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RR Kushwaha
Department of Agril. Economics, NDUAT, Kumarganj, Ayodhya, Uttar Pradesh, India

Praveen Km. Sahoo
Department of Agril. Economics, NDUAT, Kumarganj, Ayodhya, Uttar Pradesh, India

RR Verma
Department of Agril. Economics, NDUAT, Kumarganj, Ayodhya, Uttar Pradesh, India

Ram Singh Yadav
Department of Agril. Economics, NDUAT, Kumarganj, Ayodhya, Uttar Pradesh, India

Abhishek Pal
Department of Agril. Economics, NDUAT, Kumarganj, Ayodhya, Uttar Pradesh, India

Bhartendu yadav
Department of Agril. Economics, NDUAT, Kumarganj, Ayodhya, Uttar Pradesh, India

Correspondence
RR Kushwaha
Department of Agril. Economics, NDUAT, Kumarganj, Ayodhya, Uttar Pradesh, India

A study on economic analysis of paddy production in Banda district, Bundelkhand Uttar Pradesh

RR Kushwaha, Praveen Km. Sahoo, RR Verma, Ram Singh Yadav, Abhishek Pal and Bhartendu Yadav

Abstract
Hundred sample farmer (Marginal-62, small-25, and medium-13) were interviewed from five villages of "Naraini" block of Banda districts (U.P.). Data analyzed and found that average holding was 1.14 ha and cropping intensity was 218.42 percent. On an average cost of cultivation per hectare was found to be Rs 36245.70 and Rs 15968.72 per hectare on over all farms respectively. The input – output ratio was found to be 1:0.89 on cost c. paddy cultivation in the study was characterized by decreasing return to scale.

Keywords: cost and return, cropping intensity & farm structure

Introduction
Agriculture is one of the most important sector of the Indian economy. It is the only means of living for almost two third of workers in India's geographical area contribute about 14 % of India GDP (2014). Rice is one among the oldest cultivated crop as evident from Vedic literature & Archeological excavation. It is being cultivated in India & China since thousands of year. About 90% of world's area under rice is in Asia and 90% of world's rice is produced & consumed in Asia. Globally rice is grown in more than 150 m ha area. India &China of those countries together hold about half of the world's rice area & more than 60% people are rice eaters. Rice is the main staple food & the first cultivated crop in Asia a long before the era of which we have the historical evidence. Rice is the staple food for more than 65% population. It has grate impotence in Indian culture & since birth and dead its existence always prevails. The rice is consumed after coking as Bhat, Pulav, Briyani, & so many other ways. In India, rice occupies the highest area around 42 m ha & recorded the highest production 91.8 Mt (Economics survey of India, 2006). Uttar Pradesh is an important paddy growing state in the country. The area production and productivity of paddy in this state is about 54.35 lakh ha, 139.62 lakh mt. 2358kg/ha respectively (Krishi Bhavan LKO, India 2001-12). In country the paddy production is not only highest but it also earn substantial amount of forging exchange through export quality rice.

Area under paddy cultivation in Banda district was highest followed by rice and wheat. The area under paddy cultivation 57838 ha with production 511129 quintal& productivity was 8.84 q/ha. (Statistical bulletin Banda 2012-13).

Keeping this in view the proposed study entitled "A Study on Economic of Paddy production in Banda district, Bundelkhand Uttar Pradesh" assumes special significance. The main objective of studied were

1. To study farm structure, cropping intensity of sample farms
2. To work out the cost and return of paddy cultivation

Material and Methods
Selection of sample farmer
A separate list of paddy growers of farmers of five selected villages was prepared along with their size of holding and classified in to three categories i.e. (i) Marginal (below -1 ha) (ii) Small –(1-2ha) and (iii) Medium (2-4ha). Multi stage purposive cum random sampling technique was used to select the district, block, village and farmers. Banda district was selected purposively. A list of all the block was prepared on the basis of acreage in paddy and "Naraini" Block was selected randomly.

Method of enquiry

The primary data were collected by survey method, through personal interview with use of pre structured and pre-tested schedule, while secondary data were collected from (Zilla Shankhyiki Patrik, Banda district U.P.). Agriculture dept. block head quarter, journals, reports, books and internet etc.

