

An Investigation of the Factor Affecting on Paddy Production

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Abstract

This paper was conducted to explore the influencing factors of paddy production in Batticaloa district. Based on the multiple regression model, variables of land, seed, pesticides, fertilizer, family labour, hire labour, machine charges, extension services and farmer's experience are employed. The study was conducted via cross section analysis by using primary data during the period of 2015/2016 Maha season. The study used combination of both random sampling technique and convenient sampling technique to select of area and select sample farmers respectively. The results show that land, fertilizer and pesticide are influenced positively on paddy production. Seed, irrigation and farmer's experience are influenced negatively on paddy production. While other factors namely machinery, hire labour, family labour and extension service are not influenced on paddy production in Batticaloa district.

Keywords: paddy production, farmer, Batticaloa district, paddy cultivation

01. Introduction

Agriculture sector plays a dominant role in the economy of Sri Lanka. The majority of Sri Lankan people reside in rural areas (77.3) and they depend mostly for lively hood on Agriculture sector [6]. It contributes about to 10.1 per cent to the gross domestic product and employs about 28.5 per cent of out of the total employment in Sri Lanka [3].

The contribution of Agriculture sector to gross domestic production in 1977 was 31 per cent but at present contribution of it being lower. At present in 2014 the Agriculture sector contributed about 10.1 per cent of gross domestic production in Sri Lanka, while Agriculture had contributed to Gross Domestic production as 10.8 per cent of gross domestic production in 2013. In this context which is clear that, the share of Agriculture sector has slowed as 0.3 per cent in 2014 compared to 4.7 per cent in 2013[3]. The Agriculture sector is mainly driven by paddy

sector. Hence the contribution of Agriculture sector has been declining continuously consequent to declining effect of the production of paddy. The decrease in production of paddy sector, this occurs by joint outcome of the decline in production of both Maha season and Yala season.

The paddy production has declined as around 3.38 million metric tons to 27 per cent. It was lower because of low yields arose and decrease in extent cultivated land. The lower paddy yield recorded as 4.624 kg per hectare in 2014. It was recorded as 4.329 kg per hectare in 2013. Particularly, the Yala season affected mostly due to a significant decline in paddy production as 35.5 per cent similar to Yala season, Maha season recorded a decrease of 21.4 per cent [3].

The economy of Batticaloa district depends mostly on agriculture and fishing. The paddy is cultivated in two main distinct seasons such as Maha season from October to March, and Yala season April to September. Except those two seasons, farmers also grownup paddy in inter seasonal cultivation which called also late Maha¹.

The study was conducted based on the following background. Farmers' paddy production has not been showing the clear trend in Batticaloa district. It shows fluctuation on farmers' paddy production. Paddy farmers, who reside engage in paddy cultivation. They do not earn adequate yield. In addition, they have been experiencing continuously instability of paddy production. Particularly Yala season has been trending lower average yield and also Maha season has been facing fluctuation in average yield.

Even if the government of Sri Lanka assists to paddy cultivation, farmers have been facing inefficiency in terms of paddy yield. According to the [5] Average Yield (Bushel/Net Acre) of yala season was 62.20, 72.41 and 47.6 in 2005/2006, 2011/2012 and 2014/2015 during the periods respectively. Similarly, average yield (Bu/Net Ac) of maha season was 71.38, 81.24 and 76.90 in 2007, 2009 and 2012 respectively. The lower paddy yield was in 2014/2015 at 47.6 bushel per acre in comparison to 78.17 bushel per acre in

¹ It is practiced during February to May by the farmers in some areas with the help of minor tanks.

2009/2010. According to the available data Batticaloa district does not show a clear trend as well as paddy farmers have not obtained a steady growth on paddy yield. Hence, the present study tries to set out the influencing factors on paddy production in Batticaloa district.

Previous studies regarding the factor influencing on paddy cultivation had been conducted in various countries. In this line the following studies were taken for literature review.

The study was conducted to examine the determinants of sustainability of paddy rice production in Niger Delta Region of Nigeria. The results show that household size, farm size, seed input, hired labor and fertilizer application were directly proportional to sustainability level of farmers production system [7].

