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Resource use efficiency of important used in rice production

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ABSTRACT

The present study is confined to Nagod block of district Satna Madhya Pradesh. Following purposing random sampling technique. 60 sample farmers were selected and interviewed for collection of data. Cobb-Douglas production function was fitted to found out resource use efficiency. Return to scale in all size of land holding was found more than unity (small up to 2 ha, medium 2.01 to 4 ha, and large above 4 hac) indicates that production of rice was characterized by increasing return to scale in case of all categories of farm, human labour, seed, irrigation, fertilizer, plant protection and machinery; the value of marginal value product (MVP) to factor cost were found positive indicating these is future scope for increasing in the investment to realize more return.

Key Words : Functional analysis, Cobb-Douglas production function, Standard error, Multiple determination (R_2), Σbi.

INTRODUCTION

Rice (*Oryza sativa* L.) is the world's most important stable food grown in more than hundred countries of the world. India is one of the world largest producers of white rice and brown rice accounting for 20 % of all world rice production. Rice is one of the oldest cultivated crops in China and India for several thousand years. East and central India accounts for 70 % of rice area. The area is roughly 3 times more in *Kharif* than in *Rabi*. The country achieve a record rice production of 100 million tonnes in 2010-11 crop year on the back of better monsoon this year and 104.32 million tonnes in 2011-2012 crop year July-June. As this crop covered major portion in cropping pattern in Satna district so it necessary to know the present status and level of profitability in study area then farmers can grow continue and including in the cropping pattern

METHODOLOGY

Sampling design:

This study was conducted in Nagod block of district Satna, M.P. were selected purposely. A list of all the rice growing village of the selected block was prepared and arranged in descending order on the basis of magnitude of area under rice and 5 village were selected randomly from this

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list. A list of all the rice growers of each selected villages prepared along with their size of land holding and was arranged in ascending order. From this list 60 sample farmers (*i.e.* 70 small, 72 medium, 60 large) were selected following the proportionate random sampling technique.

Method and period of enquiry:

The primary data was collected from the selected rice growers by survey method through personal interview and pre-tested interview schedule for the year 2014-2015.

Method and techniques:

The data collected from the sample cultivators were analysed and estimated with certain statistical techniques.

Functional analysis:

To study the effect of various independent variables on the output, various forms of production function have been dealt. However, Cobb-Douglas (production will used for estimate the productivity of resources used in rice production by the sample farmers) function was found more suitable to the data: therefore it was used for measuring resource use efficiency.

The mathematical form of Cobb-Douglas function is:

$$Y=a+X_1^{b1}X_2^{b2}X_3^{b3}X_4^{b4}X_5^{b5}$$

where,

Y=gross values of output (main product + by product) estimates at market price of the product in rupees/ha.

A= Constant

X_1= Labour cost

X_2= Seed (Rs./ha)

X_3= Irrigation (Rs./ha)

X_4= Fertilizer (Rs./ha)

RESULTS AND DISCUSSION

Resources use efficiency of rice :

The functional analysis was carried out to determine the efficiency of various resources (human labour, seed , irrigation, fertilizer, plant protection and machinery) used in the production was found best fit to data and was applied for functional analysis of data. X_1, X_2, X_3 and X_4, symbolized for human labour, seed, irrigation, fertilizer, plant protection and machinery, respectively.

Elasticity of production :

The estimated value of elasticity of production, standard error, co-efficient of multiple determination (R^2) and Σbi for rice production by different size group of farms are given in Table 1.

Table 1 reveals the co-efficient of multiple determination (R^2) on small, medium, large farms were 0.800, 0.847, 0.802, 0.969, respectively.

