

COST ANALYSIS OF PADDY : A CASE STUDY BASED ON HOUSEHOLD FARMS IN NADIA, WEST BENGAL

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Abstract : Against the backdrop of the pre-eminent role of agriculture in the Indian economy, this paper aims at analysing costs of various paddy categories within a sample of selected farms. The major objectives are to : (i) assess the magnitude of change in unit cost with respect to different elements of cost of paddies over different size classes of sample farms, (ii) determine cost patterns of various types of paddies, (iii) analyse the cost fluctuations among various types of paddies and (iv) identify low cost and high cost areas.

Key Words : Agriculture; paddies; composite cost analysis; cost per hectare; cost fluctuation; cost control.

1. Introduction

Agriculture is the past, present and perhaps, the future phenomenon of Indian economy. In the past, agriculture was mainly intended for meeting household requirements. The present form of agriculture is rather an improved one which even crosses the territory of national boundary. In the near future, with greater emphasis in this vital field through Five-Year Plans, it could be transformed into an industry which would not only generate more consumable surplus for domestic sector but would also provide surplus for export to a great extent over the present scenario.

Green Revolution (Third Five-Year Plan, 1961-66) and subsequent other development programmes, have brought a rapid change in the agricultural scenario of West Bengal as well as in the district of Nadia. It needs no emphasis that the progress of Indian economy is greatly dependent on the development of agriculture as in India where about 70% of the people are dependent on the produces of the farms, there is need and scope for extension of the utilisation of the costing principles to the farms as well. Therefore, any study on agriculture, particularly on the cost analysis of paddy undoubtedly assumes significance.

2. Objectives

This paper deals with the cost analysis of various paddies of the sample farms. Cost is analysed on the basis of per hectare and per tonne with a view to examine the magnitude of change in unit cost of various paddies over different size-classes of sample farms. The important issues discussed in this paper are as below :

- Magnitude of change in unit cost of different elements of cost among various paddies over different size-classes of sample farms.
- Cost pattern regarding various paddies
- Cost fluctuation among various paddies and the main reason thereof.
- Identification of high and low cost areas.

3. Rationale behind Selection of Nadia District and Sample Design

Nadia is selected with different size-classes of landowners as a field area of

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study. There are a number of specific reasons for such selection. Firstly, it is a multi-crop producing district; paddy and jute are the main crops. Secondly, it is highly dependent on agriculture because of the meagre scope of other employment opportunities. Thirdly, it is neither agriculturally advanced nor backward. Thus, the study on this district would reveal the fair scenario agriculture of West Bengal.

Sample farms are suitably divided as : below 2 hectares, 2 to 4 hectares and 4 and above hectares and these are symbolised as small farms, medium farms and large farms respectively. In order to have a representative character, a sizeable sample is, therefore, drawn from different size-classes of household farms.

Data are collected from primary sources only. In collecting data, door to door survey has been made to the farmers with a structured questionnaire. For measuring fluctuations in cost, coefficient of variation is used.

4. Cost Analysis

The size of production depends on the size-class of farms and other factors of production which, in turn, determines the basis of analysis. To examine the pros and cons as to the different sizes of production, it is necessary to classify the sample farms into different size-groups which is mentioned earlier.

Paddy includes boro paddy, aman paddy and aus paddy. Cost analysis for aman and aus paddy is not made separately as the cost structure and yield of these two crops are very highly correlated to each other. Therefore, a composite cost analysis is made for these two identical crops. A cropwise cost analysis of various paddies is given below.

4.1 Boro paddy

Different elements of cost of boro-paddy per hectare for different size-classes of sample farms are tabulated in Table 1.

It is evident that, on an average, direct material cost comes to Rs. 1127.70 per hectare. It however decreases with the rise in the size-class of farms (Table 1).

