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ISSN: 2513-2504

FERTILIZER POLICY INTERVENTION AND AGRICULTURE SUPPLY CHAIN SUSTAINABILITY: AN INVESTIGATION OF IMPACTS OF THE CHEMICAL FERTILIZER BAN ON FARMERS IN SRI LANKA

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ABSTRACT – There has been an immediate change in fertilizer policy in 2021 in Sri Lanka. Sri Lankan government has limited and banned the import of fertilizers and agrochemicals with the objective of making its agriculture 100% organic. Sri Lanka's leading agricultural economists and experts have indicated that this fertilizer policy reform will lead to a dramatic drop in agriculture production and has adverse impacts on farm incomes and farming families. This research aims to investigate it through a longitudinal analysis of the data to verify whether the fertilizer policy reforms have a negative impact on agricultural productivity and more importantly on the welfare of farmers. The empirical data has been collected from farmers by interviewing them face to face. Results shows that this fertilizer policy change leads to major yield losses and farmers' livelihoods have been highly affected. This study could serve as a starting point for future studies that revolve around upcoming fertilizer policy reforms.

Keywords: Fertilizer policy; Agriculture supply chain; Farmers; Sustainability

1. INTRODUCTION

Agriculture is one of the major sectors of the Sri Lankan economy contributing 7% of the gross domestic product (GDP) in average [1]. More than its contribution to GDP, its contribution to employment is of significant. As per the Sri Lanka Labor Force Survey Annual Report, 2020, twenty seven percent (27%) of the economically active population engages in agricultural production. In Fertilizer subsidies have been provided since 1962 in Sri Lanka under various forms with the exception of the period between 1990-1994. Subsidies have helped in increasing yields and ease the financial burden on farmers [2]. Productivity has doubled despite the limited land resources due to the subsidy [3]. However, there has been an immediate change in the fertilizer policy in 2021 due to fiscal burdens as well as environmental concerns. Sri Lankan government had banned the import of fertilizers and agrochemicals with the objective of making its agriculture 100% organic [4]. It is unrealistic to maintain the same level of agricultural productivity due to the lack of organic fertilizer and the absence of regulatory framework to import organic fertilizers or manufacture them at a large scale inside the country [2]. It was predicted that a majority have to face with large losses in farming income [4]. This was expected to impact rural economies leading to unemployment and disrupting numerous supply chains tied with agriculture supply chain [5].

Sri Lanka's leading agricultural economists have postulated an inverse relationship between the focal fertilizer policy reforms and agricultural productivity [6]. This research aims to investigate it through a longitudinal analysis of the data to verify whether the fertilizer policy reforms have a negative impact on agricultural productivity and have negative effects on welfare of farmers. Hence, this work will inspire further research in this context with improvements on how fertilizer policy level decisions should be taken considering sustainable impacts without disrupting the agriculture supply chain.

2. MATERIALS AND METHODS

A survey was conducted among farmers in Sri Lanka. The surveys were carried out by interviewing small holder paddy farmers. The village of Kiliveddy in Trincomalee district of Sri Lanka has been selected as the study area due to its importance of not majorly affected by any other harvesting factors. This allows a controlled investigation of the effects of the fertilizer policy without any interference by weather, pest or weed related harvest losses. The interview survey was implemented to investigate the difference of agriculture performance with the fertilizer policy change and prior to that. This research has examined the two following time periods.

Period 1: The chemical fertilizer subsidies namely Urea, Triple Super Phosphate (TSP) and Muriate of Potash (MOP) were given by the Agrarian Service Center to farmers and farmers did the paddy cultivation using chemical fertilizers.

Period 2: The removal of chemical fertilizer subsidies and the organic fertilizers have been given to the farmers by the Agrarian Service Center as the chemical fertilizer has been banned with the effect of the new fertilizer policy change.

3. RESULTS AND DISCUSSION

3.1. Agricultural Productivity

The period where chemical fertilizers were given as subsidies and paddy cultivation took place using fertilizers Urea, TSP, and MOP, the yield per acre was more than double compared to the period where the ban was imposed.

