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Impact assessment of adoption of recommended technologies of paddy production in Bhandara district

UT Dangore, MS More, VJ Rathod and NT Bagde

Abstract

The present study was undertaken in Bhandara district of Vidarbha region. The district will be selected purposively, Total 48 farmers was selected and data pertains for the year 2020-21. The schedule was design for data collection by keeping in view of the objectives of the study.

The list of farmers purchased the seed of Paddy variety, PKVHMT was collected from office of the Senior Rice Breeder, Agricultural Research Station Sakoli, Distt- Bhandara. Total 48 cultivators has been purchased the seed of PKVHMT were selected for the study. The results of the study are summarized below.

In the present study Adoption of Technology refers to actual practices adopted by farmers for the cultivation of paddy. The term recommended technology refers to the cultivation practices recommended by Dr. P.D.K.V. Akola for paddy crop. The average family size of selected farmers was 2 male, 2 female and 2 children respectively. at cent per cent of farmers are educated, among them 27.08 per cent each have completed their middle school level of education, 25.00 per cent people have completed their education up to higher secondary, 20.83 per cent people have completed their education up to Graduation. The average land holding was 2.76 hectares & the gross cropped area was 4.37 hectares. Net cultivated area was 2.76 hectares & the area sown more than once was 1.61 ha and irrigated area was 1.57 hectare. The cropping intensity at overall level was 158.33 per cent., In Kharif season proportionate area under PKV HMT was 11.21 per cent, Kharif cropping pattern was dominated by Paddy which account 49.66 per cent area to the gross cropped area.

One ploughing is recommended technology given by Dr. P.D.K.V. Akola for the cultivation of paddy. Cent percent farmers had adopted the ploughing practice. However, 81.25 per cent farmers were shows above 0.80 efficiency level. As for as puddling is concern 100 per cent farmers were adopted the technology above 80 efficiency level. In case of manure cent percent cultivator adopted the technology, In case of Nitrogen 20.83 per cent farmers adopted the recommended technology above 80 efficiency level. In case of phosphorus 41.67 farmers were adopted the technology, However, 58.33 per cent responded adopted 0 to 80 technology, 60.42 per cent farmers were moderately adopted the level of technology, 14.58 per cent farmers, were adopted low level of technology and only 25 per cent farmers were adopted the high level of technology the adoption level of recommended technologies was 0 to 0.69 for Low adopter, 0.70 to 0.95 and 0.96 and above for Medium and High adopter category. About 29 farmers were under medium adoption level, 12 and 7 farmers in High and Low adoption level. 82.63 and 13.46.

The seed requirement is near about same in all three group. The expenditure on manure was higher in high adopter group. The expenditure on labour and machine hrs was higher in medium adopter group. Highest amount for plant protection was paid by low adopter group, per hectare cost of cultivation at cost "A", cost "B" and cost "C" were Rs. 38631.80, Rs.47526.89 and Rs. 49401.59 respectively. At low adopter level average gross return worked out to Rs. 50027.68. The net return obtained at various cost were Rs. 11395.88 at Cost "A", Rs. 2500.79 at Cost "B" and Rs. 625.79 at Cost "C". At overall level the Input – output ratio at cost "C" was 1.01.

At medium adopter level average gross return worked out to Rs. 75899.47. The net return obtained at various cost were Rs. 34448.14 at Cost "A", Rs. 21391.11 at Cost "B" and Rs. 19901.75 at Cost "C". At overall level the Input – output ratio at cost "C" was 1.36.

At high adopter level average gross return worked out to Rs. 59690.14. The net return obtained at various cost were Rs. 19212.52 at Cost "A", Rs. 8829.66 at Cost "B" and Rs. 7357.93 at Cost "C". At overall level the Input – output ratio at cost "C" was 1.14

Keywords: Adoption of technology, recommended technology

Introduction

Rice (*Oryza sativa* L) is the staple cereal crop not only of India but also of other tropical and subtropical countries of the world. Paddy is a member of gramineae family. The rice is the major staple food of more than 60 per cent of the world's population.

Therefore it has shaped culture, diet and economics of thousands of million households across the globe. Considering the importance of rice in human food, the united nation designated 2004 as the international year of rice. The common uses of rice include ready to eat products (popped and puffed rice, rice flakes, canned rice and fermented products). In addition, rice straw is used as cattle feed, for thatching roof and in cottage industry for making ropes, hats, mats etc. Rice husk and bran are also used as animal feed, fuel, making paper and medium of cooking. Many technologies are recommended by Agricultural Universities for paddy cultivation but it is very important to know at what extent these technologies have been adopted by the farmers. Effect of different adoption of these technologies on economics of production also need to be investigated.