It reveals that, on an overall basis, direct labour cost is Rs. 7836.35 per hectare. It changes disproportionately with the rise in the size-group of farms which varies from Rs. 7505.35, lowest on the large farms, to Rs. 8034.84, highest on the medium farms (Table 1). It is observed that the use of animal labour is falling while machine labour is rising with the rise in the size-class of farms. It is also observed that the farmers of both small and medium farms are spending more on human labour so that direct labour cost is pushed up. It is interesting to note that human labour cost is about 3.3 times of the composite cost of animal and machine labour. Again, the share of machine labour cost is about 2% of total direct labour cost. Such a lower machine labour cost for producing this vital food crop indicates the existence of traditional agriculture in Nadia district in particular and in West Bengal in general.

It also reveals that, on an average, the share of direct expenses is Rs. 7029.28 per hectare. It declines steadily with the rise in the size-class of farms, giving Rs. 8631.82, Rs. 6473.40 and Rs. 5624.59 per hectare for small, medium and large farms respectively (Table 1). It is noticed that irrigation cost shows an overlapping

declining trend whereas the cost of insecticides shows a steady increasing trend with the rise in the size-class of farms. Moreover, irrigation cost in case of small farms clearly explains the situation of not having adequate irrigation infrastructure from the farmers' end or having inadequate government irrigation facilities; rather they have to pay for more to get urgently needed irrigation. The higher expenditure on direct expenses particularly by small farms is attributable to the higher spending on irrigation.

It appears that, on an average, field overhead is Rs. 2270.70 per hectare. It decreases gradually with larger farms (Table 1). Administration overhead, on an average, is Rs. 429.53 per hectare. It declines disproportionately with the rise in the size-class of farms (Table 1). Marketing overhead, on an average, is Rs. 413.77 per hectare. It shows declining trend with larger farms (Table 1).

It shows that, on an overall basis, cost of production comes to Rs. 18693.56 per hectare. It declines steadily with the increase in the size-group of farms (Table 1). Again, total cost per hectare, on an average, is Rs. 19107.33. It decreases significantly with larger farms, showing Rs. 21051.81, Rs. 18707.47 and Rs. 16915.76 per hectare for small, medium and large farms respectively (Table 1). The drop in cost of production and total cost per hectare for larger farms could be explained as the benefit of large scale production.

Table 1 : Per Hectare Comparative Cost Analysis of Boro paddy for the Sample Farms for 1994-95.

		(In rupees)			
Particulars	Small Farms	Medium Farms	Large Farms	All Farms	
1. Direct Materials : Seeds	1137.09	1118.41	1131.00	1127.70	
2. Direct Labour :					
Animal Labour	1761.69	1622.93	1588.81	1663.27	
Human Labour	6030.04	6239.05	5540.14	6009.49	
Machine labour	13.32	172.86	377.03	163.59	
	7805.05	8034.84	7505.98	7836.35	
3. Direct Expenses :					
Irrigation	5030.21	2624.23	1815.63	3274.81	
Fertilisers	3040.70	3124.63	2947.22	3055.68	
Insecticides	560.91	724.54	861.74	698.79	
	8631.82	6473.40	5624.59	7029.28	
4. Prime Cost (1+2+3)	17573.96	15626.65	14261.57	15993.33	
5. Field Overhead	2462.80	2305.01	1909.82	2270.70	
6. Field Cost (4+5)	20036.76	17931.66	16171.39	18264.03	
7. Administration Overhead	534.87	371.61	377.97	429.53	
8. Cost of Production (6+7)	20571.63	18303.27	16549.36	18693.56	
9. Marketing Overhead	480.18	404.20	366.40	413.77	
10. Total Cost (8+9)	21051.81	18707.47	16915.76	19107.33	

Source : Field survey. Results computed.

Per tonne different elements of cost of boro paddy for different size-classes of sample farms are presented in Table 2.

Table 2 discloses that, on an average, cost of production per tonne is Rs. 3106.24. It decreases significantly with larger farms. Total cost per tonne, on an overall basis, comes to Rs. 3173.90 and it shows a declining trend with the rise in the size-class of farms, showing Rs. 3581.27, Rs. 3077.96 and Rs. 2761.49 for small, medium and large size group of farms respectively. It is observed that per tonne direct labour, direct expenses, field overhead and marketing overhead show proportional decreasing trend while direct materials and administration overhead disclose disproportional declining trend with larger farms. The fall in both cost of production and total cost per tonne in case of larger farms could be attributed as the benefit of large scale production as well as improved yield.

