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Factors affecting fertilizer use intensity among farm size groups: Perception about fertilizer subsidy policy in Bangladesh

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Abstract

Government of Bangladesh follows universal subsidy policy and implicitly subsidizes fertilizer market to keep price within the purchasing capacity of farmers. The study aims to explore farmer's perceptions about fertilizer subsidy policy and to estimate the influence of determinants that affect farm level fertilizer usage in Bangladesh. Primary data were collected from 299 respondents from three regions of the country who were classified into four groups according to farm size i.e., marginal, small, medium and large¹. The study utilizes both descriptive and econometric analyses to achieve the objectives. With regard to farmer's perception, about 72 percent sampled marginal farmers are unaware that government is providing huge subsidy on the fertilizer market which was mainly due to ineffective extension services. Overall, only 31 percent farmers were satisfied with current policy and market prices which highlights uneven distribution of subsidy benefit. Ordinary least square regression indicates that output prices relative to fertilizer price received by the farmers, off-farm income, labor use and extension services are significantly affecting fertilizer use intensity of different farm size groups. Farmer's financial conditions and their purchasing capability are crucial in deciding about the amount of fertilizer to be used. Based on research findings, it was recommended that policy makers should revise the subsidy policy in order to reduce the distortions of resource allocation and also to secure the welfare of the farmers.

Keywords: Fertilizers, subsidy, universal subsidy policy

Introduction

Subsidies have traditionally played an important part in the pricing of fertilizers in Bangladesh. Fertilizer subsidies were initiated with an overall objective of augmenting farmers' optimum usage of fertilizers technically and boosting agricultural production. Recent years have seen a resurgent interest in large scale fertilizer subsidies in agricultural development. The increasing demand for food, caused by rapid rising population, has been met by improved agricultural productivity since green revolution in Bangladesh. Fertilizer has been a vital input which accounts for about 50 to 60 percent of the total increase in cereal production (Roy and Farid, 2011). Because fertilizer makes such an important contribution to high crop yields, its availability

¹ Marginal farm = operating between 0.02 and 0.2 ha of land; Small farms = operating between 0.2 and 1.0 ha of land; Medium farms = operating between 1.0 and 3.0 ha of land and Large farms = operating above 3.0 ha of land

and use, quality, price and subsidies are all important to the policy makers and also to the researchers as well. Considering the central role of agriculture in the economies of Bangladesh, promoting efficient and effective use of fertilizer through providing subsidies has emerged as an important target of policies in recent decades. Policy makers follow a universal subsidy policy in the country which gives extra benefits for better-off producers who would have used fertilizers anyway (Mujeri *et al.*, 2012). Landholdings are mostly small and often fragmented which limits the capacity of farmers to access quality fertilizers in adequate amounts due to lack of access to credit. For sustainable development of the country’s agricultural sector, access to fertilizer is necessary for these small and marginal land holders. Although majority of farmers are using chemical fertilizers, proportion of farmers experiencing deficit in fertilizer use is higher among these small holder groups than the large farm holders (Alam, 2013). The major hinders behind this differential fertilizer usage of farmers have to be analyzed further for improving their usage. Price might not be the only bottleneck preventing fertilizer use. Till date, no empirical research has been conducted in the country to deal with this issue. Therefore, this research will be useful for the policy makers to reformulate the policies aiming at the end benefit of farmers.

Methodology

The research covers three districts namely, Dinajpur, Mymensingh and Tangail from northern part of Bangladesh considering the farming concentration. The research is conducted at farm household level which is considered as the sampling unit. Primary data were collected through face-to-face interviews with a total of 299 farm households following the household survey method. These households were selected purposively. Different descriptive statistics like, sum, average, percentages, etc. were used to describe the farmer’s perception about subsidy policy. Reasons for farm level fertilizer usage differences among different farm size groups were analyzed using multiple regression model (OLS).

Results and Discussion

Farmer’s perception about fertilizer subsidy policy

Most of the marginal farmers (72.09 percent) were ignorant about the fact that government is giving huge amount of subsidy on fertilizer market just to keep the market price within their purchasing capacity. Instead, they claim that government is giving nothing to them to bear the rising costs of farming. However, majority of medium (about 84 percent) and large farmers (80 percent) know about fertilizer subsidy but they do not know by exactly how much government is subsidizing the market prices (Figure 1).

