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Fertilizer Market in India – An Insight on Demand Determinants

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ABSTRACT

Agriculture is one of the most important sector in the Indian economy. Indian farmers don't get a sufficient supply of chemical fertilizer for agriculture. The main objective of the fertilizer industry is to ensure the supply of primary and secondary nutrients in the required quantities. Fertiliser consumption trends expressed in terms of aggregate quantities consumed and intensity of use (i.e., kg per hectare of total cropped area) reflect both demand and supply decisions. Therefore, it is essential to understand fertiliser situation in the country. The entire requirement of potassic fertilisers is met through imports as India does not have commercially viable sources of potash. Rising share of imports is a matter of concern as world fertiliser markets are highly volatile and imperfect. This study uses causal model because time series data on fertilizer consumption as well as variables influencing fertiliser use are available. The results clearly indicate that increase in area under irrigation, and cropping intensity will accelerate fertiliser consumption in the country.

KEYWORDS : Agriculture, Fertiliser, Fertiliser Consumption

INTRODUCTION

Agriculture is one of the most important sector in the Indian economy. Agriculture contributes more than 18.5 percent of the Gross Domestic Product of the country and around 60 percent people of India are dependent on this sector. Indian agriculture in the majority of the state is looked after by the State Governments rather than the Central Government. Indian farmers don't get a sufficient supply of chemical fertilizer for agriculture. The main objective of the fertilizer industry is to ensure the supply of primary and secondary nutrients in the required quantities. The role of chemical fertilisers for increased agricultural production, in particular in developing countries, is well established. Fertiliser consumption in India has been increasing over the years and today India is one of the largest producer and consumer of fertilisers in the world. By 2009-10, total fertiliser consumption in the country was 26.49 million nutrient tonnes. Importance of fertilisers in yield improvement, which is essential for achieving increased agricultural production, further increases because there is little scope for bringing more area under cultivation as well as majority of Indian soils are deficient in many macro and micro nutrients. The application of essential plant nutrients, particularly major and micronutrients in optimum quantity and right proportion, through correct method and time of application, is the key to increased and sustained crop production. Therefore it is important to understand fertiliser use behavior in the country.

FERTILISER CONSUMPTION TRENDS IN INDIA

Fertiliser consumption trends expressed in terms of aggregate quantities consumed and intensity of use (i.e., kg per hectare of total cropped area) reflect both demand and supply decisions. Therefore, it is essential to understand fertiliser situation in the country. India is the second largest consumer of fertilisers in the world, after China. It accounted for 15.3 per cent of the world's N consumption, 19 per cent of phosphatic (P) and 14.4 per cent of potassic (K) nutrients in 2008 (FAI, 2010). The rapid expansion of irrigation, spread of HYV seeds, introduction of Retention Price Scheme, distribution of fertilisers to farmers at affordable prices, expansion of dealer's network, improvement in fertiliser availability were major reasons for increase in fertiliser consumption till 1990. The fertiliser consumption in India has generally exceeded domestic production in both nitrogenous and phosphatic fertilisers except for few years. The entire requirement of potassic fertilisers is met through imports as India does not have commercially viable sources of potash. During 1950s and 1960s, about two-third of domestic requirement of N fertilisers was met through imports. Rising share of imports is a matter of concern as world fertiliser markets are highly volatile and imperfect. This growth must be sustained, increased, and expanded to achieve levels of productivity needed to significantly reduce poverty in the region. The average intensity of fertiliser use in India at national level is still much lower than in other developing countries but there are many disparities in fertiliser consumption patterns both between and within regions of India.

CONCEPTUAL FRAMEWORK

Specifying a forecasting model is always a challenge, especially the model type and relevant variables. The common models are time series models where the forecast is based on past observations of the variable being forecasted. Causal models and qualitative methods have also been used. This study uses causal model because time series data on fertilizer consumption as well as variables influencing fertiliser use are available. We hypothesized that the demand for fertiliser is a function of prices (specifically price of fertilisers and foodgrains), subsidy, as well as non-price factors . The empirical model for the fertiliser use is specified as follows:

$$F_{it} = b_0 + b_1 HYV_t + b_2 GIA_t + b_3 CI_t + b_4 Pfert_{it} + b_5 Pr+wt + b_6 Credit_t + U_t$$

Where, F_{it} = fertiliser consumption; i = three nutrients N, P and K and total (N+P+K) fertiliser consumption in thousand tonnes; t = year.

