Int.J.Curr.Microbiol.App.Sci (2021) *10*(03): 508-515

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 10 Number 03 (2021)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2021.1003.067

Is there Any Difference in Resource Use in Rice Cultivation under Tenant and Owner Farmers in Karbi Anglong District of Assam, India?

Brota S. Bey*, J. P. Hazarika and Nivedita Deka

Department of Agricultural Economics, Faculty of Agriculture, Assam Agricultural University, Jorhat, Assam, India

**Corresponding author*

Keywords

Tenants, Owners, Rice, Resource use, Karbi Anglong, Assam

Article Info

Accepted:
07 February 2021
Available Online:
10 March 2021

A B S T R A C T

Research study reports that there is productivity difference between tenants and owner farms beside difference in resources used. A study conducted in Karbi Anglong district of Assam, India found that the resource use in rice cultivation in tenant and owner rice farms was significantly different. The owner farmers were found to be more efficient in resource use than the tenant farmers. These differences can be attributed primarily to differences in economic condition of both the group of farmers. The owners were found to be economically better off with income source beside agriculture than the tenants. For the existing level of rice production, there is still scope for increasing the amount of resource use. Awareness and training on adoption of the recommended package of practices of rice would certainly help both the tenant and owner farmers to increase their production to make them rice secured.

Introduction

Karbi Anglong, district in the Hills Zone of Assam cultivates rice as the staple crop both in the hills and plain areas. The land owners do not cultivate in all of their cultivable land because of lack of family labour and some other reasons and lease out to the tenants. There is various type of tenancy system in the Karbi Anglong district of Assam such as the pykas system, shukti system, adhi system, leased system. In pykas system of tenancy, the land owners get paid only for the value of the land and the tenant farmers can cultivate on the land whereas in the shukti system of tenancy, deal between the landowners and the tenant farmers are held, based on the deal or contract, the tenant farmers will be allowed to use the owner land for cultivation and some amount of benefits have to be given to the land owners. In adhi system of tenancy, a deal between the land owner and the tenant farmers are held where there will be an equal sharing of the production of the crops between the tenant farmers and the land owners. In case of leased system of tenancy, the tenant farmers make a contract with the land owner for cultivation of crops. Out of these, pykas system of tenancy was found to be most frequent in the Karbi Anglong

district. The crop productivity in the tenant's and owned farms appear to be different from place to place which is a debatable issue. The subject on the consequence of tenancy on production has stretched. It has engaged a projecting place mainly because of their suggestions for the impact of land and tenancy reforms on the efficacy of production. The traditional theoretical idea is that share tenancy is an incompetent form of tenurial preparation comparing to either owned farming or fixed rent tenancy, because the terms of sharecropping delivers discouragements to resource use. Some are of the view that owner operated farms are supplementary productive than the tenant farms while others found no significant difference in productivity between the owner and the tenant farms. The traditional theoretical notion is that share tenancy is an inefficient form of tenurial arrangement compared to either owner farming or fixed rent tenancy, because the terms of sharecropping provides disincentives to resource use (Johnson, 1950). Some others at the theoretical level have argued that resource allocation and productivity appear to be invariant of tenurial arrangement (Cheung, 1969). At empirical level also, many studies have been conducted regarding tenancy productivity relationship. These studies are also conflicting leading to different policy issues. Some are of the opinion that owner operated farms are more productive than the tenant farms (Jabber, 1977) while others found no significant difference in productivity between the owner and tenant farms (Talukdar, 1980). Considering the above facts, the present study was conducted to examine the resource use efficiency of rice production under tenant and owner farmers in Karbi Anglong district of Assam during 2020. In the district the tenancy system exists in the plain areas only excluding the jhum (hill) areas.

Materials and Methods

A multi stage random sampling design was used for the selection of the sample for the present study.