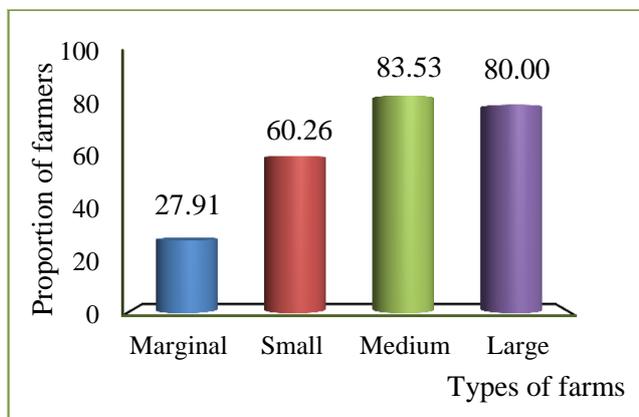


Figure 1: Proportion of farmers knowing about fertilizer subsidy policy

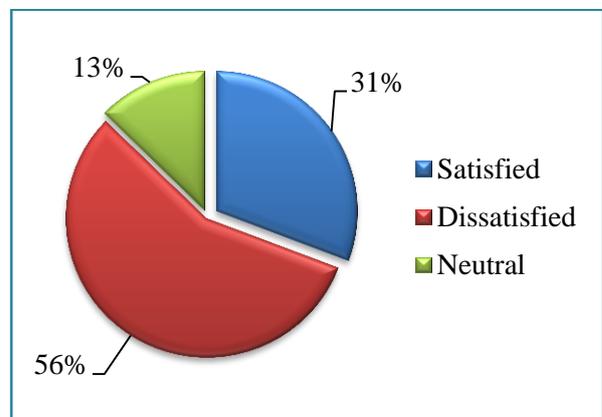


Figure 2: Farmer's satisfaction with fertilizer subsidy policy

This was mainly because of poor and ineffective extension services in the study area. Lack of information also contributed to this situation. Only 31 percent farmers, who knew about fertilizer subsidy policy, were satisfied with current market price and subsidy policy. Most of them are medium and large farmers (Figure 2). These farmers believed that the subsidized rate of fertilizer has lowered their investment on fertilizers which ultimately reduces the production cost. On the other hand, farmers, showing dissatisfaction on the subsidy policy, revealed that this policy creates uneven distribution of subsidy among the farmers. Medium and large farmers benefit more from it as they have more farming land which requires more fertilizer to cultivate.

Factors affecting farm level fertilizer usage

Three regression models were estimated for three farm size groups to measure the influence of different variables for variation in fertilizer use intensity. As revealed from the Table that, farming experience and manure application did not show any significant impact on fertilizer use intensity for all farm categories. Among other variables, off-farm income, labor availability, fertilizer-paddy price ratio and extension services showed significant impact for all categories. With higher off-farm incomes, farmers can afford fertilizers in required amount as these are the sources of liquid cash for the farmers. Marginal farmers always face difficulties in applying adequate amount of fertilizer in the field as they are constrained by financial liquidity. Farming is a labor intensive work and labor cost is increasing day by day in the country which turns the coefficient significant.

Table: Factors affecting farm households' fertilizer use intensity

Variables	Marginal		Small		Medium & large	
	Coeff.	Robust SE	Coeff.	SE	Coeff.	Robust SE
Education (years)	0.204	1.078	0.398**	0.134	0.669**	0.265
Farming experience (years)	-0.258	0.418	0.145	0.532	0.537	0.751
Knowledge of fertilizer subsidy (1= yes)	2.283**	1.201	1.168	4.519	0.321	2.102
Off-farm income (BDT/hh)	0.006***	0.002	0.004***	0.001	0.003***	0.001
Value of agricultural assets (BDT/hh)	0.036	0.120	0.057**	0.023	0.041**	0.011
Availability of labor (man-day/ha)	1.781**	0.813	1.525***	0.566	0.870**	0.340
Manure applied (ton/ha)	-0.015	0.014	-0.012	0.015	-0.019	0.018
Fertilizer-paddy price ratio	-0.442***	0.027	-0.636**	0.134	-0.728**	0.199
Expected product price (BDT/kg)	0.254***	0.135	0.191***	0.038	0.122	0.319
Assessment of soil fertility (1= good or average)	6.070*	2.021	5.771	15.033	-3.402**	1.851
Extension services (1= received)	5.524**	2.235	6.182**	1.906	4.829**	1.701
Credit access (1= yes)	4.216**	1.016	3.939	4.691	2.561	12.832
Constant	53.405	75.975	128.204	81.181	158.524	155.786
Model fit (R ²)	0.72		0.59		0.58	
Adjusted R ²	-		0.53		-	
F-value	22.83***		14.88***		10.17***	