[2] was conducted a study in Ampara District to find out the factors which affecting on paddy cultivation. He found that labor use, paddy field extension, fertilizer using, seeds, plant protect chemical, weed control chemical, and quality of seeds were statistically significant on the paddy cultivation.

The study had been conducted to identify the effect of land factors and management practices on rice yields. According to the results diseases was major determinant factor which reduce the paddy yield. Conversely, improved water management and fertilizer application were contributed to yield to increase the paddy yield. Furthermore, soil suitability also related to causes yield variability [8].

Tun and Kang [9] who examined the to examined the impact of farm mechanization on Myanmar rice production efficiency. The findings revealed that farm mechanical tools and education category significantly improved the Myanmar rice production efficiency. Other factors namely, age, family labour ratio and off-farm income were not associated with rice production efficiency.

The study on investigation of the factor affecting paddy yields had been conducted by Ann (1). Based on the study, the results showed that total extents cultivated land positively raise the paddy yield. Moreover, transplanting, type of variety, fertilizer and irrigation also played significant role on paddy production. Further, their results revealed that climate variable have not influence on yield in Anuradapura district since greatly changes in technological factors.

[4] analyzed the geographic determinants of rice self-sufficiency in Southeast Asia. The study found that the main influence factor of rice production is proportion of land that is well suited for growing paddy. Whereas,

countries having with sufficient supplies of water and flat land. Those are causes self-sufficient in rice.

Based on those studies variables factors land size, transplanting, type of variety, fertilizer and irrigation, labour seeds, plant protect chemical, weed control chemical, and quality of seeds, water management, soil suitability, mechanical tools, household size and education significantly contributed to paddy production. Conversely age, family labour ratio and off-farm income did not associate with paddy production.

02. Methodology

The study was conducted via cross section analysis by using primary data during the period of 2015/2016 Maha season. The study utilized combination of both random sampling technique and convenient sampling technique. Random sampling technique was used to select area in Batticaloa district. Further, convenient sampling technique was used to select sample among farmers. Thus, two hundred of sample were selected and also data were gathered via structure questionnaire. Collected data were analyzed by multiple regression analysis via the STATA computer package. The function of multiple regression analysis was reported in the following equation.

$$\ln Y = \beta_0 + \beta_1 LS + \beta_2 CS + \beta_3 FU + \beta_4 CP + \beta_5 HL + \beta_6 FL + \beta_7 MC + \beta_8 I + \beta_9 ES + \beta_{10} FE + \epsilon$$

Where

Y: Paddy production (Kg)

LS: land size (acre)

CS: Seeds (Kg)

FU: Fertilizer use (Kg)

CP: Cost of pesticides (Rs)

HL: Number of hire Labour

FL: Number of family Labour

MC: Machine Charges

I: Irrigation (1= rainfall 0 = pond)

ES: Extension services

FE: Farmer's experience (years)

ϵ : Error term

03. Results and Discussion

The following table reported the results of multiple regression analysis.

Table 4.1: Multiple regression results

Variable	Coefficient	t value	p value
Land size	481.6928**	2.62	0.010
Seed	-2.972958*	-1.78	0.077
fertilizer	6.81455***	7.76	0.000
Pesticide	0.053542***	3.88	0.000
Irrigation	-1058.03**	-2.43	0.016
Machinery Charges	0.0139863	1.10	0.273
Hire labour	53.90173	0.40	0.691
Family labour	-127.0182	-0.38	0.704
Extension service	206.0142	1.20	0.233
Experience	-25.35284*	-1.89	0.060
R-Squared		0.8898	
Adjusted R-Squared		0.8840	
F- statistics		152.61	
Prob > F		(0.0000)	

Source: Author's Computation

The asterisks *, **, and *** denote statistical significance at 1%, 5%, and 10% levels, respectively.