Objectives

1. To study the socio-economic characteristics of selected farmers.
2. To examine the extent of adoption of production technologies in paddy.
3. To analyze the economic impact of recommended technologies at different level of adoption.
4. To identify problems in adoption of technologies by paddy growers.

Methodology

The present study was undertaken in Bhandara district of Vidarbha region. The district will be selected purposively, Total 48 farmers was selected and data pertains for the year 2020-21. The schedule was design for data collection by keeping in view of the objectives of the study. The list of farmers purchased the seed of Paddy variety, PKVHMT was collected from office of the Senior Rice Breeder, Agricultural Research Station Sakoli, Distt-Bhandara. Total 48 cultivtors has been purchased the seed of PKVHMT were selected for the study

Table 1: Selection of sample

Sr. No.	Name of Village	Total No. of Farmers
1	Pimpalgaon	3
2	Kesalwada Wagh	2
3	Godumari	4
4	Shendurwafa	3
5	Mokhe/Kinh	1
6	Khadki babhani	1
7	Sakoli	3
8	Bhavad	1
9	Bampewada	2
10	Sawarbandh	2
11	Khandala	3
12	Dharmapuri	2
13	Pindkepar	2
14	Sukadimahalgao	1
15	Chhamabakat	1
16	Nilagondi	1
17	Mahalgao	1
18	Sangadi	3
19	Bonde	1
20	Sukadi	2
21	Bodra	2
22	Kumbhali	1
23	Shendakolari	1
24	Mundipar	1
25	Jambhalikhamba	1
26	Pimpalgaon Sadak	1
27	Pasalgaon Sonka	1
28	Murmadi Tak	1
	Total	48

Adoption Technology

In the present study Adoption of Technology refers to actual practices adopted by farmers for the cultivation of paddy. The information on practices adopted by the selected farmers was collected.

Recommended technology

The term recommended technology refers to the cultivation practices recommended by Dr. P.D.K.V. Akola for paddy crop. The University has made recommendation about ploughing, Puddling, FYM, level of fertilizer and seed rate etc. for paddy crop.

Table 2: The recommended technology developed by Dr. P.D.K.V. Akola for Paddy crop.

Sr. No.	Technology	Recommendation
1	No. of Ploughing	One Ploughing
2	Puddling	One puddling
3	Manure (Tonn/ Ha.)	10 Tonn before ploughing
4	Nitrogen (Kg./Ha.)	100
5	Phosphorus (Kg./Ha.)	50
6	Potassium (Kg./Ha.)	50
7	Seed Rate (Kg./Ha.)	40.00

Table 3: Technologies extent of Adoption

Sr. No.	Practices	Extent of Adoption
1	Ploughing	Number of Ploughing Actually done EA= ----- Recommended Ploughing
2	Puddling	Number of Puddling Actually done EA= ----- Recommended Puddling
3	Farm yard Manure	Quantity of F.Y.M. applied EA= ----- Recommended F.Y.M
4	Fertilizer	Nutrient applied by cultivator (N,P & K) EA= ----- Recommended Nutrient
5	Seed Rate	Seed rate used by cultivator EA= ----- Recommended seed rate

The components of recommended technology recommended by the University were identified and thereafter, the level of technology adopted by the farmers was assessed. The adoption score was developed to these components, whose value could not be measured in terms of unit. Adoption index for each technology was developed by using given formula. For estimating the extent of adoption of technology the following formula will be use.

$$TAI = \frac{1}{K} \left[\frac{AX_1}{RX_1} + \frac{AX_2}{RX_2} + \dots + \frac{AX_k}{RX_k} \right] \times 100$$

TAI= Technology Adoption Index

k = No. of technologies

AX_i = Actual use of selected technology

RX_i = Recommended use of selected technology

The components of technology recommended by the university for paddy crop expressed in terms of adoption score (X₁, X₂,-----X_n) were utilized for developing technological adoption index of technology adopted. A

technological adoption index is a single numerical value representing the net adoption of all components of technologies whose values lies between 0 to 1.

The net adoption of recommended technologies expressed in terms of technological adoption index of the 48 farmers are classified as below.

Low adopter = Mean- S.D.