Table 2 : Per Tonne Comparative Cost Analysis of Boro paddy on the Sample Farms for 1994-95.

		(In rupees)			
Particulars	Small Farms	Medium Farms	Large Farms	All Farms	
1. Direct Materials : Seeds	193.43	184.12	184.64	187.39	
2. Direct Labour :					
Animal Labour	299.69	267.18	259.38	276.38	
Human Labour	1025.79	1027.11	904.43	998.58	
Machine labour	2.27	28.46	61.55	27.18	
	1327.75	1322.75	1225.36	1302.14	
3. Direct Expenses :					
Irrigation	855.71	432.02	296.40	544.16	
Fertilisers	517.27	514.40	481.14	507.75	
Insecticides	95.42	119.28	140.68	116.12	
	1468.40	1065.70	918.22	1168.03	
4. Prime Cost (1+2+3)	2989.58	2572.57	2328.22	2657.56	
5. Field Overhead	418.96	379.46	311.78	377.31	
6. Field Cost (4+5)	3408.54	2952.03	2640.00	3034.87	
7. Administration Overhead	90.99	61.18	61.70	71.37	
8. Cost of Production (6+7)	3499.53	3013.21	2701.70	3106.24	
9. Marketing Overhead	81.74	64.75	59.79	67.66	
10. Total Cost (8+9)	3581.96	3077.96	2761.49	3173.90	

Source : Field survey. Results computed.

4.2 Aman and Aus Paddy

Per hectare elementwise cost of aman and aus paddy for different size classes of farms are worked out in Table 3.

It is evident that, on an average, cost of direct materials in Rs. 937.62 per hectare. It decreases gradually with the increase in the size class of farms (Table 3).

It appears that, on an overall basis, direct labour cost comes to Rs. 6631.19 per hectare. It declines disproportionately with the increase in the size class of farms which varies from Rs. 6313.06, lowest on the medium farms to Rs. 7007.35, highest on the small farms (Table 3). It is observed that the use of animal labour is falling while machine labour is rising with the increase in the size-class of farms. This indicates a forward-looking symptom towards modern agriculture from traditional agriculture. Again, the rise in direct labour cost is associated with the higher employment of human labour instead of machine labour or use of undesirable labour-mix by the small farms.

It shows that, on an average, cost of direct expenses per hectare comes to Rs. 4398.77. It declines disproportionately with larger farms which varies from Rs. 3429.18, lowest on the medium farms, to Rs. 5390.38, highest on the small farms (Table 3). It is observed that both the cost of fertilisers and insecticides are showing disproportional upward tendency with larger farms. The cost of irrigation is significantly high in case of small farms whereas the cost of insecticides is enough high in case of large farms. The higher direct expenses on the small farms are caused mainly due to the higher expenditure incurred on irrigation which pinpoints the inadequacy of irrigation facilities.

It is evident that, on an average, field overhead per hectare arrives at Rs. 1905.32. It declines steadily with the increase in size-group of farms, giving Rs. 2096.76, Rs. 1785.59 and Rs. 1704.56 per hectare on the small, medium and large farms respectively as revealed by Table 3. The overall administration overhead comes to Rs. 315.32 per hectare on the sample farms which varies from Rs. 195.14, the lowest on the medium farms to Rs. 441.08, the highest on the small farms (Table 3). Marketing overhead, on an average, per hectare is Rs. 245.94. It is ever low, Rs. 224.02 on the medium farms while it is ever high, Rs. 276.34 on the small farms (Table 3).