At the first stage, Karbi Anglong district (Fig. 1) was selected purposively where agriculture farming is carried out immensely. In the second stage, three blocks were randomly selected from the district. In the third stage, one village each from the three blocks were selected based on the existence of the tenancy system. In the final stage, 37 tenant farmers and 47 owner farmers were selected for the study purpose that resulted in 84 total farmers. Primary data were collected from the sample rice growers by interviewing them personally at their door step with the help of the schedule that included information regarding the area under rice and other crops as well, various input used, output produced, cost of inputs, price of outputs, etc.

Cobb-Douglas production function was used to analyze the impact of production variables on the rice production under tenant and owner farmers.

Production function in general form can be written as:

$$Y = f\ (Xi)$$

$$Y = \beta_{\circ} X_1^{\beta 1} X_2^{\beta 2} X_3^{\beta 3} X_4^{\beta 4} X_5^{\beta 5} e_u$$

Where, Y is the gross return in rupee of rice and X_i's are the amount in rupee terms of the various production inputs that are considered for the study

Eq. (1) of the production function in log form is:

$$\text{In } Y = \beta_{\circ} + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \ldots\ldots\ldots\ldots + \beta_n \ln X_n$$

The output of rice was converted to value terms for the functional analysis which is represented in the following equation as:

$$\ln (GR) = \beta_{\circ} + \beta_1 \ln (SD) + \beta_2 \ln (HL) + \beta_3 \ln (FER) + \beta_4 \ln (ML)$$

Where, GR is the gross return obtained from rice cultivation calculated by multiplying the riceoutput by price of the output, SD is seed cost per hectare in rupee terms, HL is human labour cost in rupee terms, FER is fertilizer cost per hectare and ML is the machine cost per hectare. The coefficients β_i (i=1,2,3,4) are the elasticities of the respective variables with respect to the gross return obtained from rice production, with the assumption that $\beta_i > 0$

The resource use efficiency of rice was analysed as stated below,

$$r = MVP/MFC$$

where r is the efficiency ratio

MVP is the marginal value product of the concerned input

MFC is the marginal factor cost or price per unit of input and assumed as Rs. 1 for all the inputs

MVP was calculated as $MVP_i = \beta_i \frac{\bar{Y}}{\bar{X}_i}$, where $\bar{Y}$ is the geometric mean of the value of output and $\bar{X}i$ is the geometric mean of the *i*th input.

A firm maximizes profits with regard to a resource when the ratio of the marginal return to opportunity cost equals 1.

If r is <1, then the resource is over-utilized; hence, a decrease in quantity is suggested to maximize profits till *r* becomes equal to 1.

If r > 1, the resource is under-utilized, and an increase in inputs will raise the profit to the level when r falls to 1.

To explore the difference, if any between the tenant and owner farmers in respect of resource use and returns, a two-sample 't' test assuming unequal variance was used

$$t = \frac{\overline{x_1} - \overline{x_2}}{S} \sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

Where, $\bar{x}_1$ and $\bar{x}_2$ are the means of various input used per hectare and return per hectare, n_1 and n_2 are the number of observations in the two samples and S is the standard deviation of the difference between two samples.

Results and Discussion

Demographic characteristics of the respondents

From the survey it was found that most of the members of the sample respondents' family of both the group of farmers belonged to the age group of 15 to 60 years. The education level of the family members was found to be comparatively higher in tenant farmers than the owner farmers. All the respondents of tenant farmers (100 per cent) were found to have agriculture as the main occupation whereas nearly 81 per cent of the owner farmers were found to have agriculture as main and 19 per cent were found to have some other occupation as main source of income (Fig. 2).

The crop grown were similar in both the farm groups with rice occupying the highest share followed by tomato, rabi vegetables, sugarcane, kharif vegetables, chilli etc. The cropping intensity of tenant farmers was found to be comparatively higher (175 %) than that of owner farmers (172 %).

Economics of rice cultivation

Rice production was found to be impacted by various factors of which area under rice, seed cost, human labour cost, fertilizer cost and machine hour cost were found to be major factors affecting the gross income from rice. Hence, estimates of these strategic variables were done and presented for both group of farmers. It was found that the total cost of cultivation per hectare was more in tenants (Rs.47, 830.96) than the owners (Rs.34, 274.49) which was due to higher rental value of land for the tenants while the gross return was more in tenant farmers (Rs. 56855.24) than the owners (Rs. 45544.00) as the yield of rice was more in tenant than in the owners.

