

## ECONOMIC CONSEQUENCES OF NEW FERTILIZER POLICY IN SRI LANKA

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### Abstract

Agriculture is one of the main sources of income in Asian countries, of which agriculture in Sri Lanka is the main source of food. There is widespread concern among the Sri Lankan farming community, industry associations, professionals and agronomists that the Sri Lankan government is restricting and banning the import of fertilizers and agrochemicals as part of a newly announced fertilizer policy. The research hopes to reveal the impact of the new fertilizer policy proposal on farmers' economy and paddy production with special reference to 145 rice farmers in *Rathnapura* district. The usage of organic and chemical fertilizers are major independent variables that affect the production of paddy. Furthermore, the log equation identified after the derived Cobb Douglas production function, depicts that all the variables except the cost of the agricultural machinery used by the farmer have a positive correlation with the farmer's paddy production. The most important finding is that overall paddy production was declined due to the new fertilizer policy. When chemical and organic fertilizers are increased by one unit the yield of the paddy was increased by 0.95 kg and 0.895 kg respectively. The final suggestion of this research is that organic manure should be given to the farmer along with chemical fertilizers until the paddy cultivation is accustomed to organic fertilizer.

**Keywords:** - *Chemical Fertilizer, Organic Fertilizer, Other variable, Paddy farming production*

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## **Introduction**

Agriculture is one of the main sources of income in Asian countries, of which agriculture in Sri Lanka is the main source of food. In Sri Lanka, rice accounts for 25% of total cultivable land and more than two million families are engaged in farming as their main occupation (CBSL, 2019). The new fertilizer policy proposed in Sri Lanka has a direct impact on rice farmers due to the fact that fertilizers are the major ingredient in rice farmers. Also, the extent sown under different water sources and crop failure have been identified as dependent factors affecting the productivity of paddy cultivation. (Razmy & Ahmed, 2005). This study revealed the impact of the new fertilizer policy proposal on paddy farmers' income and productivity with special reference to *Rathnapura* district. Through the survey of literature, the researcher identified six key factors that affect the paddy culture: use of organic & chemical fertilizers, cost of labor, agrochemical expenditure, and land area. The study used the Cobb-Douglas production function to measure the farmer's production under different fertilizer applications. Fertilizer imbalance is one of the major problems in South Asia. With India, Sri Lanka, Bangladesh, and Nepal promoting unbalanced fertilizer application, it has become an environmental problem. The main reason for this is the ignorance of the farmers about the main components required for fertilizer. Moreover, the farmers are not interested in looking into the matter as the government regularly subsidizes fertilizers. (Kishore, Alvi, & Krupnik, 2021). Furthermore, although the government has banned the import of chemical fertilizers, the government has not yet taken appropriate action regarding the production and distribution of organic fertilizers. Nevertheless, Economic authorities discovered that although organic fertilizer is good for the environment and human life, it has a direct impact on rice yields (Shantha, 2011). The end result is a reduction in the contribution of agriculture to GDP, export earnings, import expenditure and food security. The effects of the newly proposed fertilizer policy have not been studied pertaining to *Ratnapura* District, therefore, the main objective of this research was to study the economic consequences of newly proposed fertilizer policy in *Ratnapura* District and thereby fill that research gap.

## **Materials and Methods**

The end result of conducting research depends on the methodology by which the research is implemented. The aim of this research is to analyse the relationship between newly proposed fertilizer policy and paddy farming production in *Rathnapura* district, Sri Lanka. The conceptual Framework indicates the relationship between usage of chemical fertilizers, usage of organic Fertilizer, extend cultivated area, expenditure on chemical, labour

usage and also the technology usage for the paddy farming production on farmers. The data required for this analysis was obtained by conducting a field survey using a structured questionnaire and face to face interviews among 145 rain-fed farmers. The total number of farmers residing in the selected Divisional Secretariats of Ratnapura District; Embilipitiya, Balangoda, Imbulpe, Kuruwita and Weligepola Divisional Secretariats was 14448 (Census, 2013/2014). Based on this, 10% of the farmers were selected from each Divisional Secretariat and the researcher used two stage cluster sampling to select farmers; the identified population was divided into groups and the researcher randomly selected farmers from clusters. The researcher used Cobb-Douglas production function and regression analysis through case study to examine the main objective of the research. Many researchers use the Cobb Douglas production function to measure the productivity of a country's manufacturing sector and supply chain (Haijkova & Hurmic , 2007).