Moderate dopter = Mean- S.D. to Mean + S.D.

Higher adopter = Mean + S.D.

Economics of paddy was worked out on the basis of different level of adoption of technologies by using standard cost concept.

The standard cost concept i.e. Cost 'A', Cost 'B' and Cost 'C' were used.

I. Cost Concept

(a) Cost 'A'

- i. Hired human labour
- ii. Bullock labour
- iii. Machine labour
- iv. Seeds
- v. Manure
- vi. Fertilizer
- vii. Irrigation charges
- viii. Plant protection charges
- ix. Incidental charges
- x. Repairs of implement
- xi. Interest on working capital
- xii. Depreciation
- xiii. Land revenue

(b) Cost 'B'

Cost 'A' + Interest on own fixed capital + Rental value of land. Rental value of land is taken as 1/6 value of gross produce – land revenue.

(c) Cost 'C'

Cost 'B' + Imputed value of family labour

Results and Discussion

Average family size of selected cultivator

Family size and its components are basically the function of economic, social characteristics customs and religious belief of society. The family size play an important role in managing the paddy crop. The details of average family size of selected cultivator are presented in Table 4.

Table 4: Average family size of selected cultivator. (No.)

Sr. No.	Particulars	Average Family Size
1	Male	2 (0.33)
2	Female	2(0.33)
3	Children	2(0.33)
	Total	6(100.00)

(Figures in parentheses are the percentage to the total family members)

The table 4 described the Average family size of selected cultivator and it was found that, the average family size of selected farmers was 2 male, 2 female and 2 children respectively.

Educational status of selected farmers

Education is an important factor in understanding importance and availability of new technology and its adoption. It is also one of the important aspects which affect the standard of living of farmers in adoption of new technologies and so on. The information regarding educational status of selected farmers is presented in Table 5

Table 5: Educational status of the selected farmers. (No.)

Sr. No.	Educational Status	N=48
1	Illiterate	0.00(0.00)
2	Primary	5.00(10.42)
3	Middle School	13.00(27.08)
4	High School	8.00(16.67)
5	Higher Secondary	12.00(25.00)
6	Graduation	10.00(20.83)
	Total	48.00(100.00)

(Figures in parentheses are the percentage to the total)

The information presented in Table 2 reveals that, at cent per cent of farmers are educated, among them 27.08 per cent each have completed their middle school level of education, 25.00 per cent people have completed their education up to higher secondary, 20.83 per cent people have completed their education up to Graduation, 16.67 per cent each have completed their high school level of education and only 10.42 per cent people have completed their education up primary level.

Land utilization pattern of selected farmer

Land utilization indicates the area of land actually utilized in different purpose like crop production, irrigated, unirrigated etc. Average land utilization pattern of selected paddy growers are presented in Table 6

Table 6: Land use pattern of selected farmers

Sr. No.	Particulars	Area in Ha
1	Total Land Holding	2.76(100.00)
2	Fallow land	0.000.00
3	Net Cultivated area	2.76(100.00)
4	Area sown more than once	1.61(58.33)
5	Irrigated area	1.57(56.88)
6	Gross cropped area	4.37
	Cropping Intensity (%)	158.33

(Figures in parentheses are the percentage to the total land holding area)

The information presented in Table 6 reveals that, the average land holding was 2.76 hectares & the gross cropped area was 4.37 hectares. Net cultivated area was 2.76 hectares & the area sown more than once was 1.61 ha and irrigated area was 1.57 hectare. The cropping intensity at overall level was 158.33 per cent.

Cropping pattern of selected paddy growers

The percentage area allocated to different crops with reference to gross cropped area by the selected paddy growers has been presented in Table 7

Table 7: Cropping pattern of sample farmer

Sr No.	Particulars	Area in Ha
I Kharif		
1	P.K.V.-H.M.T.	0.49(11.21)
2	Tur	0.10(2.29)
3	Other paddy	2.17(49.66)
	Total	2.76 (63.16)
II Rabi		
1	Wheat	0.40 (9.15)
2	Gram	0.24(5.49)
2	Summer Paddy	0.97(22.20)
	Total	1.61(36.84)
	Gross cropped Area	4.37(100.00)

(Figures in parentheses are the percentage to the gross cropped area)

It was observed from Table 7 that, in Kharif season proportionate area under PKV HMT was 11.21 per cent, Kharif cropping pattern was dominated by Paddy which account 49.66 per cent area to the gross cropped area while tur occupied 2.29 per cent area in kharif season. In rabi season wheat occupied 9.15 per cent area and gram 5.49 per cent area. Summer season proportionate area under summer paddy was 36.84 per cent.