Return over variable cost was higher (1.98) in tenant farmers compared to owners' farms (1.69). However, Ali et al (2012) reported that cotton output was more in owner farms than in the tenant farms in Pakistan.

Estimation of impact of production variables on rice production under tenant farms

The regression coefficient for area under rice was positive and significant (0.570) depicting that considering all other factors constant, one per cent increase in area under rice would increase gross returns by 0.570 per cent. The regression coefficient for seed cost (0.362), human labour cost (0.363), fertilizer cost (0.013) and machine hour cost (0.311) were found to be positive but not significant. The coefficient of multiple determinations (R^2) was found to be 0.61 which implies that nearly 61per cent variation in rice production was explained by the variables considered in the study and there is still scope for the tenant farmers in the study area to improve rice production by increasing the inputs considered in the study area. The return to scale ($\sum b_i$) was found to be higher (1.619) than 1, indicates an increasing return to scale. (Table 2)

Table.1 Cost of cultivation (Rs) and return per hectare (Rs) of rice cultivation

Particulars	Tenants	Percentage to total cost	Owner	Percentage to total cost
Seed cost	1148.81	2.40	1197.29	3.49
Human Labour cost	22350.68	46.73	20625.97	60.18
Fertilizer cost	1751.99	3.66	1840.07	5.37
Machine hour cost	2148.65	4.49	2074.47	6.05
Interest on working capital@10%	1370.01	2.86	1286.89	3.75
Total variable cost	28770.13	60.15	27024.69	78.85
Depreciation @ 10%	288.29	0.60	884.32	2.58
Land revenue	39.74	0.08	39.74	0.12
Rental Value of owned land	17000	35.54	5666.67	16.53
Interest on fixed capital@10%	1732.8	3.62	659.07	1.92
Total fixed cost	19060.83	39.85	7249.8	21.15
10% managerial cost	4637.7	9.70	3370.38	9.83
TOTAL COST	47830.96	100.00	34274.49	100.00
Gross return (Rs/ha)	56855.24		45544	
Net return (Rs/ha)	10478.26		11840.15	
Return over total cost	1.19		1.33	
Returns over variable cost	1.98		1.69	

Table.2 Production function estimation for rice cultivation

Variables	Tenant	Owner
Area in hectare (X_1)	0.570***	0.658***
	(0.107)	(0.173)
Value of seed in Rs/ha (X_2)	0.362	0.390
	(0.533)	(0.638)
Value of human labour in Rs/ha (X_3)	0.363	0.453*
	(1.028)	(0.198)
Value of fertilizer in Rs/ha (X_4)	0.013	0.108
	(0.661)	(0.763)
Value of machine hour in Rs/ha (x_5)	0.311	0.064
	(0.187)	(0.082)
R^2	0.61	0.77
Returns to scale	1.619	1.673

*Significant at 10 per cent probability level ** Significant at 5 per cent probability level *** Significant at 1 per cent probability level

Table.3 Estimated resource use efficiency for tenant and owned farmers

Farm inputs	Production elasticities		MVP		MVP/MFC (*r*)	
	Tenant	Owner	Tenant	Owner	Tenant	Owner
Seed cost	0.362	0.390	17.92	14.84	17.92	14.84
Human labour cost	0.363	0.453	0.92	2.27	0.92	2.27
Machine hour cost	0.311	0.064	8.23	1.41	8.23	1.41
Fertilizer cost	0.013	0.108	0.42	2.67	0.42	2.67

Table.4 t estimates for difference between tenant and owner farmers

t values	Seed cost	Human labour cost	Fertilizer cost	Machine hour cost	Gross return	Net return
	1.99**	2.01	1.99**	1.99	1.99***	2.00***

