Major Determinants of Paddy Production and Effectiveness of Fertilizer Subsidies in Sri Lanka: A study in Kurunegala District

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Abstract

The main objectives of this study were to identify the major determinants of paddy production and to examine how far fertilizer subsidy affects the paddy production. Based on primary and secondary data, Multi Stage Stratified Sample Technique was employed to examine the power of fertilizer as a major input to increase the paddy production. Ordinary Least Square (OLS) method was used to identify the major determinants of paddy production in the area. Analysis revealed that the fertilizer subsidy programme has positive effect to increase the paddy production but not the productivity. Extending cultivated land and man-days had the greater possibility to increase the paddy production while seed paddy and fertilizer were the other factors which had considerable impact on the paddy production. The study revealed that *Paddy production increased* by 24.6% in response to 59.1% increase of fertilizer application. It indicated that the productivity level was far behind the expected level. Hence farmers should be made aware about as to how the subsidized fertilizer be utilized more effectively to increase the paddy production while minimizing environmental cost.

Key words: Fertilizer, Paddy production, Subsidy

Introduction

As the population grows, essensiality of more land for housing and roads is inevitable. Cultivated areas will shrink. Hence, the solution is to increase productivity. For this purpose. specialy after the green revolution fertilizer was a key diterminant of increasing productivity of paddy. Though the agricultural production is determined by the several factors, chemical fertilizer has played a major role in increasing paddy production since the origin of green revolution. Prices of fertilizers have been rapidly increased, resulting in reduced fertilizer application by farmers. This was a severe problem to full fill the essential food requirement of the nation. After identifying this problem successive governments have taken steps to overcome the problem. As a major strategy to boost the paddy production in Sri Lanka fertilizer subsidy was introduced by the government since 1962. According to (Rosegrant 1998) fertilizer subsidy has been employed as a key instrument to stimulate rice production in Indonesia. It has led to rapid growth in fertilizer use, rice production, and subsidy expenditure.

Fertilizer subsidy was used as a strategy to solve this problem. Kurunegala District is the second largest paddy harvesting area. This study focused to identify the major determinates of the paddy production and whether government subsidy program has succeed.

The main objectives of the study were 1) to identify the effectiveness of fertilizer subsidy to increase paddy production in Kurunegala district, 2) and to identify the major determinants and their magnitudes to increase the paddy production in selected area.

Materials and Methods

Primary data was collected by the sampling survey using a structured questionnaires and interviews with special references to Panduwasnuwara Secretariat Divisional Area. Based on the Stratified Sampling method 76 farmers were selected randomly from the four Grama Niladari divisions in the area. Farmers engaged with the paddy cultivation under the rain-fed cultivation pattern. Secondary data was gathered from the official website of the Census and Statistics Department of Sri Lanka, Central Bank reports published in various years, and Govijana Seva Centres of the study area and AG offices. Ordinary Least Square (OLS) method was used to identify the major determinants of paddy production in the area. Having a problem of multi-collinearly, Simple Regression Analysis employed to evaluate the relationship between each explanatory variable and the depended variable of paddy harvest by term of bushels.

Table 1: The coefficient of Independent variables, derived from the simple regression analysis

D variables	The coefficient of Independent variables					
	Land(acre)	Capital (Rs.)	Labour (Md$_s$)	Seed Paddy (bushel)	Chemicals (Rs.)	Fertilizer (kg)
Paddy (bushels)	89.3	0.0119	6.60	32.6	0.0316	0.541

Results and Discussion

Based on the regression analysis, following results were derived trough the estimable form of the equation:

Where, $Y = \beta_0 + \beta_1 x_1 + U_i$

Y= Paddy yield (bushels per acre),
X$_i$ explanatory variables (land, capital, labour, seed paddy, fertilizer)

Results derived from the regression analysis explain that the most powerful factor affected to increase the paddy production as cultivated land area by terms of number of acre (Table 1). The regression coefficient interpreted that, any increase of land by one acre when all other variables are constant, paddy production increases by 89.3 bushels/ac. The second most effective factor to increase the paddy production was the seed paddy. It was seen that many farmers in this area were not willing to broadcast or seed plant more than 2 bushels per acre. According to some farmers, there is a

paddy harvest can be increased by approximately by half of bushels associated with any increase of the application of fertilizer subsidy. The changes of the fertilizer application and production have been represented by the following Table 2.

Annual average of urea application increased by 81.6% from 115.6 kg in 2004 to 209.9kg by 2008. TSP application has also been increased by 43.4 % from 51.8 kg in 2004 to 74.2 kg by 2008. Contribution by the TSP application to increase the hervest was at low level because most of the paddy fielgs had no sufficient water. MOP application was the most effective fertilizer which influences the production by wider context because it applies to the paddy fields in the phase of broadcasting. Therefore it will be more effective to increase the paddy production.

Table 1.Average application of fertilizer and paddy production per acre basis

Year	Fertilizer				Output Qty (Bushels)
	UREA	MOP	TSP	Total	
2004	115.6	51.2	51.8	218.5	114.0
2008	209.9	63.6	74.2	347.7	142.0
Change (%)	81.6	24.3	43.4	59.1	24.6

further possibility to increase the production by increasing the seed paddy just by additional 0.5 bushels per acre in the area.

The third factor to increase the production is that the number of man days contributed during the three and half month. Due to very busy life farmers are not rich to engage with the cultivation properly in due event and due time. Regression coefficient reveled that, if farmer contributes additional one man days for their cultivation, harvest will be increased by 6.6 bushels (ceteris paribus). Fertilizer application was the fourth factor to boost the production specially through increasing the productivity. According to the study

Conclusion

The major determinants of increasing paddy production in Kurunegala district was the extended land area. Fertilizer subsidy has influenced to increase the paddy production by 24.6% due to 59% increase in fertilizer application, but not the productivity. This study revealed that the fertilizer subsidy is not much powerful to increase the paddy production as it expected level due to low productivity in the Kurunegala district. Ro increase the production factors such as recommended fertilizer amount, quality of seed paddy, possibilities for cultivating paddy fields, awareness programmes etc. should also be further revised.

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