Analytical tools

Both the tabular and functional analysis were used, weighted average, cropping intensity and cost benefit ratio were workout with the following formula

1. Weight Average $= \frac{\sum w_i x_i}{\sum w_i}$
2. Cropping Intensity = Total cropped area / Net cultivated area *100

Functional analysis

Production was carried out to examine the productivity & efficiency of different resource of the sample farms, multiple regression analysis was done to examine the cost benefit relationship & productivity of farms. Different type of production function were explored, out of them only Cobb Douglas production function was found fit for analysis

$Y = ax_1^{b1}x^{b2}\ldots\ldots\ldots\ldots Xn^{bn}\, e\mu$

Y= Dependent variable (output value in Rs/ha)

X_i = i^{th} independent variable (input value in Rs/ha)

X_1= Seed (Rs/ha)

X_2 = Manure& fertilizer (Rs/ha)

X_3= Irrigation (Rs/ha)

$X_{4=}$ Human labour (Rs/ha)

$X_{5=}$ Machinery charge (Rs/ha)

A= Constant

bi= Product elasticity with respect to X_i

e= Error terms or disturbance farm

μ= Random variable

Marginal value product (MVP)

The Marginal value product of input was estimated by taking partial derivative to return with respect to input concerned, at the geometric mean level of inputs = $MVP(X_j) = \frac{b_j \bar{Y}}{\bar{X}}$

b_j= Production elasticity with respect to Xi

$\bar{Y}$= Geometric mean of Y (output value in Rs/ha)

$\bar{X}j$= Geometric mean of X_j (input value of Rs/ha)

Table 1: Average size of holding on sample farmer under different size of group:

S. No.	Size of Farms	No. of Farms	Net Cultivated land (ha.)	Average size of holding (ha.)
1	Marginal(below-1ha)	62	31.90 (27.98)	0.51
2	Small (1-2 ha)	25	38.60 (33.15)	1.54
3	Medium (2-4 ha)	13	43.50 (38.15)	3.34
4	Overall	100	114 (100)	1.14

It is clear from the table 1 that net cultivated area of sample form constituted 31.9%, 38.6% and 43.50% paddy under to marginal, small and medium farms respectively. The avg. size of holding of marginal, small and medium farms come to be 0.51, 1.54 and 3.34 ha respectively. On an avenge holding size was estimated to 1.14 ha

Cropping pattern

Cropping pattern indicate that paddy in Kharif and wheat in Rabi were major crop ocupid 33.33and 30.12 % to gross cropped area. Other crops showed ascending order pertaining to Pumpkin, Okra, Bottle gourd, Berseem, Chari, Sesame, Gram, Arhar covering2.81,2.81,3.21,3.21,3.21,5.22,6.43,and 9.64% to gross cropped area respectively. It is evident from table 2 that per hac avg. net cultivated area was found to be.51hac for marginal, 1.54hac for small and 3.34hac for medium farm and 1.14hac for overall farms. Total gross cropped area per farm was 2.49hac overall farm.

Table 2: Cropping pattern.

S No.	Name of crop	Marginal farms		Small farms		Medium Farm		Overall avg.	
		Area in ha	%	Area in ha	%	Area in ha	%	Area in ha	%
A	Kharif								
1	Paddy	0.43	34.96	1.12	34.56	2.15	32.82	0.83	33.33
2	Chari	0.02	1.63	0.11	3.39	0.22	3.35	0.08	3.21
3	Sesame	0.02	1.63	0.15	4.62	0.53	8.09	0.13	5.22
4	Arhar	0.08	6.50	0.28	8.64	0.74	11.28	0.24	9.64
5	Subtotal	0.55	44.72	1.66	51.21	3.64	55.54	1.28	51.41
B	RABI								
1	Wheat	0.38	30.89	1.02	31.48	1.99	30.38	0.75	30.12
2	Gram	0.05	4.07	0.20	6.17	0.53	8.09	0.16	6.43
3	Berseem	0.03	2.44	0.13	4.01	0.18	2.77	0.08	3.21
4	Subtotal	0.46	37.4	1.35	41.66	2.70	41.21	0.99	43.76
C	Zaid								
1	Bottle Guard	0.08	6.50	0.92	2.83	0.076	1.16	0.08	3.21
2	Pumpkin	0.05	4.07	0.10	3.08	0.11	1.67	0.07	2.81
3	Okra	0.09	7.32	0.04	1.23	0.030	0.45	0.07	2.81
	Subtotal	0.22	17.89	0.23	7.14	0.21	3.28	0.22	8.84
	Gross Total	1.23	100	3.24	100	6.55	100	2.49	100
	Cultivated Area	0.51		1.54		3.34		1.14	