Extent of Adoption

Actually level of adoption of each item of technology of farmers field was identified using the recommended technologies developed by Dr. P.D.K.V., Akola. All extent of adoption score were scale down to 0 to 1 and all farmers were classified on the basis of efficiency.

Table 8: Extent of adoption of recommended technology.

Efficiency	Technology						
	Ploughing	Puddling	Manure	Nitrogen	Phosphorus	Potassium	Seed rate
0.0-0.50	9(18.75)	0.00(0.00)	5.00(10.42)	17.00(35.42)	28.00(58.33)	37(77.08)	0(0.00)
0.51-0.80	0(0.00)	0.00(0.00)	22.00(45.83)	21.00(43.75)	0.00(0.00)	0(0.00)	5(10.42)
0.81 above	39(81.25)	48.00(100.00)	21.00(43.75)	10.00(20.83)	20.00(41.67)	11(22.92)	43(89.58)
Total	48(100.00)	48(100.00)	48(100.00)	48(100.00)	48(100.00)	48(100.00)	48(100.00)

(Figures in parentheses are the percentage to the total)

It was observed from Table 8 that, one ploughing is recommended technology given by Dr. P.D.K.V. Akola for the cultivation of paddy. It is revealed from the Table 8 that, cent percent farmers had adopted the ploughing practice. However, 81.25 per cent farmers were shows above 0.80 efficiency level. As for as puddling is concern 100 per cent farmers were adopted the technology above 80 efficiency level. In case of manure cent percent cultivator adopted the technology, In case of Nitrogen 20.83 per cent farmers adopted the recommended technology above 80 efficiency level. In case of phosphorus 41.67 farmers were adopted the

technology, However, 58.33 per cent responded adopted 0 to 80 technology,

Estimation of composite index of adoption

Composite index of adoption of technologies was estimated for each farmer based on the adoption index of technology. Thus composite index was estimated for each of the farmers separately. The farmers were arranged in the ascending order of composite index of adoption. Distribution of farmers according to the composite index is presented in the Table 9.

Table 9: Distribution of the farmers on the basis of composite adoption index

Sr. No.	Groups	No. of farmers
1	Low	7.00
	0 to 0.69	(14.58)
2	Moderate	29.00
	0.70 to 0.95	(60.42)
3	High	12.00
	0.96 to above	(25.00)
	Total	48.00
		(100.00)

(Figures in parentheses are the percentage to the total)

It has been observed from the Table 9 that, 60.42 per cent farmers were moderately adopted the level of technology, 14.58 per cent farmers, were adopted low level of technology and only 25 per cent farmers were adopted the high level of

technology

Estimation of adoption level

The adoption level was estimated and presented in Table 10

Table 10: Estimation of adoption level

Sr. No.	Particular	Adoption level	Sample grower
1	Low adopter (Mean-SD)	0 to 0.69	7.00
2	Medium Adopter	0.70 to 0.95	29.00
3	High Adopter (Mean + SD)	0.96 to above	12.00
4	Mean		82.63
5	Standard Deviation		13.46

It was observed from table 10 that, the adoption level of recommended technologies was 0 to 0.69 for Low adopter,

0.70 to 0.95 and 0.96 and above for Medium and High adopter category. About 29 farmers were under medium

adoption level, 12 and 7 farmers in High and Low adoption level. 82.63 and 13.46 mean and standard deviation was found respectively.

Economics of Paddy cultivation

A) Per hectare input utilization for paddy crop

The pattern of utilization of resource by farmer indicates the degree of management of resource, their choice and the

decision making. Besides this, it indicates the level of technology adopted by the farmer. The farmers required to spend on various input like seed, manure, fertilizer, labour, machine hrs. etc. Therefore, it is necessary to know the pattern of expenditure on various input on per hectare basis. The per hectare input utilization for paddy crop are presented in Table 11