It shows that, on an average, cost of production is Rs. 14188.22 per hectare. It decreases at a disproportionate rate, which varies from Rs. 12604.34, lowest on the medium farms, to Rs. 15979.95, highest on the small farms (Table 3). Per hectare total cost, on an average, is Rs. 14434.16 on the sample farms. It decreases in the U-shape with the increase in the size-class of farms, giving Rs. 16256.29, Rs. 12828.36 and Rs. 13616.25 per hectare on the small, medium and large size-group of farms respectively (Table 3). The increase in total cost per hectare on the small farms is attributable to the higher expenditure incurred mainly on human labour as well as on irrigation.

Table 3 : Per Hectare Comparative Cost Analysis of Aman and Aus paddy on the Sample Farms for 1994-95.

		(In rupees)			
Particulars		Small Farms	Medium Farms	Large Farms	All Farms
1.	Direct Materials : Seeds	1044.38	881.37	801.61	937.62
2.	Direct Labour :				
	Animal Labour	1552.70	1130.64	1168.90	1318.73
	Human Labour	5454.65	4912.94	4742.63	5116.32
	Machine labour	—	269.48	514.74	196.14
		<u>7007.35</u>	<u>6313.06</u>	<u>6426.27</u>	<u>6631.19</u>
3.	Direct Expenses :				
	Irrigation	2735.08	1289.28	1226.28	1900.00
	Fertilisers	2160.27	1722.67	2228.69	1998.54
	Insecticides	495.03	417.23	703.08	500.23
		<u>5390.38</u>	<u>3429.18</u>	<u>4158.31</u>	<u>4398.77</u>
4.	Prime Cost (1+2+3)	13442.11	10623.61	11386.19	11967.58
5.	Field Overhead	2096.76	1785.59	1704.56	1905.32
6.	Field Cost (4+5)	15538.87	12409.20	13090.75	13872.90
7.	Administration Overhead	441.08	195.14	278.42	315.32
8.	Cost of Production (6+7)	15979.95	12604.34	13369.17	14188.22
9.	Marketing Overhead	276.34	224.02	247.08	245.94
10.	Total Cost (8+9)	<u>16256.29</u>	<u>12828.36</u>	<u>13616.25</u>	<u>14434.16</u>

Source : Field survey. Results computed.

Per tonne elementwise cost of aman and aus paddy for different size-classes of sample farms are exhibited in Table 4.

Table 4 shows that, on an overall basis, cost of production per tonne comes to Rs. 3810.50. It decreases steadily with the increase in the size-class of farms. Per tonne total cost, on an average, arrives at Rs. 3876.27. It shows a decreasing trend with the rise in the size-class of farms. It is, however, observed that per tonne direct materials, direct labour, field overhead and marketing overhead exhibit declining trend with larger farms. On the contrary, the behaviour of direct expenses and administration overhead is showing an oscillation in nature. Finally, the fall in cost of production as well as total cost per tonne with larger farms is attributable to the benefit of large scale production and improved yield.

Table 4 : Per Tonne Comparative Cost Analysis of Aman and Aus Paddy on the Sample Farms for 1994-95.

		(In rupees)			
Particulars	Small Farms	Medium Farms	Large Farms	All Farms	
1. Direct Materials : Seeds	280.18	248.18	195.17	251.82	
2. Direct Labour :					
Animal Labour	416.54	318.38	284.59	345.17	
Human Labour	1463.33	1383.44	1154.70	1374.08	
Machine labour	—	75.88	152.33	52.67	
	<u>1879.87</u>	<u>1777.70</u>	<u>1564.62</u>	<u>1780.92</u>	
3. Direct Expenses :					
Irrigation	733.74	363.05	298.63	510.28	
Fertilisers	579.54	485.09	542.63	536.74	
Insecticides	132.80	117.48	171.18	134.35	
	<u>1446.08</u>	<u>965.62</u>	<u>1012.44</u>	<u>1181.37</u>	
4. Prime Cost (1+2+3)	3606.13	2991.50	2772.23	3214.11	
5. Field Overhead	562.50	502.81	415.01	511.71	
6. Field Cost (4+5)	4168.63	3494.31	3187.24	3725.82	
7. Administration Overhead	118.33	54.95	67.79	84.68	
8. Cost of Production (6+7)	4286.96	3549.26	3255.03	3810.50	
9. Marketing Overhead	74.10	63.04	60.12	65.77	
10. Total Cost (8+9)	<u>4361.06</u>	<u>3612.30</u>	<u>3315.15</u>	<u>3876.27</u>	

Source : Field survey. Results computed.