## Results and Discussions

The data analysis primarily focuses on the Cobb Douglas production function and case study to identify how the newly proposed fertilizer policy will affect the Sri Lankan economy, which is the main objective of the study. The researcher developed two production functions as before the policy implementation and after the implementation of fertilizer policy. The Cobb Douglas production function selected by the researcher measures the farmer's average annual yield. Variables include the use of organic and chemical fertilizers, labor costs, cultivated land area, agricultural chemical expenditure and machinery costs.

### *Before Implementation of the New Fertilizer Policy*

$$Y1 = \beta_0 X1^{\beta_1} X3^{\beta_3} X4^{\beta_4} X5^{\beta_5} X6^{\beta_6} \quad Y1 = 8.647 X1^{0.099} X3^{0.062} X4^{0.251} X5^{0.132} X6^{0.614}$$

The efficiency parameter of the equation developed by the researcher is 8.647, which is greater than one, therefore the selected variables reflect a positive effect on the paddy production.

$$\begin{aligned} \ln Y1 &= \ln \beta_0 + \beta_1 \ln X1 + \beta_3 \ln X3 + \beta_4 \ln X4 + \beta_5 \ln X5 + \beta_6 \ln X6 \\ \ln Y1 &= 8.64 \ln + 0.099(0.19) \ln X1 \\ &\quad + 0.062(0.20) \ln X3 - 0.251(0.38) \ln X4 \\ &\quad + 0.132(0.37) \ln X5 + 0.614(0.52) \ln X6 \end{aligned}$$

### *After Implementation of the New Fertilizer Policy*

Second Cobb Douglas production function is as follows;

$$Y1 = \beta_0 X2^{\beta_2} X3^{\beta_3} X4^{\beta_4} X5^{\beta_5} X6^{\beta_6}$$

$$Y1 = 4.81X2^{0.163}X3^{0.029}X4^{-0.088}X5^{0.224}X6^{0.839}$$

The efficiency parameter of the equation developed by the researcher is 4.810, which is greater than one, therefore the selected variables reflect a positive effect on the paddy production

$$\begin{aligned} \ln Y2 &= \ln \beta_0 + \beta_2 \ln X2 + \beta_3 \ln X3 + \beta_4 \ln X4 + \beta_5 \ln X5 + \beta_6 \ln X6 \\ \ln Y1 &= 4.81 \ln + 0.163(0.13) \ln X2 \\ &\quad + 0.029(0.05) \ln X3 - 0.088(0.09) \ln X4 \\ &\quad + 0.224(0.29) \ln X5 + 0.839(0.07) \ln X6 \end{aligned}$$

According to the above equation,  $\beta_0$  depicts constant value of the function. That is, when all other factors are remaining constant, average paddy yield is 4.810. Chemical fertilizer usage (Ln X1), labour cost (Ln X3), agriculture chemical expenditure (Ln X5), and cultivated land area (Ln X6) depict positive relationships for paddy productivity and the machinery cost (Ln X4) represents a negative relationship for paddy yield (kg per acre).

The findings of the case study by the researcher are as follows. Farmers have no knowledge of organic fertilizer production due to the newly proposed Fertilizer Policy. Farmers have not been given adequate knowledge on how to process organic manure by the government, but the farmers have received organic manure provided by the government. It took three and a half months for farmers to prepare organic fertilizer at an average cost of Rs. 2080.00. The newly proposed fertilizer policy has not reduced the amount of land cultivated by farmers but farmers expect their average annual yield and their income to definitely decrease.

### **Conclusion and Recommendation**

Based on the variables selected by the researcher and the primary objective developed by the researcher, the main finding is that the newly proposed fertilizer policy will have a severe impact on the income of the farmers and the annual production of the farmers. The research also concludes that chemical fertilizers can yield much higher yields and incomes, which results in a slight reduction in the yield obtained by using organic fertilizers in the same lands, thereby reducing the income of farmers.

The researcher made the following findings in comparison to the basic assumptions and conclusions were made by the researcher. It was found that the labor used by the farmer contributes significantly to the yield of the farmer. Thus, considering the technology used by the farmer and its cost, it also makes a significant contribution to the average production of the farmer. The researcher found that the farmer's average production increased relative to the agrochemicals used, as well as their income and annual production increased

relative to the amount of land the farmer produced. New technologies can be substituted for paddy cultivation to make the country self-sufficient in paddy cultivation in order to achieve high economic growth. With the new Agent Fertilizer Policy Problems, the researcher's suggestions in determining the appropriate course of action are as follows: instead of accustoming farmers to the use of organic fertilizers all at once, they should gradually become accustomed to organic fertilizers by applying organic fertilizers gradually along with chemical fertilizers.

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