Table 11: Average per hectare input use pattern of sample farm

Sr. No.	Particulars	Low Adopter	Medium Adopter	High Adopter	Overall Adopter
1	Seed	2000	1946.48	1966.2	1958.51
		5.74	4.76	4.92	4.91
2	Manures	4285.71	3309.86	4647.89	3817.43
		12.30	8.10	11.63	9.57
3	Fertilisers	3121.45	5170.79	4838.03	4834.66
		8.96	12.65	12.11	12.12
4	Labour (M+F)	18946.43	19882.85	19397.89	19631.22
		54.37	48.64	48.56	49.19
5	Machine Hrs	3883.57	9009.86	7767.61	8048.3
		11.14	22.04	19.44	20.17
6	Plant Protection	2053.57	1109.15	816.9	1132.78
		5.89	2.71	2.04	2.84
7	Irrigation	559.64	452.46	514.08	483.07
		1.61	1.11	1.29	1.21
	Total	34850.37	40881.45	39948.6	39905.97
		100	100	100	100

(Figures in parentheses are the percentage to the total)

It is observed from Table 11 that, the seed requirement is near about same in all three group. The expenditure on manure was higher in high adopter group. The expenditure on labour and machine hrs was higher in medium adopter group. Highest amount for plant protection was paid by low adopter group.

B) Per hectare cost of cultivation of paddy

The share of each item, the total cost provides necessary due to economizing cost. The cost has determined on the basis of standard cost concept i.e. cost "A", cost "B" and cost "C". The per hectare cost of cultivation of paddy grown by the low adopter farmer is presented in Table 12

It is revealed from Table 12 that, per hectare cost of cultivation at cost "A", cost "B" and cost "C" were Rs.

38631.80, Rs.47526.89 and Rs. 49401.59 respectively. The major share of cost of cultivation goes towards cost "A" (78.20 per cent). In Cost "A" share of hired human labour were 34.56 per cent, manure 8.68 per cent, machine hrs 7.86 per cent, bullock labour 7.59 per cent, fertilizer 6.32 per cent, plant protection 4.16 per cent and seed 4.05 per cent indicating that, all the above input are cash input for which farmer required to pay immediately from his pocket. Cost "B" contributes to 96.20 per cent. The share of family labour was 3.80 per cent. The per hectare yield obtained by low adopter was 19.60 quintal with gross return of Rs. 50027.68. In case of low adopter the per quintal cost of production was Rs. 2443.97.

Table 12: Per hectare cost of Cultivation of paddy grown by low adopter farmer

Sr. No.	Item		Units	Units Required	Price/ Unit	Cost in Rs.	% to total
1	Hired Human Labour	Male	DAYS	20.00	244.64	4892.86	9.90
		Female	DAYS	92.50	131.66	12178.57	24.65
		Total	DAYS	112.50	151.75	17071.43	34.56
2	Bullock Labour	Hired	DAYS	5.36	699.63	3750.00	7.59
		Owned	DAYS	0.00	0	0.00	0.00
		Total	DAYS	5.36	699.63	3750.00	7.59
3	Machine	Hired	DAYS	6.07	639.80	3883.57	7.86
		Owned	DAYS	0.00	0.00	0.00	0.00
		Total	DAYS	6.07	639.80	3883.57	7.86
4	Seed		KGS.	50.00	40.00	2000.00	4.05
5	Manure		QTLS.	75.00	57.14	4285.71	8.68
6	Fertilizer	N	KGS.	24.29	60.67	1473.76	2.98
		P	KGS.	24.29	60.67	1473.76	2.98
		K	KGS.	3.57	48.72	173.93	0.35
		Total				3121.45	6.32
7	Irrigation	Cost	RS.			559.64	1.13
8	Incidental	Cost	RS.			131.43	0.27
9	Plant protection	Cost	RS.			2053.57	4.16

10	Repairs	Cost	RS.			119.64	0.24
11	Working Capital	Cost	RS.			36976.44	74.85
12	Depreciation	Cost	RS.			546.07	1.11
13	Land Revenue	Cost	RS.			0.00	0.00
14	Int. On Working Capital	Cost	RS.			1109.29	2.25
15	COST "A"		RS.			38631.80	78.20
16	Rental Value Of Land		RS.			8337.95	16.88
17	Int. On Fixed Capital		RS.			557.14	1.13
18	COST "B"		RS.			47526.89	96.20
19	Family Labour Charges	Male	DAYS	5.00	242.86	1214.29	2.46
		Female	DAYS	5.00	132.14	660.71	1.34
		Total	DAYS	10.00	187.50	1875.00	3.80
20	COST"C"		RS.			49401.89	100.00
21	Yield	Main	QTLS.	19.60	2475.90	48527.68	
		Bye	QTLS.	16.07	93.34	1500.00	
22	Value Of Total Produce		RS.			50027.68	
23	Per Qtl. Cost Of Production					2443.97	