5. Cost Pattern

In this section, an attempt is made to derive cost pattern of boro paddy and aman and aus paddy separately. The aim of deriving cost pattern separately of both the crops, is to observe whether there is any similarity or otherwise between the two crops.

What does the cost pattern convey? Simply, it is the behaviour of cost over different levels of production. As we know the multi-dimensional behaviour of cost, cost pattern may be termed as the changing behaviour of cost accompanied by the change in the levels of production. Cropwise cost pattern of crops is designed in the following paragraphs.

5.1 Boro Paddy

The break up of different components of cost and coefficient of variation of boro paddy for different size-classes of farms are tabulated in Table 5.

Table 5 : Comparative Cost Pattern and Coefficient of Variation of Boro Paddy on the Sample Farms for 1994-95 (Percentage)

Particulars	Small Farms	Medium Farms	Large Farms	All Farms
1. Direct Materials	5.40	5.98	6.69	5.90
2. Direct Labour	37.08	42.98	44.37	41.03
3. Direct Expenses	41.00	34.62	33.25	36.80
4. Prime Cost (1+2+3)	83.48	83.58	84.31	83.73
5. Field Overhead	11.70	12.33	11.29	11.89
6. Field Cost (4+5)	95.18	95.91	95.60	95.62
7. Administration Overhead	2.54	1.99	2.23	2.25
8. Cost of Production (6+7)	97.72	97.90	97.83	97.87
9. Marketing Overhead	2.28	2.10	2.17	2.13
10. Total Cost (8+9)	100.00	100.00	100.00	100.00
11. Coefficient of Variation	21.24	19.43	18.86	22.42

Source : Field survey. Results computed.

The cost pattern of boro paddy among different ingredients of cost displays that, on an average, the highest cost is incurred on direct labour, it being 41.03% of total cost, followed by 36.80% on direct expenses, 11.89% on field overhead, 5.90% on direct materials, 2.25% on administration overhead and 2.13% on marketing overhead (Table 5). It is, however, observed that direct labour cost is rising gradually with rise in the size-class of farms. This indicates that larger farms are depending more on human labour in particular and total labour force in general. It is further observed that the cost of direct expenses is declining with larger farms. This indicates that larger farms are, however, getting the benefit of large scale production as well as exercising some sort of control over different items of direct expenses. Other elements of cost, in fact, varies disproportionately with the rise in the size-group of farms.

It reveals that, on an overall basis, the rate of fluctuation (measured by coefficient of variation)¹ of cost of production of this vital food crop is 22.42% on the sample farms. It declines gradually with larger farms, showing 21.24% 19.43% and 18.86% on the small, medium and large size-group of farms respectively as revealed by Table 5. The greater the rate of fluctuation, the greater is the degree of inconsistency in cost pattern. It is noticed that the degree of fluctuation over different size-classes of farms do not vary significantly among themselves. The emerging cost pattern is that the larger the size-group of farms, the greater is the degree of consistency.

5.2 Aman and Aus Paddy

The cost break up and coefficient of variation² of aman and aus paddy for different size-classes of farms are presented in Table 6.

