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Abstract

While fertilizer subsidy has probably been one of the most hotly debated issues in the country over the past two decades but debate reached a new height following a recommendation by the Prime Minister's Economic Advisory Council (PMEAC) in its latest Economic Outlook 2012/13 that "subsidies are progressively losing their relevance and are becoming unbearable fiscal burden so a beginning can be made in dismantling fertilizer subsidy". In view of this, the present paper analyses the fertilizer subsidy from two different aspects, both important for policy planners in the country. First, who is benefiting from the current system of fertilizer subsidies and secondly what is the impact of recent policy changes on fertilizer consumption and prices and proposed removal of fertilizer subsidies on farm income. Fertilizer subsidies account for a significant share of the total support to agriculture and have increased by about 560 per cent between triennium ending (TE) 2003-04 and TE2010-11 mainly due to steep increase in international prices of fertilizers and feedstocks/raw materials, increased consumption and unchanged farm gate prices. The findings suggest that all farmers benefit from subsidies, however, small and marginal farmers receive about 53 per cent of the subsidy, higher than their share in total cropped area (44.3%). The partial decontrol of fertilizer sector which has led to unprecedented increase in prices of phosphatic (P) and potassic (K) fertilizers (about 160% in DAP and 280% in MOP) and relatively cheaper nitrogenous (N) fertilizers, led to sharp fall in consumption of P and K fertilizers, thereby imbalance in use of N, P and K nutrients. Moreover, dependence on expensive imports has significantly increased during the last 6-7 years. The results show that removal of fertilizer subsidy will make farming unprofitable in many states and therefore removal of fertilizer subsidies will not be in the interest of farming community, particularly, small and marginal farmers and less developed states/regions. The paper argues for containing subsidy but without hurting interest of millions of small and marginal farmers including tenant cultivators. As radical reforms like dismantling of subsidy and deregulation of fertilizer industry in one go are neither economically desirable nor politically feasible, a case can be made for continuation of fertilizer subsidy with better targeting and rationing to achieve socio-economic objectives of national food security, poverty alleviation and farmers' welfare as well as subsidy reduction.

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Introduction

Increased fertilizer consumption has been instrumental in the success of green revolution and helped improve agricultural productivity and farm incomes in the country. The subsidies have played an important role in promoting use of fertilizers and contributed to significant increases in yields (Morris et. al., 2007) although their contribution to agricultural growth and poverty reduction has declined steadily over time (Fan et. al., 2007). The fertilizer subsidies have been questioned in the recent years due to their declining contribution to productivity improvement, inefficiency, inequity and the government's expanding budget deficit.

Fertilizer subsidies in India have increased significantly during the last decade. In 2008-09, India spent nearly 60 per cent of total subsidies on fertilizers and fertilizer subsidy, at Rs. 99494.7 crore, was more than 3.5 times the total public investment (Rs. 28035 crore at current prices) in agriculture (Gol, 2012). Fertilizer subsidy has become one of the largest spending items of the sector. As in many developing countries, use of agricultural subsidies is highly political and very sensitive issue in the country, as it is linked to the food security, livelihood and welfare issues of millions of small and marginal farmers. The government continues to allocate a significant share of budget to agricultural subsidies. The 2012-13 budget allocated Rs. 190015 crore to subsidise food, fertilizers, petroleum, credit, pulses, edible oils, etc., of which the first two accounted for bulk of resources (about 72 per cent). However, these subsidies have been widely criticized as being inequitable, inefficient and leading to fiscal burden. The Prime Minister's Economic Advisory Council (PMEAC) in its latest Economic Outlook 2012/13 argued for "dismantling of fertilizer subsidy because agricultural input subsidies are progressively losing their relevance, becoming an unbearable fiscal burden and their role in contribution to productivity enhancement is fast disappearing" (PMEAC, 2012).

In this paper we seek to analyse the fertilizer subsidies from two different aspects, both important for policy planners in the country. First, who is benefiting from the current system

