

Evolution and Emerging Issues in Fertilizer Policies in India

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Paper no: 127 **Received:** 23 November, 2013 **Revised:** 15 February, 2014 **Accepted:** 12 May, 2014

Abstract

Over the years the policy makers in India have adopted a wide range of strategies to ensure supply of fertilizers equitably by providing it at an affordable price. The major fertilizer policies implemented, including the retention price scheme, decontrol of prices, nutrient based pricing, nutrient based subsidy etc., could not ensure a steady increase in the crop response to the fertilizers. Hence it is important to trace the evolution of fertilizer policies and suggest some measures to improve them. Some changes in the policy regime like subsidy intervention from the input side, making the fertilizers available in smaller quantity along with other inputs, preferential taxes and tax holidays on the selected fertilizer products and the raw materials, fertilizer mix customised to the requirements of the soil in different regions, targeted distribution of fertilizers etc. can bring about improvements. Policies like that of the proposed Direct Cash Transfer (DCT) of fertilizer subsidies should be carefully studied for the fraud involved in it before being implemented.

Keywords: Crop response to fertilizers, Fertilizer policy, subsidy, Direct Cash Transfer

The fertilizer use in agriculture is dependent on the crop response to the fertilizers, fertilizer cost, price that the farmers receive for their produce and the availability of fertilizers. The demand for fertilizers increases, when the crop responds well to its application and when output fetches reasonable market price. About 50 to 60 % of the increase in food grain production in India is attributed to the higher use of fertilizers. The impetus for the growth of fertilizer industry was provided by the green revolution, which resulted in an increased consumption of fertilizers after 1960s. The increasing fertilizer consumption and increasing crop yield, thus, mutually promoted each other since the crops responded well to the fertilizers.

The trend in crop response to the fertilizers of late is however not encouraging (Table 1). Even though the growth rate in per hectare fertilizer consumption showed an improvement in the last decade the signals from the growth rate in yield of wheat and total food grains are directed downwards. The crop response to the fertilizer consumption increased between the decades of 1960 and 1980, evident from the increasing growth rates in total food grains yield during the period, after which one can observe a drastic decline.

Table 1: Growth rate (%) in fertilizer consumption (kg per ha gross cropped area) and the yield (kg per ha) of major crops

Year	Growth rate in Fertilizer consumption	Yield					
		Rice	Wheat	Maize	Total cereals	Total pulses	Total food grains
1960-70	23.36	0.82	4.94	1.72	1.97	0.45	1.90
1971-80	9.34	1.65	2.44	1.36	2.52	-0.47	2.24
1981-90	7.48	3.58	3.02	2.52	3.38	1.41	3.18
1991-00	4.26	1.08	1.69	2.54	1.85	0.68	1.87
2001-10	5.86	1.60	1.16	3.00	1.98	1.62	1.81

Source: Authors' calculation based on the Fertilizer statistics 2011-12

The imbalance in the use of fertilizers are said to be responsible for this decreasing trend in crop response to fertilizers. A complex web of policies, to act at different nodes in the fertilizer production and supply chain, have been framed by the government to overcome this imbalance.

An ideal fertilizer policy should promote national fertilizer production and ensure duty and tax free trade between regions. If government resources are inadequate and/or government delivery systems are not the most efficient, it should provide for the improvement of supply and distribution network through Public Private Partnerships. The farmer's access to fertilizers should be improved alongside other complementary inputs as well. Finally the subsidies if any should be targeted and should be designed not only to improve the farmer's access but also rationalize levels of usage and achieve optimal mix of nutrients. With this background a synthesis of different elements of fertilizer policies and the suggestions to improve those are attempted here.

Evolution of fertilizer policies in India

Over the years the policy makers in India have adopted a wide range of strategies to ensure supply of fertilizers equitably by providing it at an affordable price. Sulphate of ammonia was the first among the fertilizers used by the Indian farmers (shortly after the First World War, 1914-18) especially in plantation crops (tea, coffee and rubber due to better crop response). At the beginning of the Second World War (1939-45), India's market for Sulphate of ammonia was only 1 lakh tonnes a year. By-products of the Indian steel industry were able to contribute only 15 to 20 thousand tonnes to this requirement (Henry K 1954). The Bengal Famine (1942-43) compelled the British government to look for food security which resulted in the launch of Grow More Food (GMF) Campaign in 1943.