Consumption as the dependent variable the following independent variables were hypothesized positively (+), negatively (-), or either negatively or positively (+/-):

HYV = Percentage of area under HYV to gross cropped area (+) ; GIA = Percentage of gross irrigated area to gross cropped area (+) ;CI = Cropping intensity (%) (+) ; P_{fert} = Prices of fertilisers are represented by price of N through Urea, average price of P through DAP and SSP, price of K through MOP and N+P+K price is the price of N, P and K and weighted by their consumption shares ; P_{r+w} = Output price is represented by procurement price of rice and wheat (main users of fertilisers) and weighted by the share of their production ; Credit = Short term production credit per hectare of gross cropped area (Rs.)

Table 1. Estimated regression equation for total fertiliser (N+P+K) use in India

	Coefficient	Standard error 't'	Value	Rank3
Constant	-59,461.75	9,260.82	-6.421	-
HYVs	56.792@	38.521	1.474	5
GIA	437.355***	105.735	3.812	1
CI	426.189***	86.385	4.934	2
Pfert	-603.725***	140.827	-4.287	3
Pr+w	5.420*	2.843	1.906	4
Credit	0.029**	0.012	2.393	6

Adj. R Square	0.994	-	-	-
F	947.3181***	-	-	-
D-W statistics	1.683	-	-	-

*** Significant at one per cent; ** Significant at 5 per cent; * Significant at 10 per cent;

@ Significant at 15 per cent

FERTILISER DEMAND PROJECTIONS

Based on the estimated regression results and the projected values of the explanatory variables, we forecasted the demand for fertiliser in year 2015-16 and 2020-21. The fertiliser requirement forecasts were generated by an estimated model using historical fertiliser consumption data. The total demand for fertilisers (N+P+K) is projected to increase to about 35 million tonnes by 2015-16 and 41.6 million tonnes by 2020-21. The demand for N is expected to increase to about 19.9 million tonnes and 23 million tonnes during the corresponding period. In case of P fertilisers demand is projected at 9.6 in 2015-16 and 11.5 million tonnes in 2020-21. For K fertilisers the demand is projected to reach about 5.5 million tonnes and 7.1 million tonnes by 2015-16 and 2020-21, respectively.

Table 2: Fertiliser product demand forecasts for 2012-13 and 2020-21

	Urea	DAP	SSP	MOP	Complex fertilisers
2012-13	31.3	11.5	3.8	5.4	10.0
2013-14	32.6	12.1	4.0	5.7	10.4
2014-15	33.8	12.6	4.1	6.1	10.9
2015-16	34.8	13.1	4.3	6.4	11.4
2020-21	40.3	15.8	5.2	8.3	13.6

Total demand for fertiliser (N+P+K) in the eastern region is projected to reach a level of about 5.3 million tonnes by the end of 2015-16 and 6.35 million tonnes by 2020-21. In case of North region, total fertiliser demand is expected to be about 10.4 million tonnes in 2015-16, and in South and Western region about 9.1 and 9.8 million tonnes, respectively. The demand for fertilisers is projected to reach about 12.2 million tons in north, 10.9 million tonnes in south and 12.1 million tonnes in western region by 2020-21. But with renewed focus on agricultural development in eastern region we expect the demand for fertiliser to increase at a faster rate in the region. The highest increase in fertiliser consumption is expected in southern region, followed by east, north and western region.

CONCLUSIONS

With the limited land resources, and burden of increasing population, development of new technologies and efficient use of available technologies and inputs will continue to play a vital role in sustaining food security in India. It is expected that India's available land might drop below the current level of about 140 million hectares, if the use of farmland for commercial/non-agricultural purpose is not restricted in the near future. Therefore, the only way to improve food production is to increase crop yields through the scientific use of fertilisers along with other inputs like high yielding variety seeds, irrigation, etc. , with an emphasis on protecting the environment. The Government of India has been consistently pursuing policies conductive to increased availability and consumption of fertilisers in the country. The country had achieved near self-sufficiency in N and P, with the result that India could manage its requirement of these fertilisers from indigenous industry and imports of all fertilisers except K were nominal. By 2020, fertiliser demand in the country is projected to increase to about 41.6 million tonnes to 23 million tonnes of N, 11.5 million tonnes of P and 7.1 million tonnes of K. The projected fertiliser demand in eastern and southern region is expected to grow at a faster rate compared with north and west. To meet the projected demand of about 41.6 million tonnes in 2020, additional capacity will be needed. Overall, a conducive and stable policy environment, availability of raw materials, capital resources, and price incentives will play a critical role in meeting the fertiliser requirements of the country.

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