In case of small size group of farm factor X_1 (Human labour), X_3 (irrigation), X_5(Plant protection) were found statistical significant at 0.10 level of probability level except. In case of medium size group of farm X_2(Seed), X_4 (fertilizer), X_6 (machinery) and large size group of farm X_2(Seed), X_5

Table 1 : Resources use efficiency of rice crop under different size group

Size of group	A Constant	Production elasticity of variable						Σbi	R^2
		Human labour	Seed	Irrigation	Fertilizer	Plant Protection	Machinery		
Small	.353	.657***	.140	-.202***	.351	.376**	-.027	1.753	.800
	(.353)	(.212)	(.177)	(.077)	(.235)	(.158)	(.253)		
Medium	1.297	-.125	.184*	-.032	.594***	.078	.318**	1.331	.847
	(.923)	(.206)	(.098)	(.059)	(.143)	(.123)	(.121)		
Large	-.283	.057	.425***	-.021	.267	.402***	.377**	1.549	.802
	(1.043)	(.165)	(.132)	(.140)	(.171)	(.121)	(.165)		
Over all	-.889	.184**	.282***	-.089**	.312***	.226***	.237***	1.33	.969
	(.153)	(.090)	(.073)	(.042)	(.107)	(.071)	(.083)		

*significant at 0.10 level of probability

(Plant protection), X_6 (machinery) was found significant and other factor were found non-significant.

Σbi in case of small, medium and large farms were 1.753, 1.331, 1.549, 1.33 respectively. Σbi in all three categories of farm was found more than unity it indicates that production of rice is characterized by increasing Σbi on the each farm situation

Marginal value productivity of rice production :

The MVP of different factors were percent in Table 2. This table reveals. That in case of small farms MVP, the factors X_1, X_2, X_4, X_5 and X_6 Had been underutilized but X_3 inputs implying over utilization of these inputs, medium size farm that, the factor X_2, X_4, X_5 and X_6 had been underutilized but X_1 and X_3 Inputs implying over utilization and large size farm that , the factors X_1, X_2 , X_4, X_5 and X_6 Underutilized and X_3 was found over utilized, respectively.

Table 2 : Marginal value productivity of resources

Inputs	Price of input	Small	Medium	Large	Over all
X_1	31/Hr.	207.565	-46.8553	7.197199	72.07275
X_2	15/kg.	72.64342	105.351	26.14079	162.6747
X_3	53/hr.	-424.019	-80.6332	-53.4233	-216.66
X_4	11/kg.	62.81993	114.6664	54.55025	60.68659
X_5	0.6/ml.	118.0075	27.69968	143.2474	78.14903
X_6	200/hr.	148.947	1908.102	2412.003	5862.856

REFERENCES

Alimi, T. (2000). Resource use efficiency in food crop production in Oyo State of Nigeria. *J. Agric. & Environ.*, **1** (1): 1-7.

Aye, G.C. and Oboh, U.V. (2006). Resource Use Efficiency in Rice Production in Benue State, Nigeria: Implication for Food security and poverty Alleviation. Department of Agricultural Economics. University of Agriculture, Makurdi.

Bolarin Titus Omonona, Justina Oluyemisi Lawal and Ifeoluwa Damilola Oyebiyi (2012). Profitability of production and resource-use efficiency among ofada rice (*Oryza sativa* japonica). *Comunicata Scientiae*, **3**(2): 104-107.

Majumder, M. K., Mozumdar, L. and Roy, P. C. (2009). Productivity and Resource Use Efficiency of Boro Rice

Production. *J. Bangladesh Agril. Univ.,* **7**(2): 247–252.

Sani, A., Yakubu, A.A. and Bello, H.M. (2010). Resource-Use Efficiency in Rice Production Under Small Scale Irrigation in Bunkure Local Government Area of Kano State. *Nigerian J. Basic & Appl. Sci.*, **18**(2): 292-296

Shehu, J.F. and Mshelia, S.I. (2007). Productivity and Technical Efficiency of Small-scale Rice Farmers in Adamawa State. *Nigeria J. Agric. & Soc. Sci.,* 1813-2235/03-4-117-120.

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