The war caused difficulties in imports to the extent that during 1940-44, no fertilizer was imported. Thus fertilizer availability became the major constraint in the implementation of GMF campaign (Mohanam T.C.2002). In the year 1943, the government fixed the fertilizer prices on a no-profit-no-loss basis, which is considered as the first major fertilizer policy. The major fertilizer policies implemented in India are presented in the Table 2.

Table 2: Major fertilizer policies in India

Pricing and subsidy policies		Marketing and distribution policies	
1976	Fixed subsidy	1957	Fertilizer control order
1977	Retention price scheme	1966	Liberalization of fertilizer marketing
1991	Decontrol of prices	1973	Fertilizer movement control order
2003	New pricing scheme	1979	Equated freight scheme
2008	Nutrient based pricing	1980	Block delivery scheme
2010	Nutrient based subsidy	2012	Reimbursement of freight for P and K
Production and import policies		Policies to ensure nutrient balance	
1992, 1993	Decanalisation of imports	2005	Task force on balanced use of fertilizers
2008	New investment in urea sector (indigenous and abroad)	2008	Guidelines for production and import of customised fertilizers

Source: Fertilizer statistics 2011-12

After a hype in consumption of fertilizers during green revolution, the fertilizer were becoming unaffordable to the Indian farmers due to the devaluation of rupee in 1966 and the oil price shock in the 1973. These pushed the fertilizer prices upwards and pulled the investments downwards, as a result of which the expansion of production capacity also faced a setback.

In order to protect the industry and ensure low farm gate prices for fertilizers, the central government implemented Retention Price Scheme in 1977. This protectionist policy ensured each production unit a 12 % post tax return on net worth regardless of the age, location, technology and cost of production. The government intervention continued in the 1980s through fixed subsidies, equated freight scheme and block delivery scheme.

The policies of the 1970s and 1980s had raised the subsidy burden of the government. Cuts in the fertilizer subsidies were a part of the New Economic Policy instituted in India since 1991. To meet this end, the prices of Ammonium sulphate, Calcium ammonium nitrate and Ammonium chloride were decontrolled with effect from 25th July 1991. The fertilizer prices were also increased by 40 % in the same month. Owing to the protests from the farmers, government tried a Dual Pricing Scheme, by which the marginal farmers were exempted from the hiked prices.

Attempts to liberalise the fertilizer industry continued with the decontrol of the prices, movement and distribution of all the phosphatic and potassic fertilizers. This reform increased the fertilizer (P and K) prices and decreased the consumption. The nitrogen fertilizers, however, still remained the holy grail and enjoyed the benefits of Retention Price Scheme. This led to a wide disparity in the composition of fertilizer use in the country.

Looking forward

In India, a wide range of fertilizer policies have been tried by the government from 1940s onwards. The fertilizer policies of the government implemented from the beginning of the 21st century are however attached with the objectives to remove the aberrations and deficiencies that had crept into the policy regime. These, aim to improve the production capacities of the plants along with ensuring feed stocks. The improvement in nutrient balance of the soil is another area which is given high stress. The government also attempt to widen the fertilizer availability and reduce the subsidy burden. Broadly the components of a holistic fertilizer policy can be categorised into the following groups:

Pricing and subsidy policies

The subsidy burden of the government of India (due to fertilizers) has been rising steadily in spite of the attempts to restrain it with reform options. The existing policy regime, that subsidises the output, does not oblige the fertilizer manufacturers to improve. It rather provides subsidy to the manufacturers without considering their efficiency, feedstock and capacity utilization. This is the reason for considering the fertilizer industry as a lucrative one, even though the profit generated here are less compared to other core industries (Table 3).