The break up of cost of aman & aus-paddy reveals that, on an average, direct labour cost accounts for highest proportion, showing 45.94% of total cost, followed

Table 6 : Comparative Cost Pattern and Coefficient of Variation of Aman and Aus Paddy on the Sample Farms for 1994-95 (Percentage)

Particulars	Small Farms	Medium Farms	Large Farms	All Farms
1. Direct Materials	6.42	6.87	5.89	6.50
2. Direct Labour	43.11	49.21	47.19	45.94
3. Direct Expenses	33.16	26.73	30.54	30.48
4. Prime Cost (1+2+3)	82.69	82.81	83.62	82.92
5. Field Overhead	12.90	13.92	12.52	13.20
6. Field Cost (4+5)	95.59	96.73	96.14	96.12
7. Administration Overhead	2.71	1.52	2.05	2.18
8. Cost of Production (6+7)	98.30	98.25	98.19	98.30
9. Marketing Overhead	1.70	1.75	1.81	1.70
10. Total Cost (8+9)	100.00	100.00	100.00	100.00
11. Coefficient of Variation	21.06	13.34	12.62	21.21

Source : Field survey. Results computed.

by direct expenses 30.48%, field overhead 13.20%, direct materials 6.50%, administration overhead 2.18% and marketing overhead 1.70% (Table 6). It is noticed that the proportion of direct labour is rising disproportionately with larger farms. This indicates that larger farms are, however, banking more on hired human labour in order to complete the process of cultivation in time. It is further noticed that the share of direct expenses is declining disproportionately with larger size-group of farms. This indicates that the larger farms are using different items of direct expenses in a planned manner with enable minimisation of wastages and losses. The proportion of direct materials and administration overhead is falling disproportionately with larger farms. The marketing overhead is, however, increasing marginally with larger farms.

The average rate of fluctuation of cost of production comes to 21.21% on the sample farms. It decreases with larger farms, giving 21.06%, 13.34% and 12.62% on the small, medium and large size-group of farms respectively as disclosed by Table 6. The lower the rate of fluctuation implies the greater the degree of consistency. In spite of variation there is closer consistency or otherwise observed in case of both medium and large size-group of farms because the rate of fluctuation is, however, close the each other.

Table 5 and 6 reveal that, in terms of percentage, the expenditure on direct labour is rising while the expenditure on direct expenses is falling with larger farms for producing different varieties of paddy. This indicates the emerging cost pattern which is labour intensive in Nadia in particular and in West Bengal in general.

We already observed the magnitude of change in unit cost for producing different varieties of paddy on the sample farms as shown by Tables 1,2,3 and 4. Fluctuation in unit cost is inevitable for producing different varieties of paddy over different size-groups of farms. Again, cost structure is dependent on many factors, viz. fertility of land and its location, availability of productive resources and their efficient utilisation. difference in yield and above all, the influence of natural agents.

It is evident by Tables 5 and 6 that the rate of fluctuation in cost of production per tonne is about 22% for cultivation of different varieties of paddy on the sample farms. It gives a positive sign of declining trend with the increase in the size-group of farms. Such a moderate degree of fluctuation is well acceptable because natural agents have great influence over the fluctuation of cost. Nevertheless, the main reason of such fluctuation lies in difference in cost structure and in yield.

6. Identification of High and Low Cost Areas

In this section an attempt is made to highlight some cost areas which require special attention with a view to exercising cost control in particular and cost analysis in general.

The success of agriculture as in the case of other economic activities is largely dependent on the proper and efficient utilisation of available resources. Efficient utilisation of resources not only minimises wastages and losses but it also leads to the minimisation of total cost. To make optimal utilisation of various resources in agriculture, it is highly essential to identify such cost areas which absorb highest proportion of total cost. In identifying high cost areas, overall distribution of total cost and its break up for producing different varieties of paddy are tabulated in Table 7.

The elementwise analysis of total cost of different varieties of paddy shows that direct labour accounts for highest proportion. It being 42.92% of total cost, followed by direct expenses 34.37%, field overhead 12.39%, direct materials 6.13%, administration overhead 2.23% and marketing overhead 1.96% (Table 7). The analysis of cost has been made separately for boro paddy and aman and aus paddy with a view to finding the difference or otherwise with respect to high and low cost areas. The distribution of total cost into different elements of boro paddy shows that highest cost proportion is incurred on direct labour, 41.03% of total cost, followed by direct expenses 36.80%, field overhead 11.89%, direct material 5.90%, administration overhead 2.25% and marketing overhead 2.13% as revealed by Table 7. Again, the elementwise analysis of total cost of aman and aus paddy exhibits that highest portion of total cost is absorbed by direct labour, 45.94% of total cost, followed by direct expenses 30.48%, field overhead 13.20%, direct materials 6.50%, administration overhead 2.18% and marketing overhead 1.70% (Table 7).