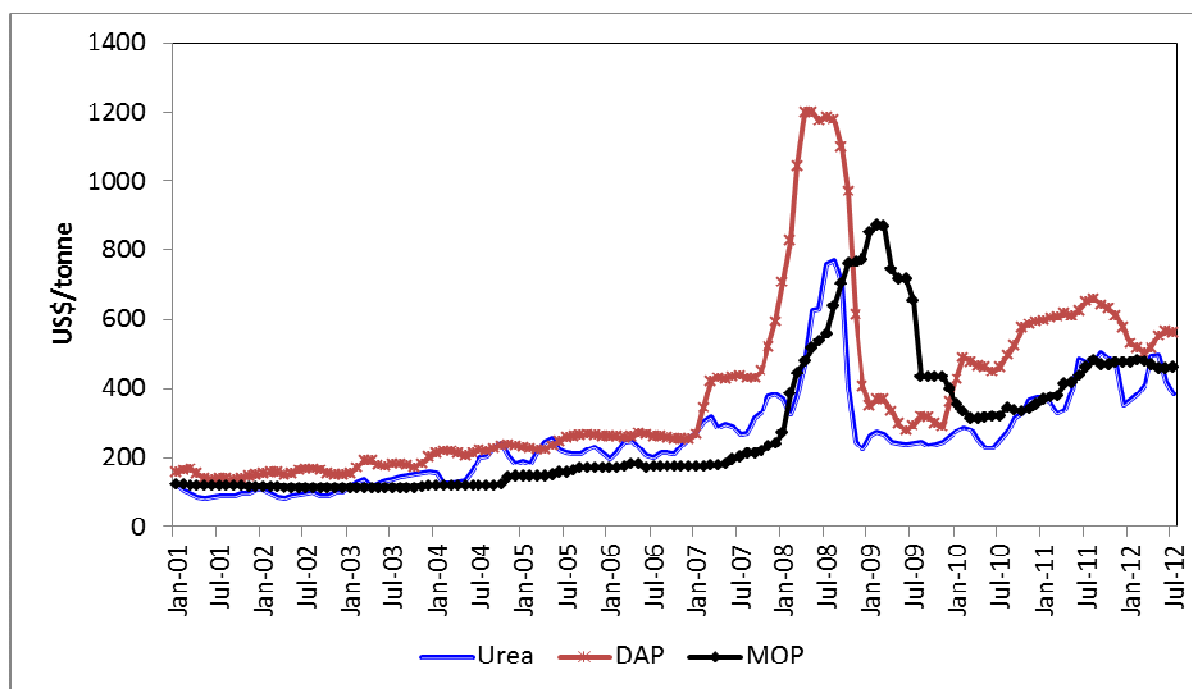
of fertilizer subsidies and secondly we estimate the impact of recent policy changes and proposed removal of fertilizer subsidies on fertilizer prices, consumption and farm income. Since agriculture has played and will continue to play a very important role in the Indian economy and production as well as prices of food commodities is a key factor for policy makers, our analysis looks beyond pure economic efficiency criterion and include long-term goals of food security, self-sufficiency and livelihood issues.

II. Fertilizer Subsidies: The Context

The fertilizer subsidy seeks to promote fertilizer consumption, increase agricultural productivity and maintain national food security. However, there has been a growing concern about steep increase in the subsidy during last few years and several factors have contributed to higher subsidy bill but more important being steady increase in consumption, sharp increase in prices of imported fertilizers, feedstock and intermediaries, and more importantly unchanged farm gate prices of fertilizers for a long time. The trends in international prices of fertilizers are given in Figure 1. Between 2007 and 2008, prices of all three major Fertilizers, urea, diammonium phosphate (DAP) and muriate of potash (MOP) increased manifold. For example urea price increased from US\$309 per tonne in 2007 to US\$493 in 2008 (a peak of US\$770/tonne in August 2008), while price of DAP increased from US\$433 per tonne to US\$967 per tonne (peak of US\$1200/tonne in April-May 2008) during the same period. The MOP price, which was about US\$200 per tonne in 2007 increased to US\$630 per tonne in 2009 and reached a level of about US\$875 per tonne in February-March 2008. On the other hand, fertilizer retail prices remained constant between March 2003 and March 2010 (FAI, 2012). Similarly, prices of fertilizer raw materials and feedstock such as ammonia, sulphur, rock phosphate and phosphoric acid also witnessed a steep increase during the last five years. The price of phosphoric acid, which is the main feedstock for di-ammonium phosphate (DAP), increased from US\$461 per tonne in 2006-07 to US\$1480 per tonne in 2008-09 (more than 220% increase) and price of rock phosphate increased from US\$79 per tonne in 2006-07 to US\$377 per tonne in 2008-09 (Figure 2). Ammonia and sulphur prices also increased manifold during the last five years. Since the country is fully dependent on imports for meeting the requirement of potash (MOP) and deficient in phosphatic resources with nearly 90 per cent requirement being met through

import of finished phosphatic fertilizers or phosphatic raw materials/intermediates for indigenous production of phosphatic fertilizers, international prices have direct impact on domestic prices and consequently subsidy.