The estimated coefficient of the are presented as

$$Y = 290.2064 + 481.6928L_S - 2.972958C_S + 6.81455F_U + 0.053542C_P + 53.90173H_L - 127.0182F_L - 1058.03I + 206.0142E_S - 25.35284F_E + \epsilon$$

The results reveal that fertilizer, pesticide were significant positively on output of paddy production at 1 percent level. Land size influenced positively on paddy production at five percent level. Conversely,

seed paddy and irrigation were negatively significant with output of paddy production at ten percent level and five percent level respectively. Similarly, farmer's experience had negatively significant at ten percent level. While other factors namely machinery, hire labour, family labour and extension service were found to be insignificant on paddy output.

The coefficient of land size was (481.6928) positively significant and indicates that a one acre increases in land size which would lead to increase by 481.6928 kilograms of paddy output. According to the results, if increase the size of land which would increase the output of paddy cultivation.

Conversely, seed paddy found to be negatively significant on output of paddy. Seed has coefficient value of -2.972958 implies that if increase seed paddy by one kilograms it would reduce the output by -2.972958 kilograms.

The positive coefficient expected of the term of fertilizer has been confirmed and the variable was strongly significant at 1 percent. The coefficient was 6.81455 which also positive as expected in the model. Thus it indicates that a one kilograms of fertilizer implies an increase of output of paddy by 6.81455 percent. Thus, the result of fertilizer shows that if increase fertilizer it would increase the paddy production in Batticaloa district since fertilizer may induce the grow of paddy.

Similarly, the factor namely pesticide which found that it has a significantly positive relationship with the paddy output since it found significant at one percent level. The coefficient of pesticide was 0.053542 implies that a one rupee increases on pesticide to buy pesticide which would lead to increase by 0.053542 kilograms of paddy output. Thus, the result show that, if increase the cost of pesticide it would increase the output of paddy cultivation. It may have attributed due to the fact that pesticide may destroyed fungus, bacteria, insects, plant diseases, snails, weeds among others when paddy cultivation was affected by those things.

The result of irrigation showed a negative coefficient of -1058.03 implies it had significantly negative effect on paddy output at five percent level. If farmers watering via rainfall, it would reduce the paddy yield by 1348.2364 since it had the coefficient value 1348.2364.

Based on the results, an increase in the watering of irrigation, it would reduce paddy production significantly by 290.2064 kilograms. Moreover, if farmers increase watering to paddy land through pond, it would lead to reduce the output of paddy by

290.2064 kilograms. In order to the results when watering via rainfall it reduces more the paddy output compare to pond. Entirely the results of irrigation revealed that watering more affect negatively to diminish paddy output significantly, which was attributed due to that the increased over watering affect to increase the risk of plants failing which induced to occur reduction of paddy output.

Further, the study found the coefficient value of - 25.35284 corresponding to farmers' experience - 25.35284. It implies that farmers' experience increased by one year it would lead to reduce the paddy output by 25.35284 kilograms. Thus, Farmers' experience determines the paddy output negatively.

Machinery charges, hire labour, family labour and extension service were found to be insignificant. Therefore, those factors did not determine the paddy output in Batticaloa district.

According to the results of the analysis, land, fertilizer and pesticide were determined the paddy output positively. Conversely seed paddy, irrigation and farmers' experience were determined negatively the paddy output.

In this study, high R-Squared value (0.8898) and Adjusted R-Squared value (0.8840) reveal that over 88 per cent variations in the paddy production were explained by the explanatory variables included in the model. Moreover, the estimated F value was 152.61 indicating that the explanatory variables included in the model collectively have significant influence on paddy production.

04. Conclusion

The key objective of this study is to examine the influencing factors on paddy production in Batticaloa district. This objective was evaluated by utilizing multiple regression method. For this evaluation, the primary data from the period of 2015/2016 maha season have been used. Based on the result, it is proved that among the factors land, fertilizer and pesticide have influenced the paddy production positively. Conversely seed paddy, irrigation and farmers' experience are determined negatively the paddy output. Although, other factors namely machinery charges, hire labour, family labour and extension service are not influence on paddy production in Batticaloa district.

05. References

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