It is observed that breaking the analysis into boro paddy and aman and aus paddy, the position of cost absorbing ingredient does not change. It is also observed

that direct labour is predominant in agriculture. The next highest cost element is direct expenses. So they are regarded as high cost areas.

Table 7 : Comparative Cost Pattern and Coefficient of Variation of Aman and Aus paddy on the Sample Farms for 1994-95 (Percentage)

Particulars	Boro Paddy	Aman and aus paddy	Total
1. Direct Materials	5.90	6.50	6.13
2. Direct Labour	41.03	45.94	42.92
3. Direct Expenses	36.80	30.48	34.37
4. Prime Cost (1+2+3)	83.73	82.92	83.42
5. Field Overhead	11.89	13.20	12.39
6. Field Cost (4+5)	95.62	96.12	95.81
7. Administration Overhead	2.25	2.18	2.23
8. Cost of Production (6+7)	97.87	98.30	98.04
9. Marketing Overhead	2.13	1.70	1.96
10. Total Cost (8+9)	100.00	100.00	100.00

Source : Field survey. Results computed.

7. Findings

Some of the major findings are listed below :

1. By sketching cropwise cost analysis on the basis of per hectare and per tonne, the study highlights the magnitude of change in unit cost over different size-groups of farms. It discloses that larger farms are, as compared with smaller ones, deriving the benefit of large scale production (Tables 1,2,3 and 4).
2. Smaller farms are, as compared with larger ones, spending more on irrigation. So, they have to depend more on private irrigation which increase costs (Tables 1,2,3 and 4).
3. The study reveals that the expenditure on direct labour is rising while the expenditure on direct expenses is falling with larger farms (Tables 5 and 6). This indicates that larger farms are, as compared with smaller ones, banking more on human labour as well as exercising some sort of control over various elements of direct expenses.
4. It shows that the fluctuation in cost of production (measured by coefficient of variation) is about 22% on the sample farms for producing different varieties of paddy. It gives a positive sign of decreasing tendency with larger farms (Tables 5 and 6). This indicates that the larger farms are, as compared with smaller ones, efficient in allocating and utilising available rerurces. Nevertheless, such a moderate degree of fluctuation is well acceptable because natural agents have great influence over the fluctuation of costs.

5. Direct labour absorbs 42.92% of total cost, followed by direct expenses 34.37% (Table 7). These two jointly represent 77.29% of total cost. Thus, both the direct labour and direct expenses are identified as high cost areas.
6. Lower expenditure on machine labour irrespective of the size-group of farms indicates the existence of traditional agriculture in Nadia district in particular and in West Bengal in general.

NOTES

1. It is pertinent to note that calculations for Arithmetic Mean (\bar{x}), Standard Deviation (σ) and Coefficient of Variation (C.V.) are based on per quintal cost of production for cultivation of different varieties of paddy. Coefficient of variation on the basis of cost of production per quintal and per tonne will be same because change of scale from cost of production per quintal to cost of production per tonne will affect both \bar{x} and σ in the same proportion. As a result, coefficient of variation will remain unchanged in case of per tonne cost of production too.

Values of \bar{x} and σ on the basis of cost of production per quintal for different size-classes on the sample farms are given in table below :

Per Quintal Size-classwise \bar{x} and σ on the Sample Farms for 1994-95

(In rupees)

Particulars	Small Farms	Medium Farms	Large Farms	All Farms
Boro Paddy :				
\bar{x}	349.50	304.13	270.05	311.81
σ	74.32	59.08	50.94	69.92
Aman & aus-paddy :				
\bar{x}	428.73	354.84	324.55	380.85
σ	90.31	47.33	40.96	80.79

Source : Field survey. Results computed.

2. See note 1 for detailed computation of coefficient of variation.

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