Figure 1: Trends in international prices (nominal) of fertilizers¹: January 2001 to July 2012



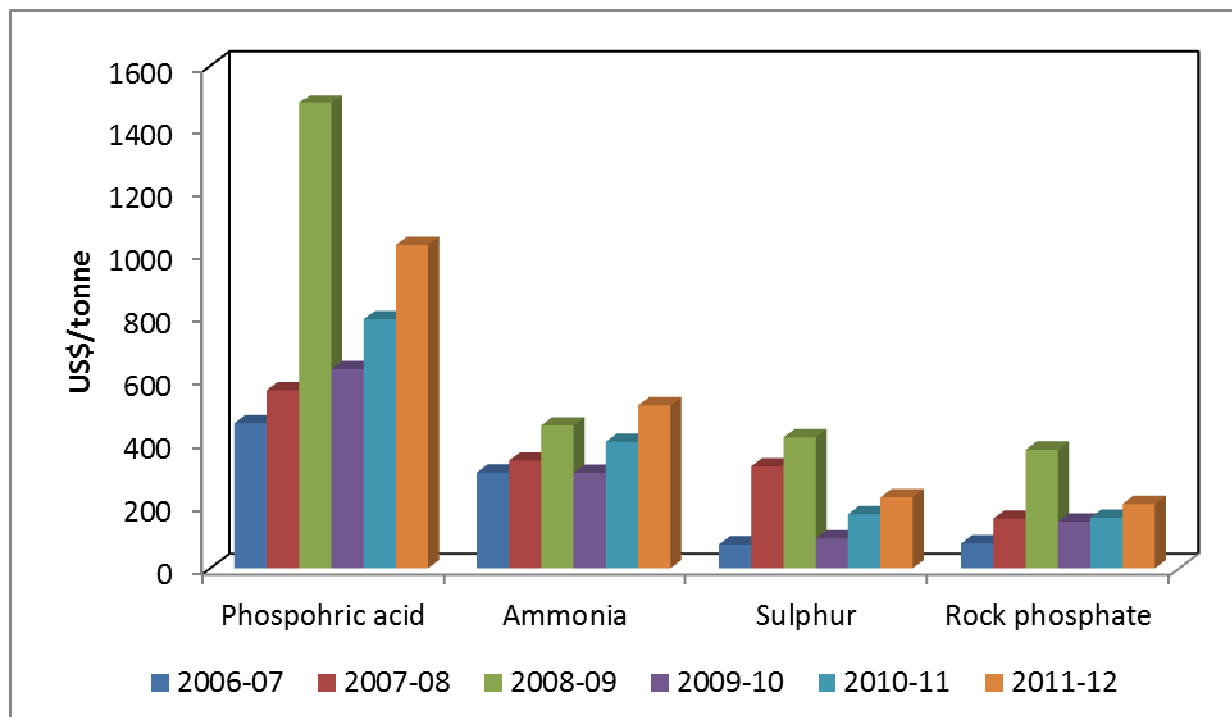
Source: World Bank (2012)

The steep increase in cost of inputs to fertilizer production, high import prices of fertilizers and constant farm gate prices led to substantial increase in the subsidy. Public spending on fertilizer subsidy increased significantly during the last decade. The fertilizer subsidy increased by about 560 per cent between triennium ending (TE) 2003-04 and TE2010-11, from Rs. 11432 crore to Rs. 75246 crore (Table 1). The share of fertilizer subsidy in total subsidies varied from about 25 per cent in 2002-03 to about 59 per cent in 2008-09. The fertilizer subsidy reached a peak of Rs. 99495 crore in 2008-09 and then witnessed a declining trend. After two consecutive annual decreases in 2009-10 and 2010-11, fertilizer subsidy started increasing mainly due to rise in world prices of fertilizers and fertilizer prices in 2011 averaged 43 per cent higher than 2010 and are expected to rise in 2012 in response to high energy prices and strong worldwide fertilizer demand driven by rising crop prices

¹ DAP (diammonium phosphate), standard size, bulk, spot, f.o.b. US Gulf; MOP (muriate of potash), standard grade, spot, f.o.b. Vancouver and Urea, bulk, spot, f.o.b. Black Sea

(World Bank, 2012a and Agriculture and Agri-Food Canada, 2012). As fertilizer subsidy is one of the largest components of agricultural subsidies, it is important to understand who captures the benefits of these subsidies?