Fig.1 A. Map of study area

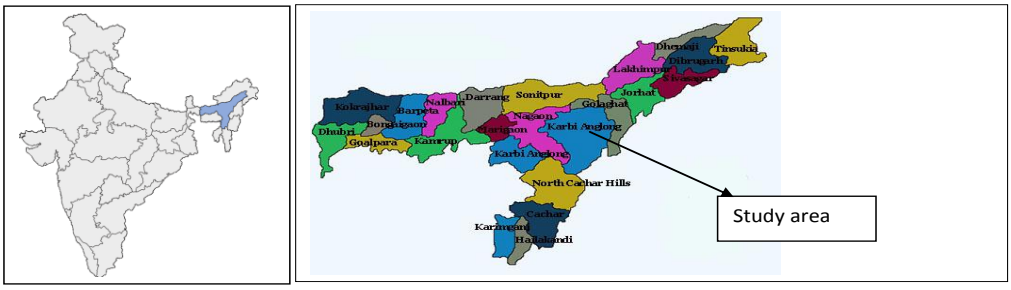
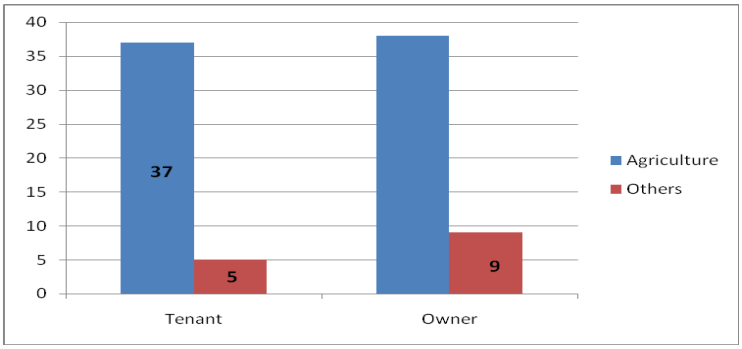


Fig.2 Occupational pattern



Estimation of impact of production variables on rice production under owner farms

For the owned farms, rice production was positively affected by area (0.658), seed cost (0.390), human labour cost (0.453), fertilizer cost (0.108) and machine hour cost (0.064). However, only area under rice and human labour cost were found to affect the gross return significantly depicting that considering all other factors constant, one per cent increase in area under rice and one per cent increase in the human labour cost would increase gross returns by 0.658 and 0.453 per cent, respectively. The coefficient of multiple determinations (R^2) was found to be 0.77 which implied that nearly 77 per cent of the variation in rice production was explained by the variables considered in the study and there is still scope for the owner farmers in the study area to improve rice production by increasing the inputs considered in the study area. The return to scale ($\sum b_i$) was higher (1.673) than 1 indicating an increasing return to scale. (Table 2)

Estimated resource use efficiency for tenant and owner farmers of rice production

The *r* values for seed, human labour, machine hour and fertilizers for rice production were computed for tenant farmers based on the estimated parameters in the rice production function is given in Table 3. For tenant farmers, the *r* value was more than unity for seed (17.92) and machine hour (8.23) indicating that the farmers have the opportunity to increase the output per hectare by increasing the use of seed and machine labour while *r* value was less than unity for human labour (0.92) and fertilizer (0.42) indicating that farmers need to reduce their use of human labour and fertilizer for present level of rice cultivation.

The *r* value for owner farmers was more than unity for seed (14.84), human labour (2.27), machine hour (1.41) and fertilizer (2.67). It indicates that the owned farmers were under-utilizing their inputs and there is still scope to increase the use of inputs by the owner farmers in rice cultivation. Mazumder *et al.*, (2009) reported that for owners the MVP of seedlings and insecticides were greater than one while for tenants MVP of seedlings, insecticides and fertilizers were greater than one which indicates scope for increasing the rice output by spending more on these inputs. A similar finding was reported by Parashar *et al.*, (2016) that the MVP values of seed, chemical fertilizer, plant protection chemicals and human labour were greater than one in rice production revealing that there were opportunities to increase per hectare rice output by using more seedlings, chemical fertilizers, plant protection chemicals and

human labour. Majumder *et al.,* (2019) that reported that farm yard manure was over-utilized in the SRI method and human labour was over-utilized in the conventional method.