Table 13: Per hectare cost of Cultivation of paddy grown by medium adopter farmer

Sr. No.	Item		Units	Units Required	Price / Units	Cost in Rs.	% to total
1	Hired Human Labour	Male	DAYS	17.87	251.97	4502.64	8.04
		Female	DAYS	85.35	162.75	13890.85	24.81
		Total	DAYS	103.22	178.20	18393.49	32.85
2	Bullock Labour	Hired	DAYS	0.00	0.00	0.00	0.00
		Owned	DAYS	0.00	0.00	0.00	0.00
		Total	DAYS	0.00	0.00	0.00	0.00
3	Machine	Hired	DAYS	14.30	630.06	9009.86	16.09
		Owned	DAYS	0.00	0.00	0.00	0.00
		Total	DAYS	14.30	630.06	9009.86	16.09
4	Seed		KGS.	48.66	40.00	1946.48	3.48
5	Manure		QTLS.	83.80	39.50	3309.86	5.91
6	Fertilizer	N	KGS.	56.94	45.99	2618.49	4.68
		P	KGS.	39.72	42.92	1704.76	3.04
		K	KGS.	28.87	29.36	847.54	1.51
		Total				5170.79	9.23
7	Irrigation	Cost	RS.			452.46	0.81
8	Incidental	Cost	RS.			118.87	0.21
9	Plant Protection	Cost	RS.			1109.15	1.98
10	Repairs	Cost	RS.			107.39	0.19
11	Working Capital	Cost	RS.			39618.35	70.75
12	Depreciation	Cost	RS.			535.49	0.96
13	Land Revenue	Cost	RS.			108.94	0.19
14	Int. On Working Capital	Cost	RS.			1188.55	2.12
15	COST "A"		RS.			41451.33	74.02
16	Rental Value Of Land		RS.			12540.97	22.40
17	Int. On Fixed Capital		RS.			516.06	0.92
18	COST "B"		RS.			54508.36	97.34
19	Family Labour Charges	Male	DAYS	3.38	239.60	809.86	1.45
		Female	DAYS	4.30	158.02	679.50	1.21
		Total	DAYS	7.68	193.93	1489.36	2.66
20	COST"C"		RS.			55997.72	100.00
21	Yield	Main	QTLS.	29.69	2506.11	74406.51	
		Bye	QTLS.	10.60	140.85	1492.96	
22	Value Of Total Produce		RS.			75899.47	
23	Per Qtl. Cost Of Prod.					1835.80	

Table 14: Per hectare cost of Cultivation of paddy grown by High adopter farmer

SR. NO.	Item		Units	Units Required	Price Per Unit	Cost In RS.	% to Total
1	Hired Human Labour	Male	DAYS	17.68	237.99	4207.75	8.04
		Female	DAYS	89.72	152.90	13718.31	26.21
		Total	DAYS	107.40	166.91	17926.06	34.25
2	Bullock Labour	Hired	DAYS	0.00	0.00	0.00	0.00
		Owned	DAYS	0.00	0.00	0.00	0.00
		Total	DAYS	0.00	0.00	0.00	0.00
3	Machine	Hired	DAYS	10.77	721.23	7767.61	14.84
		Owned	DAYS	0.00	0.00	0.00	0.00
		Total	DAYS	10.77	721.23	7767.61	14.84

4	Seed		KGS.	49.15	40.00	1966.20	3.76
5	Manure		QTLS.	101.41	45.83	4647.89	8.88
6	Fertilizer	N	KGS.	77.18	31.24	2411.09	4.61
		P	KGS.	40.42	32.17	1300.18	2.48
		K	KGS.	42.25	26.67	1126.76	2.15
		Total				4838.03	9.24
7	Irrigation	Cost	RS.			514.08	0.98
8	Incidental	Cost	RS.			130.28	0.25
9	Insecticide	Cost	RS.			816.90	1.56
10	Repairs	Cost	RS.			83.10	0.16
11	Working Capital	Cost	RS.			38690.15	73.93
12	Depriciation	Cost	RS.			540.85	1.03
13	Land Revenue	Cost	RS.			85.92	0.16
14	Int. On Working Capital	Cost	RS.			1160.70	2.22
15	COST "A"		RS.			40477.62	77.35
16	Rental Value Of Land		RS.			9862.44	18.85
17	Int. On Fixed Capital		RS.			520.42	0.99
18	COST "B"		RS.			50860.48	97.19
19	Family Labour Charges	Male	DAYS	3.38	229.19	774.65	1.48
		Female	DAYS	4.37	159.54	697.18	1.33
		Total	DAYS	7.75	189.91	1471.83	2.81
20	COST"C"		RS.			52332.31	100.00
21	Yield	Main	QTLS.	23.17	2516.91	58316.90	
		Bye	QTLS.	11.97	114.72	1373.24	
22	Value Of Total Produce		RS.			59690.14	
23	Per Qtl. Cost Of Prod.					2199.36	