Result and Discussion

Per ha cost & return from the cultivation of paddy crop on different categories of farms has been in table 2 it is depicted from table on overall average per hac cost of paddy come to Rs.42811.74. The major component to total cost were as total human labor Rs 1953.98 (4.56%), rental value of owend land

Rs 9000 (21.02%). Machinery charges Rs. 6303.01(14.72%). Irrigation charges Rs. 3304.10(7.72%). Charges paid for manure and fertilizers, seed cost and plant protection intesest on working capital & interest on fixed were also accounted for Rs. 406.02 (9.349%), Rs. 2412.80 (5.64%), Rs. 42.49, Rs. 2825.30 (6.59%) and Rs. 3451.30 (8.06%). Total cost respectively as far as the cost of cultivation on various size group of farms is concerned it was found to the Rs. 42534.8 Rs 42130.72 &Rs. 42356.27 per ha on Marginal, Small and Medium size group of farm of respectively. It is obscurely that the farm size had inverse relationship with the cost of cultivation.

Table 3: Cost and Return

S. No.	Items	Size Groups of Farms			Overall Average
		Marginal	Small	Medium	
1	Cost A1/A2	17773.08	23000.83	26394.36	22462.64
2	Cost B1	21413.48	26231.84	29720	25857.66
3	Cost B2	30413.48	35231.84	38720	34857.66
4	Cost C1	25615.72	27672.02	30045.71	27811.63
5	Cost C2	34615.72	36672.05	39045.71	36811.63
6	Cost C3	38077.29	40339.22	42950.28	40492.79
7	Gross Income	38983.09	37019.57	32858.03	36245.70
8	Net Income	22013.70	16693.77	9476.78	15968.72
9	Family labor Income	4202.24	1440.21	325.71	1953.98
10	Farm Investment	51624.29	28924.78	21802.42	33836.02
11	Farm business Income	21120.81	14018.74	6463.67	13782.06
12	Cost of production	574.49	698.23	891.92	723.82
13	Yield (q/ha)	29.53	29.11	26.21	28.26
	Input –Output ratio				
A	On the basis of A1/A2	1:2.19	1:1.60	1:1.24	1:1.61
B	On the basis B1	1:1.28	1:1.0	1:0.84	1:1.03
C	On the basis B2	1:1.52	1:1.33	1:1.0	1:1.30
D	On the basis C2	1:1.12	1:1.0	1:0.85	1:0.98
E	On the basis C3	1:1.02	1:0.92	1:0.77	1.089

Table 4: Cost of cultivation per hectare of paddy on different size of sample farm (Value in Rs.)

S. No.	Particular	Size group of farmers cost of cultivation of sample farms							
		Marginal		Small		Medium		Overall Average	
		Rs	%	Rs	%	Rs	%	Rs	%
1	Total Human labor	6302.61	14.81	5591.09	13.27	4685.71	10.75	5514.36	12.88
A	Family labor	4202.24	9.87	1440.21	3.42	325.71	0.74	1953.98	4.56
B	Hired labour	2100.37	4.93	4150.88	9.85	4360	10	3560.38	8.31
2	Bullock Power								
3	Machinery Power (Tractor)	4425.09	10.40	6464.05	15.34	7932.14	18.21	6303.01	14.72
4	Seed	2502.62	5.88	1875.80	4.46	2866.07	6.57	2412.80	5.64
5	Manure and Fertilizer	3989.66	9.37	3974.91	9.43	4227.32	9.70	4065.02	9.349
6	Irrigation Charges	3079.77	7.24	3421.70	8.12	3400	7.81	3304.10	7.72
7	Plant Protection	535.58	1.25	306.04	0.73	428.57	0.97	421.49	
8	Interest on Working Capital	2756.46	6.48	2675.03	6.35	3013.11	6.91	2825.30	6.59
9	Rental value of owned land	9000	21.15	9000	21.36	9000	20.64	9000	21.02
10	Interest on Fixed Capital	3640.40	8.55	3231.01	7.66	3325.64	7.64	3451.30	8.06
11	10% Marginal cost								
	Grand Total	42534.8	100	42130.72	100	43564.27	100	4284.74	100

Note: Figure in parenthesis indicates percentage total to the grand total

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