75	70682.21

CONCLUSION

In a labour surplus economy like ours, these employment potentialities make the agriculture more attractive to retain in cultivation. Variations in all type of cost measures, yield and returns over the different size group of producers are been visualized in positive relations with the increase in area and inverse relation with the yield and returns. Return per rupee spent (Return–Cost Ratio) over different cost bases like, Cost A_1, Prime Cost, Cost B, and Cost C clearly discerns the descending order with the increase in operational sizes. The return over seed production both in winter and summer time offered higher returns over the general non-seed production which unveils that conversion of non-seed to seed production is not only remunerative but also helps in quality seeds in the regional demand of seed needs to the farmers.

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