Table 15: Per hectare cost of Cultivation of paddy grown by overall adopter farmer

Sr. No.	Item		Units	Units Required	Price / Unit	Cost in Rs.	% to total
1	Hired Human Labour	Male	Days	18.06	247.02	4461.10	8.24
		Female	Days	87.47	155.95	13641.08	25.19
		Total	Days	105.53	171.54	18102.18	33.43
2	Bullock Labour	Hired	Days	0.62	702.71	435.68	0.80
		Owned	Days	0.00	#DIV/0!	0.00	0.00
		Total	Days	0.62	702.71	435.68	0.80
3	Machine	Hired	Days	12.30	654.33	8048.30	14.86
		Owned	Days	0.00	0.00	0.00	0.00
		Total	Days	12.30	654.33	8048.30	14.86
4	Seed		Kgs.	48.96	40.00	1958.51	3.62
5	Manure		Qtls.	87.97	43.39	3817.43	7.05
6	Fertilizer	N	Kgs.	59.11	41.01	2424.39	4.48
		P	Kgs.	38.13	40.88	1558.73	2.88
		K	Kgs.	29.88	28.50	851.54	1.57
		Total				4834.66	8.93
7	Irrigation	Cost	Rs.			483.07	0.89
8	Incidental	Cost	Rs.			123.69	0.23
9	Insecticide	Cost	Rs.			1132.78	2.09
10	Repairs	Cost	Rs.			101.66	0.19
11	Working Capital	Cost	Rs.			39037.96	72.09
12	Depriciation	Cost	Rs.			538.30	0.99
13	Land Revenue	Cost	Rs.			89.50	0.17
14	Int. On Wor.Capital	Cost	Rs.			1171.14	2.16
15	COST "A"		Rs.			40836.90	75.41
16	Ren. Value Of Land		Rs.			11263.54	20.80
17	Int. On Fixed Cap.		Rs.			522.12	0.96
18	COST "B"		Rs.			52622.56	97.18
19	Family Lab. Char.	Male		3.57	237.11	846.47	1.56
		Female	Days	4.40	155.13	682.57	1.26
		Total	Days	7.97	191.85	1529.04	2.82
20	COST"C"		RS.			54151.60	100.00
21	Yield	Main	Qtls.	26.57	2508.84	66659.75	
		Bye	Qtls.	11.64	125.30	1458.51	
22	Value Of Total Produce		Rs.			68118.26	
23	Per Qtl. Cost Of Prod					1983.18	

The per hectare cost of cultivation of paddy grown by the medium adopter farmer is presented in Table 13

It is revealed from Table 13 that, per hectare cost of cultivation at cost "A", cost "B" and cost "C" were Rs.

41451.33, Rs.54508.36 and Rs. 55997.72 respectively. The major share of cost of cultivation goes towards cost "A" (74.02 per cent). In Cost "A" share of hired human labour were 32.85 per cent, machine hrs 16.02 per cent, fertilizer 9.23 per cent, manure 5.91 per cent, and seed 3.48 per cent indicating that, all the above input are cash input for which farmer required to pay immediately from his pocket. Cost "B" contributes to 97.34 per cent. The share of family labour was 2.66 per cent. The per hectare yield obtained by medium adopter was 29.69 quintal with gross return of Rs. 75899.47. In case of medium adopter the per quintal cost of production was Rs. 1835.80.

The per hectare cost of cultivation of paddy grown by the high adopter farmer is presented in Table 14

It is revealed from Table 14 that, per hectare cost of cultivation at cost "A", cost "B" and cost "C" were Rs. 40477.62, Rs. 50860.48 and Rs. 52332.31 respectively. The major share of cost of cultivation goes towards cost "A" (77.32 per cent). In Cost "A" share of hired human labour were 34.35 per cent, machine hrs 14.84 per cent, fertilizer 9.24 per cent, manure 8.88 per cent, and seed 3.86 per cent indicating that, all the above input are cash input for which farmer required to pay immediately from his pocket. Cost "B" contributes to 97.19 per cent. The share of family labour was 2.81 per cent. The per hectare yield obtained by high adopter was 23.17 quintal with gross return of Rs. 59690.14. In case of high adopter the per quintal cost of production was Rs. 2199.36.