Figure 2: Trends in nominal prices (CFR) of fertilizer feedstocks/raw materials/intermediates: 2006-07 to 2011-12



Source: GOI (2012a) and PIB (2012)

III. Who Benefits from Fertilizer Subsidies in India?

The incidence of benefits from fertilizer subsidy is analysed using two All India Reports on Input Survey by Agricultural Census Division of Ministry of Agriculture, Government of India – Input Survey Report 1996-97 and 2006-07. It is evident from Table 2 that small and marginal farmers on an average use more fertilizers per hectare of gross cropped area. In 2006-07, the marginal farmers (140 kg/ha) used twice as much fertilizer per hectare than large farmers (68 kg/ha). In case of small farmers, average fertilizer consumption was about 90 per cent higher than large farmers. Between 1996-97 and 2006-07, average fertilizer use recorded the highest increase (55.4%) in case of small farmers, followed by semi-medium (43.9%) and the lowest (32.2%) on large farms. The data on fertilizer consumption show that small and marginal farmers use more fertilizers compared to large farmers.

Table 1: Trends in fertilizer subsidy (Rs. crore) in India: 2001-02 to 2012-13

Period	Concession on decontrolled fertilizers		Subsidy on urea		Total fertilizer subsidy	Share(%) in total subsidies ²
	Indigenous P&K	Imported P&K	Indigenous	Imported		
2001-02	3760	744	8044	148	12695	40.4
2002-03	2488	737	7799	1.2	11016	25.3
2003-04	2606	4720	8521	0.8	11848	26.7
2004-05	3977	1165	10243	742	16128	34.6
2005-06	4499	2097	10653	2141	19390	38.8
2006-07	6648	3650	12650	5071	28019	42.0
2007-08 ³	10334	32598	1640	9935	43319	43.7
2008-09	32957	32598	20969	12971	99495	59.1
2009-10	16000	23452	17580	7000	64033	43.3
2010-11	40766 ⁴		15081	6454	62301	35.9
2011-12 (RE)	34208		19108	13833	67199	31.1

Source: Gol (2011; PIB (2012a)) and Gol (2012)

Small and marginal farmers, who accounted for 82.6 per cent of total operational holdings in 2006-07, had 44.3 per cent share in gross cropped area (Table 3). On the other hand, the proportion of large farmers in total holdings was one per cent and their share in gross cropped area was more than 10 per cent. However, it is interesting to note that share of small and marginal farmers in total fertilizer consumption was much higher (52.9%) than their share in gross cropped area (42.8%). While in case of large farmers, share in fertilizer consumption was lower (6.1%) than their share in total cropped area (10.2%). These results show that small and marginal farmers have a significant share in fertilizer subsidy (higher than their share in total cropped area).

² Share is computed from subsidy figures given in various issues of Expenditure Budget Vol. I, Ministry of Finance, Government of India

³ Subsidy figures for 2007-08 and 2008-09 include both cash and bonds for both urea and decontrolled fertilisers

⁴ Data on subsidies on sale of decontrolled fertilisers for 2010-11, 2011-12 and 2012-13 is total of imported and indigenous P&K fertilisers as separate data is not available after NBS

Table 2: Trends in fertilizer consumption per hectare of gross cropped area and total fertilizer area by major size groups during 1996-97 and 2006-07

<i>Farm size group</i>	<i>Per ha of gross cropped area (kg)</i>		<i>Per ha of fertilizer area (kg)</i>	
	<i>1996-97</i>	<i>2006-07</i>	<i>1996-97</i>	<i>2006-07</i>
Marginal (<1.0 ha)	104	140 (34.6)	162	190 (17.1)
Small (1.00 – 1.99 ha)	83	128 (55.4)	132	168 (27.1)
Semi-medium (2.00 – 3.99 ha)	75	108 (43.9)	124	143 (15.8)
Medium (3.00 – 9.99 ha)	68	95 (39.6)	119	133 (12.2)
Large (>10.0 ha)	51	68 (32.2)	114	117 (2.5)
All groups	77	113 (46.2)	131	155 (18.5)

Figures in parentheses show per cent increase in consumption between 1996-97 & 2006-07
Source: Computed from Gol (2007 and 2012b)