Table 3: Profit comparison between fertilizer industry and other core industries in India (2009-10)

Company	Business Sector	Net worth (₹ crore)	Net profit (₹ crore)	Return on net worth (%)
GAIL (India) Ltd.	Natural Gas	17810	3140	17.6
ONGC	Oil / Natural Gas/ Petroleum products	86441	16768	19.4
SAIL	Steel	1677	466	27.8
NTPC	Power	62437	8728	14
Ambuja Cement	Cement	6471	1217	18.8
Coal India Ltd.	Coal	25795	9622	37.3
Rashtriya Chemicals & Fertilizers Ltd.	Fertilizer	1837	235	12.8
Indian Farmers Fertilizers Coop Ltd.	Fertilizer	4271	401	9.4
Gujarat State Fertilizers and Chemicals Ltd.	Fertilizer	2144	254	11.8

Source: Planning commission 2012

The government of India, in its quest to improve the efficiency of the fertilizer plants implemented the stage III of the New Pricing Scheme in 2006. This policy seeks to convert the non-gas based units to gas-based and encourage investments in joint venture projects abroad. Most of the urea plants now use natural gas, which is the most efficient one, as feed stock. For the NPS stage III to give the intended results, the availability of natural gas to these newly converted (or to be converted) plants has to be ensured. The support of the government towards this has been however disappointing. The allocation of natural gas to the fertilizer industry has not increased proportionately to the increase in its net production (Figure 1). Thus there exists a contradiction in the policy of government, in making it compulsory to convert the naphtha based and other fertilizer plants to gas based on one side, and not providing the feed stock to these in the required quantity on the other side.

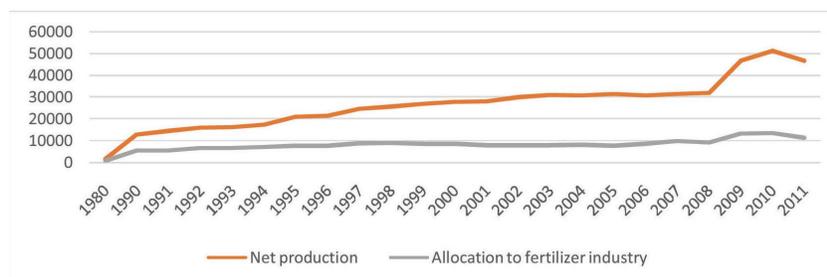


Fig. 1: Net production and allocation of natural gas to fertilizer industry (Million cubic meters)

The state of things in the phosphatic fertilizer industries is much more complicated as India is largely dependent on the imports of rock phosphate (7.5 million tonnes in 2011) and phosphoric acid (1.9 million tonnes in 2011) for the production of phosphatic fertilizers. The price volatility of feed stock and raw materials that exist in international market will thus have significant impact on the Indian fertilizer industry.

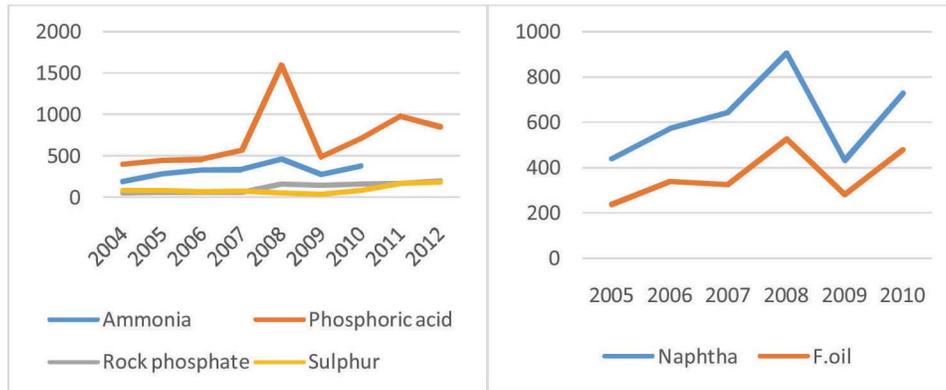


Fig. 2: Price volatility of imported feed stocks and raw materials in fertilizer industry

Since these many issues exist in the input front, government can think of a policy change involving a shift in the subsidies from the final output to the inputs. The fertilizer manufacturers will then be bound to improve the efficiency of their plants when subsidies to procure raw materials and feed stocks are given to them. The increased efficiency will lead to higher production, then to higher availability and ultimately to the price reduction of final fertilizer produce.