Source: Author's estimation

Note: ***, ** and * represent statistical significance at 1%, 5% and 10% level, respectively;

Coeff. = Coefficients, SE = Standard error

The price ratio has negative but significant impact on fertilizer use showing lowest magnitude for marginal farms. These farmers are more sensitive to price movements in the market especially for paddy. As fertilizer price is almost invariant among the respondents, the estimated coefficient indicates the positive correlation between paddy price and farmer's use intensity of fertilizer.

Extension service is one form of farmer learning and enhances the ability to acquire and use information required for production. A higher level of education facilitates fertilizer application by improving access to information on and knowledge of fertilizer. Agricultural assets increases the liquidity position of a farmer to meet the crises faced during farming. Most of the time, marginal farmers cannot meet their emergencies from agricultural assets as they do not have enough livestock animals and other agricultural machineries due to meagre financial capital. Marginal and small farmer's fertilizer use intensity largely depends on their expectation regarding the future paddy price after harvesting. Marginal farmers are more resource constrained and risk averse. They try to apply their limited resources on comparatively fertile lands which make the coefficient of soil fertility variable significant while this variable has negative impact on medium and large farmer's fertilizer use as they tend to apply more fertilizer on land with poor soil quality as a method for improving the fertility of that land. Marginal farmers need more external financing than other group of farmers as they are more financially constrained.

Conclusions

The research explored that output prices play a noteworthy role, in addition to fertilizer prices, in enhancing the fertilizer usage. Marginal and small farm's fertilizer usage depends mostly on their financial conditions, access to various credit institutions for getting help in case of crisis and services received from extension agents. These groups of farmers are actually in need of the support from government. Government should pay more attention in enhancing the purchasing capability of farmers and reducing the distortions of resource allocation in framing the subsidy policy in the country.

References

- Alam, M. J. (2013). Fertilizer marketing, distribution and pricing in Bangladesh. Paper presented in the International Conference 'Agricultural Transformation in Asia: Policy Options for Food and Nutrition Security', organized by International Food Policy Research Institute (IFPRI) and Cambodia Development Resource Institute, Siem Reap, Cambodia.
- Casselbrant, M. and Stahle, S. L. (2012). Demand and perception of fertilizer among small-holder farmers in Kenya. Independent project in Economics, Faculty of Natural Resources and Agricultural Sciences, Swedish University of Agricultural Sciences, Sweden.
- Eba, N. and Bashargo, G. (2014). Factors affecting adoption of chemical fertilizer by smallholder farmers in Guto Gida District, Oromia Regional State, Ethiopia. *Science, Technology and Arts Research Journal*, 3 (2): 237-244.
- Gujrati, D. N. (2003). Basic econometrics. Fourth edition, McGraw Hill, United States Military Academy, West Point, New York.
- Knepper, E. T. (2002). Factors affecting the use of fertilizer by small and medium sized farming households in Zambia, 1997 to 2000. Master thesis submitted to the Department of Agriculture and Natural Resources, Michigan State University.
- Mujeri, M. K., Shahana, S., Chowdhury, T. T. and Haider, K. T. (2012). Improving the effectiveness, efficiency and sustainability of fertilizer use in South Asia. Briefing Paper, Global Development Network, New Delhi, India.
- Roy, R.N. and Farid, A.T.M. (2011). Bangladesh. *In: Case studies on policies and strategies for sustainable soil fertility and fertilizer management in South Asia*. RAP publication, Food and Agriculture Organization of the United Nations (FAO), Regional Office for Asia and the Pacific, Bangkok.
- Wooldridge, J. M. (2009). Introductory econometrics: A modern approach. South-Western, Cengage Learning Publishing.