The per hectare cost of cultivation of paddy grown by the Overall adopter farmer is presented in Table 15

It is revealed from Table 15 that, per hectare cost of cultivation at cost "A", cost "B" and cost "C" were Rs. 40836.90 Rs. 52622.56 and Rs. 54151.60 respectively. The major share of cost of cultivation goes towards cost "A" (75.41 per cent). In Cost "A" share of hired human labour were 33.43 per cent, machine hrs 14.86 per cent, fertilizer 8.93 per cent, manure 7.05 per cent, and seed 3.62 per cent indicating that, all the above input are cash input for which farmer required to

pay immediately from his pocket. Cost "B" contributes to 97.18 per cent. The share of family labour was 2.82 per cent. The per hectare yield obtained by overall adopter was 26.57 quintal with gross return of Rs. 68118.26. In case of overall adopter the per quintal cost of production was Rs. 1983.18.

C) Per hectare cost and return from paddy

The cost and return structure per hectare of agricultural production help the farmer in mapping adjustment in the organization and thereby secure the optimum level of production and income. The per hectare cost and returns from paddy was presented in Table 16.

It is revealed from Table 16 that, at overall average gross return worked out to Rs. 68118.26. The net return obtained at various cost were Rs. 27281.36 at Cost "A", Rs. 15495.70 at Cost "B" and Rs. 13966.66 at Cost "C". At overall level the Input – output ratio at cost "C" was 1.26.

Table 16: Per hectare cost and returns from Paddy (Rs/Ha)

Sr. No.	Particulars	Low	Medium	High	Overall
1	Value of Main Produce	48527.68	74406.51	58316.9	66659.75
2	Value of By- Produce	1500.00	1492.96	1373.24	1458.51
3	Total Produce	50027.68	75899.47	59690.14	68118.26
4	Total Cost				
	Cost"A"	38631.80	41451.33	40477.62	40836.90
	Cost"B"	47526.89	54508.36	50860.48	52622.56
	Cost"C"	49401.89	55997.72	52332.21	54151.60
5	Net Return Over				
	Cost"A"	11395.88	34448.14	19212.52	27281.36
	Cost"B"	2500.79	21391.11	8829.66	15495.70
	Cost"C"	625.79	19901.75	7357.93	13966.66
6	Input- Output ratio at				
	Cost"A"	1.29	1.83	1.47	1.67
	Cost"B"	1.05	1.39	1.17	1.29
	Cost"C"	1.01	1.36	1.14	1.26

At low adopter level average gross return worked out to Rs. 50027.68. The net return obtained at various cost were Rs. 11395.88 at Cost "A", Rs. 2500.79 at Cost "B" and Rs. 625.79 at Cost "C". At overall level the Input – output ratio at cost "C" was 1.01

At medium adopter level average gross return worked out to Rs. 75899.47. The net return obtained at various cost were Rs. 34448.14 at Cost "A", Rs. 21391.11 at Cost "B" and Rs. 19901.75 at Cost "C". At overall level the Input – output ratio at cost "C" was 1.36.

At high adopter level average gross return worked out to Rs. 59690.14. The net return obtained at various cost were Rs.

19212.52 at Cost "A", Rs. 8829.66 at Cost "B" and Rs. 7357.93 at Cost "C". At overall level the Input – output ratio at cost "C" was 1.14

Constraints in adoption of technology by paddy grower

All the selected paddy cultivators were interviewed for the constraints they face for production of paddy. The information Limited availability of the seed of the University release variety was the major constraints expressed by the cultivator followed by High labour charges, Less availability of human labour and High cost of machinery

Table 14: Constraints in adoption of technologies by paddy grower

Sr. No.	Constraints	No. of Farmers (N=48)	Percentage to total farmer	Rank
1	High labour charges	42	87.50	II
2	Less availability of human labour	40	83.33	III
3	High cost of machinery	38	79.16	IV
4	Lack of financial facility in time	37	77.08	V
5	Limited availability of the seed of the University release variety	44	91.66	I
6	Less availability of the irrigation facility.	36	75	VI

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