Marketing and distribution policies

The major portion of the fertilizer market in India is situated in rural area which makes it difficult to tap. The marketing and distribution policies are implemented to ensure the equity of the fertilizer use by region and farmer categories. The marketing and distribution of fertilizers to the farmers is done by about 269175 fertilizer sale points situated all over India. The sale points, 77 % of which are under private traders and 23 % under cooperative and other institutional agencies, distribute 60 million tonnes of fertilizers every year. For this, the rail, road and sea transport contribute effectively through logistic support.

The distribution network and the logistics for fertilizers are thus in a good shape in India. The improvement if any could be on the product which is distributed. One difficulty that the Indian farmers face is the non-availability of fertilizers in customised packs. The fertilizers should be made available in small packs, which the marginal and small farmers will find useful. A policy in this line is having great implications in future since fixed subsidy floating price is implemented.

It should provide the small and marginal farmers in India, the customized quantity of fertilizers, high yielding seeds of the crops suitable to the area, and customized quantity of other inputs like plant protection chemicals along with the directions for use of all these inputs. The existing distribution network for fertilizers and other inputs can be utilized for this. The retailers should however perform an improved role (of an extension agent) in advising the farmers about the benefits of, and how to use, the starter packs.

Policies for production and import

The steadily increasing demand for fertilizers in India, which is projected to a level of 39603 thousand tonnes by the year 2024-25, can be met only if the production and imports are carefully monitored. The drastically increasing demand for urea contribute heavily to this projected total fertilizer demand (Figure 3). Primarily because there exist limitations in availability of raw materials and feedstock required for production, and secondly because the imports depend heavily on the evolving international trade regulations. The policy of self-sufficiency may not benefit India due to raw material limitations. The existing policies affecting fertilizer production by different manufacturers are successful ensuring a fair bit of competition as evident from the values of the Top4 concentration ratio. The CR4 values in urea and DAP production were 56.77 % and 75.70% which falls under the medium concentration category.

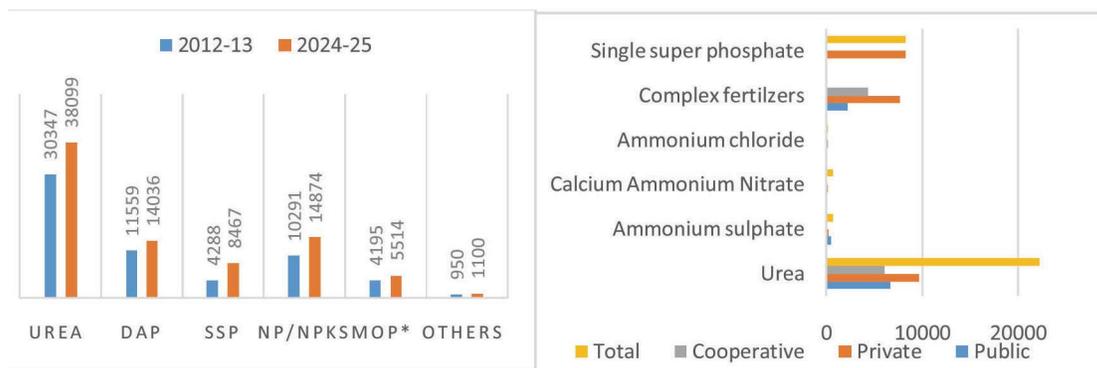


Fig. 3: All India demand projections (2024-25) and sector wise capacity (2012) for fertilizer products ('000 tonnes)

The options available in policies related to production is thus limited to creating new capacities and capacity expansion in public, private and cooperative sectors. The development of private sector production plants may be given impetus as these plants are better in terms of efficiency. Modernisation of existing units, changeover to more efficient feed stocks, joint ventures and long term off take arrangements with foreign countries can also add to these efforts.

