

Determinants of Fertilizer Demand: Evidence from Sri Lanka

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Many developing countries are faced with continual challenges in increasing their agricultural production. Concerns over food security have pushed governments to provide input subsidies. Among many input subsidy schemes implemented, subsidies for fertilizer have undoubtedly been a major agricultural intervention for many developing countries. As in many developing countries, subsidy of fertilizer represents a major agricultural policy in Sri Lanka, with the paddy sector being the chief recipient. There are concerns regarding the effectiveness and sustainability of the subsidy due to farmers' overuse of subsidized fertilizer as well as using it for crops other than paddy. Yet, in terms of establishing food security and reducing unemployment, the government is under constant pressure to continue with the subsidy program. Furthermore, the subsidy has become a politically sensitive issue in Sri Lanka, as paddy farmers comprise the majority voter base, a common experience for governments of most developing countries. However, to evaluate the effectiveness of the subsidy scheme implemented by the government of Sri Lanka, a clear understanding of the factors that determine the demand for fertilizer is necessary.

The empirical form of the fertilizer demand function can be depicted as follows:

$$\ln F = \alpha + \beta D_c + \gamma \ln Y + \sum_{i=1}^3 \delta_i \ln W_i + \sum_{j=1}^4 \vartheta_j \ln Z_j + \epsilon \dots\dots\dots(1)$$

In equation (1) F is the fertilizer usage based on the major paddy-producing area, Y is the paddy output, Z1 is the price of rice fertilizer, Z2 is the price of labor, Z3 is the price of seed paddy, W1 is the cost of machinery, W2 is the cost of materials, W3 is the cost of pesticides, Dc1 is the dummy variable to represent the subsidy years (subsidy dummy) and Dc2 is the dummy variable to represent commercial paddy-producing areas (area dummy). The α , β , γ , δ , and ϑ are estimated parameter coefficients and ϵ is the random error.

A panel-data analysis (1990-2011) reveals that demand for fertilizer is negatively affected by the price of fertilizer and the price of seed paddy and positively by the price of labor. The own price elasticity of fertilizer is relatively inelastic which highlight the fact that there isn't a close substitute for chemical fertilizer. Despite strong demand for fertilizer in commercial paddy production, the impact of the subsidy on demand is low. Results indicate that mechanization will prevent overuse of fertilizer and a seed paddy subsidy will ensure self-sufficiency in rice production. Finally, we recommend that the fertilizer subsidy be removed in the long-term in a gradual manner. However, a short-term reduction (within the next 2-3 years) in the fertilizer subsidy can be implemented for non-commercial paddy-producing areas. Removal of the fertilizer subsidy from the commercial paddy producing areas can threaten the self-sufficiency of paddy production of the country. Therefore the removal of the subsidy from these areas has to be done gradually while introducing organic fertilizer as a substitute. Majority of non-commercial areas are working with traditional paddy varieties and these areas can be exposed to organic fertilizer much more easily and remove the fertilizer subsidy in the short run.

Key Words: Fertilizer demand, Fertilizer prices, Fertilizer subsidy, Paddy production

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