Differences in resource use and returns

Apparently, it was observed that there were differences in amount spent per hectare on different resources used in rice cultivation by tenant and owner farmers along with differences in returns obtained. A t test was used to find out the difference statistically. The t estimation for the resource used showed that there was no significant difference in human labour cost and machine hour cost, however there was significant difference in seed cost (1.99**) and fertilizer costs (1.99***) between tenant and owner farmers. Similarly, it was found that there was significant difference in gross (1.99***) and net return (2.00***) between the group. (Table 4)

In conclusion from the study, it was observed that there were differences in resource use between tenant and owner farmers in the study area. The tenant farmers were found to use more of human and machine hour where s owner farmers were found to use more seed and fertilizer. Gross return was more in tenant farmers than the owners. However, due to high rental value of land in tenant farmers, the net return was lower in this group than that of owner farmers. The resource use efficiency was found to be better in owner farmers than the tenant farmers in rice cultivation. Farmers in the study area still had scope for improving rice production by increasing their use of inputs. The human labour and fertilizer were over-utilized by the tenant farmer's hence, they have to be advised to reduce the use of human labour and fertilizer to achieve the present level of production. The owned farmers could still increase the use of the resources to further increase the rice production. To improve the resource use efficiency and to optimize input use for rice cultivation for both tenant and owned farmers, appropriate policy measures like awareness and training on adoption of the recommended package of practices for better yield performance, advisory services and proper training regarding the insect, pest and disease management of rice are recommended.

Acknowledgement

The authors express sincere thanks to the department of Agricultural Economics and Farm Management, Assam Agricultural University, Jorhat, for facilitating the survey.

References

Ali, A, A. Abdulai and R. Goetz. 2012. Impacts of tenancy arrangements on investment and efficiency:
evidence from Pakistan. *Agricultural Economics*, 43. 1-13

Basorun J.O. and Fasakin J.O. 2012: Factors influencing rice production in lgbemo-Ekiti Region of Nigeria. *Journal of Agriculture, Food & Environment Science*. 5:1-9

Cheung, S.N.S., 1969. The Theory of Share Tenancy. University of Chicago Press, Chicago, ISBN-13: 978-0226103587, Pages: 188.

Johnson, D.G., 1950. Resource allocation under share contracts. *J. Political Econ.*, 58: 111-123.

Jabbar, M.A., 1977.Relative Productive Efficiency of Different Tenure Classes in Selected Areas of
Bangladesh. *The Bangladesh Development studies*. 5(1):42-44

Majumder.; M.K., Mozumder, L. and Roy, P.C. 2009: Productivity and resource use efficiency of boro production. *J. Bangladesh Agril. Univ*. 7: 247-252.

Majumder, H.S., Gogoi, B.P., Hazarika, J.P.,

and Deka. N. 2019: Does the system of rice intensification make a difference to resource use efficiency? Evidence from Tripura, India. *Agricultural Economics Research Review* 2019, 32 (2), 289-294.

Parashar, I., J.P. Hazarika, and N. Deka. 2016. Resource use efficiency in rice production under SRI and conventional method in Assam, India. *Agricultural Science Digest* 35 (2): 152-54.

Talukdar, R.K., 1980. Land Tenure and Efficiency in Boro Rice Production in an Area of Mymensingh

District, Bangladesh Journal of Agricultural Economics. 3(2):33-3

How to cite this article:

Brota S. Bey, J. P. Hazarika and Nivedita Deka. 2021. Is there Any Difference in Resource Use in Rice Cultivation under Tenant and Owner Farmers in Karbi Anglong District of Assam, India? *Int.J.Curr.Microbiol.App.Sci.* 10(03): 508-515.
doi: https://doi.org/10.20546/ijcmas.2021.1003.067