Table 4: Concentration in urea and DAP production

Name of the plant	Share in urea production (%)	Name of the plant	Share in DAP production (%)
CFCL	9.76	Coromandel International Ltd	9.26
IFFCO	20.40	GSFC	13.52
KRIBHCO	11.15	IFFCO	37.75
NFL	15.46	Paradeep Phosphates Ltd	15.17
Top 4 Concentration Ratio (CR4)	56.77	Top 4 Concentration Ratio (CR4)	75.70

Source: Authors' calculation based on the Fertilizer statistics 2011-12

Domestic tax and international tariff and non-tariff policies

The fertilizers in India are available at different prices in different states due to the tax policies of the government. Various taxes like sales tax, Value Added Tax (VAT), and excise duty are imposed on the fertilizers as well as on the raw materials for its manufacture. Other than these some of the states impose entry tax on inputs. The rate of this tax is 4 to 8.8 % in Punjab, whereas it is 2, 1 and 5 % respectively in Haryana, Madhya Pradesh and Uttar Pradesh. Similarly VAT on inputs in Haryana is 4.20 % and in Madhya Pradesh it is 12.50 %. These cannot be transferred to the final product since the MRP of the fertilizers is decided by the government. Any delay or error in the reimbursement scheme through which manufacturers claim the paid tax will render their condition worst.

A recent development in the tax regime is the decision of the Government of India to implement Goods and services Tax (GST). GST aims to promote the cooperative federalism by the interaction of two of its components: Central GST and State GST levied separately on imports of goods and services. Input tax credit (ITC) will be allowed on goods and services and capital goods. CGST and SGST shall be credited to the accounts of the Centre and the States separately. The matter of concern, however, is the proposed ousting of natural gas from GST. If natural gas is kept outside the GST, input credit on natural gas cannot be realised, and this may lead to higher cost for fertilizers, especially urea.

Considering the dynamics of demand–supply gap in Indian fertilizer sector, the government cannot refrain from immediate improvements in the taxation policies. Thus policies for preferential taxes and tax holidays on the selected fertilizer products and the raw materials can be of great value to the fertilizer manufacturers and importers.

Policies for technology up gradation

In technology terms, the Indian fertilizer industry is considered to be comparable to the world standards. Still, there exist several plants which use inefficient feed stocks for the manufacturing of fertilizers. The policy for technology upgradation has to be carefully implemented since the industry will have to face challenges from various fronts in the future. It has to promote sustainable development by investing in technologies that are water, energy, and feedstock efficient to meet the expectations of the country. The future technologies of the industry should be safe for environment. It should also keep a balance between economic needs and financial constraints along with impacting the growth. For this R&D in the fertilizer sector has to be strengthened and plants of high capacities have to be implemented.

The availability of feed stocks and raw materials will be the major concern for Indian fertilizer industry in future. It can look for feed stock alternatives like Coal bed methane, Coal gasification technologies and Gas hydrates for urea production. The Coal Bed Methane (CBM) is similar to natural gas and it contains more than 90% methane. The CBM gas can be also utilized as a feed stock for the Ammonia or Urea fertilizer complex. Coal gasification is another viable option for urea production. The abundance of coal and lignite in India and the availability of technologies to reduce the ash content underline its relevance for Indian industry. Though gas hydrates is the other viable future fuel, the technology to exploit the gas hydrate reserves are yet to be developed.

Energy consumption is another area where care needs to be taken. Reduction in energy consumption levels can be achieved by installing plants of very high capacities (as in China) and by using better Catalysts. For these, Research and Development (R&D) in the fertilizer sector needs to be strengthened. At present, fifteen fertilizer producers are involved in some kind of R&D activities. Almost all of the R&D centres in fertilizer companies are recognized as in-house R&D centres by Department of Scientific and Industrial Research, Ministry of Science and Technology (DSIR). The Department of Fertilizers (DOF) also sponsors R&D projects. The public funded institutions in the country are not involved much in the R&D activities for fertilizers in the country, which is a matter of concern.

Policies to ensure nutrient balance in the soil

The crop response to fertilizers has decreased over the years in India due to indiscriminate use of fertilizers, without caring for the nutrient requirements of the soil. The Indian farmers’ affection towards nitrogenous fertilizers compared to phosphatic and potassic fertilizers is one reason for the nutrient imbalance (Table 5). The rate of application of fertilizers by the farmers is not based on the recommendations, but on the factors like price, availability and subsidy. Region wise consumption of nutrients given in the Fig. 4: reiterate the ignorance towards phosphatic and potassic fertilizers.