Table 1. Productivity and Revenue

	Average number of Paddy bags per acre	Average selling price of a paddy bag (in SL Rs)	Average revenue of a farmer (in SL Rs)
Period 1	38	4500	171000
Period 2	15	7000	105000

3.2. Economic Performance

As seen in Table 1, though the selling price of a paddy bag has increased, the revenue incurred in the second period is lesser due to the much lower yield. Further, in Figure 1, it can be seen that the cost of cultivation in the second period is double the amount in the first period. It resulted in a major loss for farmers during the second period.

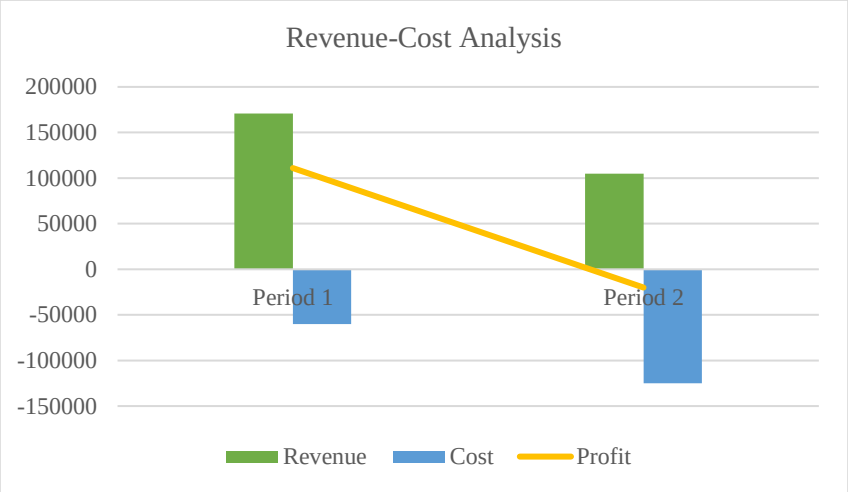

Figure 1. Revenue-Cost Analysis

4. CONCLUSION

In conclusion, this study focused on the economic impact of the fertilizer policy change on paddy farmers. It could be deduced that the fertilizer policy change implemented in 2021, banning the import of chemical fertilizer has resulted in nearly 60% yield losses in the control group we observed. Already the cost of cultivation has skyrocketed because of Sri Lanka's economic turmoil. Amidst this issue, the new policy change and the results of it left the farmers on the losing side. Future studies could be developed by focusing on the social dimension of this policy change and analyzing subjective perceptions such as stress and social support.

ACKNOWLEDGEMENT

The authors wish to acknowledge the financial support given by the Norwegian Program for Capacity Development in Higher Education and Research for Development (NORHED II – Project number 68085), the "Politics and Economic Governance" sub theme, the project "Enhancing Lean Practices in Supply Chains: Digitalization", which is a collaboration between the University of Stavanger (Norway), ITB (Indonesia), and the University of Moratuwa.

REFERENCES

1. A. Demand and E. Trade, "Key Economic Indicators," vol. 2020, no. January 2017, pp. 2020–2021, 2020.
2. C. S. Wijetunga and K. Saito, "Evaluating the Fertilizer Subsidy Reforms in the Rice Production Sector in Sri Lanka : A Simulation Analysis," vol. 7, no. 1, pp. 31–51, 2017.
3. P. L. Pingali, "Green revolution: Impacts, limits, and the path ahead," Proceedings of the National Academy of Sciences of the United States of America, vol. 109, no. 31. pp. 12302–12308, Jul. 31, 2012.
4. J. Weerahewa, "Reforming Fertilizer Import Policies for Sustainable Intensification of Agricultural Systems in Sri Lanka: Is there a Policy Failure?," 2021.
5. W. M. Semasinghe, "Economic and Social Cost of Fertilizer Subsidy on Paddy Farming in Sri Lanka," Int. J. Sci. Res., 2012.
6. Sri Lanka Restricts and Bans the Import of Fertilizers and Agrochemicals Country: Sri Lanka Post: New Delhi," 2021.