Table 5. All India consumption ratios of N and P₂O₅ in relation to K₂O

Year	N	P ₂ O ₅	K ₂ O
1951	7.9	0.9	1
1961	8.9	2.2	1
1971	6	1.9	1
1981	6	1.9	1
1991	5.9	2.4	1
2001	6.8	2.6	1
2011	6.7	3.1	1

Source: Fertilizer Association of India 2012

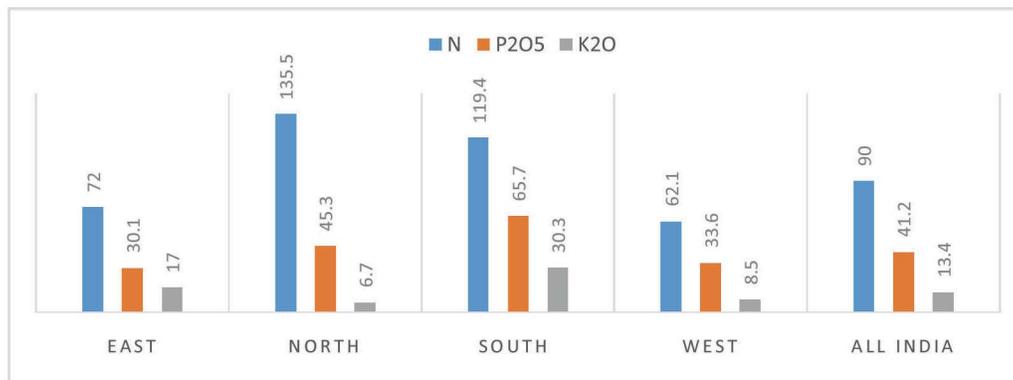


Fig. 4: Region wise consumption of plant nutrients (kg/ha) per unit of gross cropped area (2011-12)

Nutrient balance in the soil is a dynamic concept. The requirements of the soil have to be understood first by soil testing and then the right quantity of fertilizer mix should be applied at the right time. The nutrient application should also be tailored to the crop needs. At present, there are about 715 soil testing laboratories in India, which are under various government departments. These labs, however, are not able to create any significant impact in improving the nutrient balance in the soils of the country. A policy that conceptualise and use separate fertilizer mix for various states and regions according to the requirements of the soil is the need of the hour. The network of soil testing laboratories has to be strengthened and the use of organic, customized and bio fertilizers should be promoted.

Direct transfer of fertilizer subsidies to the beneficiaries

The fiscal burden on the government due to fertilizer subsidies have been increasing over the years. The government, in order to ensure greater efficiency, cost effectiveness and better delivery of fertilizers constituted a committee in February 2011 under the Chairmanship of Mr. Nandan Nilekani, Chairman, Unique Identification Authority of India (UIDAI). The committee recommended to provide fertilizer subsidies through Direct Cash Transfer (DCT) in a phased manner

Proposed scheme of operation of DCT for fertilizers

The DCT for fertilizer has been proposed to be implemented in three phases. In phase I, a comprehensive digital map of the fertilizer supply chain is to be produced. This will be done through the creation of an online database to monitor the movement of fertilizers from the plant all the way to the retailer. In the second phase, the cash transfer is to be provided directly to the retailers based on receipt of fertilizers from the wholesaler. Finally subsidy is directly provided to the farmers as a cash transfer to purchase fertilizer in the third phase, which hinges on the coverage of Aadhaar cards.

Issues in implementation of the DCT for fertilizers

The DCT for fertilizer faces extremely difficult problems of how the beneficiaries will be identified. Most of the criteria that can be thought of for identification (such as BPL cards, farmer cards with landholding, cropping patterns) are fraught with problems. Apart from misreporting, the changes over

time in these characteristics are likely to make targeting extremely difficult. The Aadhar based system may help plug the leakage due to duplicate or fake identities but might not identify the beneficiary. Since a nationwide database of all retailers will be prepared in phase I, retailers should be relatively easy to identify in phase II. The main complexity arises here since the payment is to be made based on the stocks held by the retailer rather than their sales. This sidesteps the issue of identification of the ultimate beneficiary i.e. the farmer. At the end of phase II only the total amount of sales will be recorded in a central database and not who gets the fertiliser in the end.

Further, a seamless transfer system requires well-functioning banks. The banking services in India still cover only a small section of population. The total number of bank branches in India is 1,00,277, among them only 36,972 are rural. Also, facilities like Automated Teller Machines (ATMs) are lacking in the rural areas (Figure 5). Above all, the illiterate farmers will find it difficult to understand the snags in the system and might not be able to avail of redressal services if transfers are not made accurately or on time.

Further, the cash transfer for fertilizers has a direct interface with the market and incentives for adequate and timely supply at different levels of the supply chain need to be preserved. There can be hold up problems as markets at wholesale or retail level get consolidated and demand for fertilizers rises.



Fig. 5: Households in rural and urban areas availing banking services (per cent) and the spread of ATMs in India (per cent)

As the cash transfer system is expected to replace (or at least phase out) the current system of subsidies, the evolution of market prices will have a significant bearing on the effectiveness of this system. Without indexation the purchasing power for the farmers could get eroded. The costs of having a system which has perfect indexation could be quite high especially given that there are several different fertilizers which are decontrolled. The prices of the decontrolled domestic fertilizers will have greater synchronisation with the international fertilizer prices (Figure 6). Indexation to prices could thus turn out to be extremely difficult given the volatility in fertilizer prices.

The system of cash transfer for fertilizers intends to improve access of farmers. Still, the system should take into account the issues of optimal use of fertilizers, right mix of fertilizers and also organic farming. The overhaul in the subsidy system should be used as an opportunity to rationalise usage of fertilizers and should also create demand pull pressures to regulate fertilizer usage.

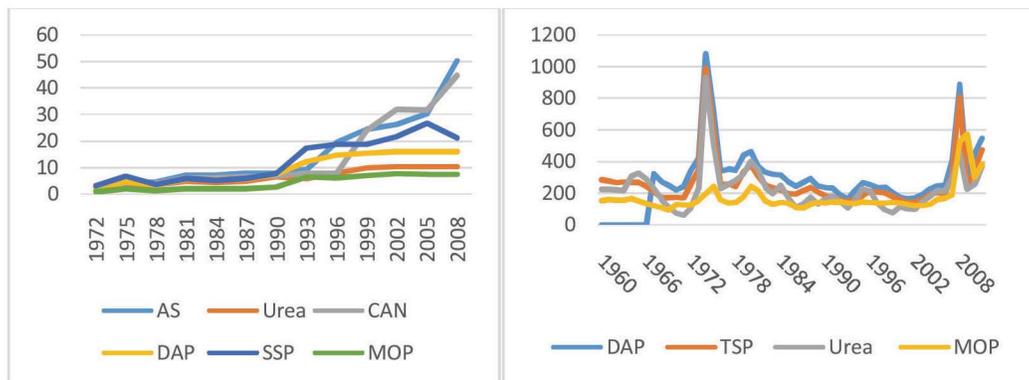


Fig. 6: MRP of fertilizers in terms of nutrients (₹/kg) in India and international prices (US\$/mt) of fertilizers (in constant 2005 US \$)

Conclusion

Several policies have been attempted by the government of India in the fertilizer sector starting from the 1940s. These timely and effective policies have made India one among the largest producers and consumers of fertilizer in the world. In future, some changes like subsidy intervention from the input side may improve the policy regime, since the availability of the feed stocks and raw materials are the major constraint faced by the industry. A policy which makes the fertilizers available in smaller quantity along with other inputs like high yielding seeds, and plant protection chemicals may better the small and marginal farmers in India. Creating new capacity and modernisation of existing units, changeover to more efficient feed stocks, joint ventures and long term off take arrangements with foreign countries can help in ensuring the availability of fertilizers. Policies of preferential taxes and tax holidays on the selected fertilizer products and the raw materials can be thought of to improve the status of fertilizer manufacturers and importers. The future technologies of the industry should be safe for environment for which R&D in the fertilizer sector has to be strengthened. A policy to provide fertilizer mix customised to the requirements of the soil in different regions will help to ensure the nutrient balance in Indian soils. Finally, fertilizer subsidies if distributed should be targeted. The problems and fraud involved in the mechanism of Direct Cash Transfer of fertilizer subsidy should be addressed properly before it is being implemented.

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