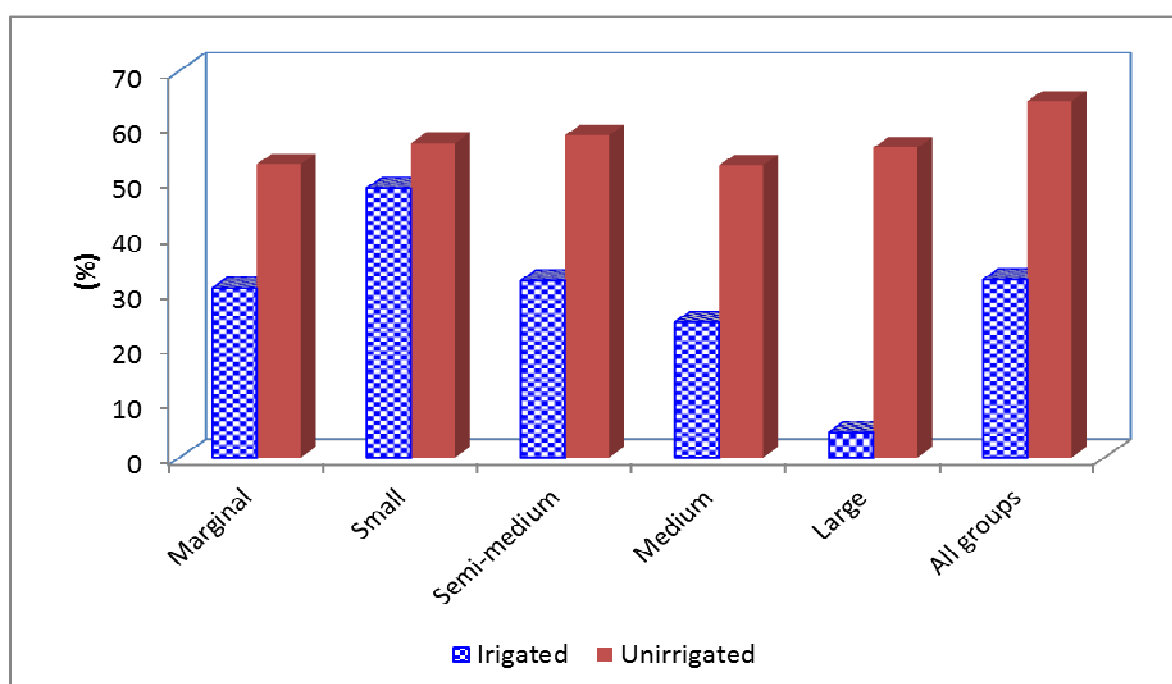
Table 3: Distribution of number of holding, gross cropped area, and fertilizer consumption by major size groups in India: 2006-07

<i>Size group (ha)</i>	<i>Percentage share in total</i>		
	<i>Number of holdings</i>	<i>Cropped area</i>	<i>Fertilizer consumption</i>
Marginal	63.9	23.4	29.1
Small	18.7	20.9	23.8
Semi-medium	11.1	23.0	22.1
Medium	5.3	22.5	18.9
Large	1.0	10.2	6.1
All groups	100.0	100.0	100.0

Source: Computed from Gol (2007 and 2012b)

To assess the benefits of fertilizer subsidies in irrigated and un-irrigated areas, we analysed fertilizer consumption trends in irrigated and un-irrigated areas between 1996-97 and 2006-07. The data on fertilizer consumption in irrigated and un-irrigated areas show that although farmers in irrigated areas use more fertilizers (172 kg/ha) than un-irrigated areas (59 kg/ha) but fertilizer consumption has increased at much higher rate in un-irrigated areas (64.5%) compared with irrigated areas (32.2%) between 1996-97 and 2006-07 (Figure 3). A similar trend was observed in all farm size groups.

Figure 3: Per cent change in average fertilizer consumption per hectare of gross cropped area in irrigated and un-irrigated areas between 1996-97 and 2006-07



Source: Computed from Gol (2007 and 2012b)

The analysis in this section supports the argument that public spending to subsidise fertilizers is desirable as a larger share of the benefits is captured by small and marginal farmers as small and marginal farmers use higher quantities of fertilizers and their share in total fertilizer consumption is more. Since there is no targeting of fertilizer subsidies and all categories of farmers pay same price, it can be inferred that small and marginal farmers receive higher subsidy per hectare as well as larger proportion of total subsidy. These findings are corroborated by the fact that earlier studies and input surveys show a similar distribution of benefits (Sharma and Thaker, 2010). However, as fertilizer subsidies have become financially unsustainable, significant fiscal savings can be made through better

targeting of the fertilizer subsidy and affordable increase in fertilizer prices. Having explored the distribution of benefits of fertilizers subsidy in the country, one question remains unanswered. Will dismantling of subsidy adversely affect fertilizer consumption and thereby their farm income? The next section analyses changes in fertilizer prices, subsidy and consumption after new policy traduced initiatives introduced during the last decade.

IV. Impact of Recent Policy Changes on Fertilizer Prices, Subsidy and Consumption

In this section of the paper, we provide a snapshot of the recent policy changes such as Nutrient Based Subsidy (NBS) policy, New Price Scheme (NPS) for Urea, and direct transfer of subsidy to farmers, as well as provide some data on fertilizer prices, subsidy and consumption trends. We focus on DAP, MOP (decontrolled fertilizers) and urea (under government control), since these fertilizers represent a bulk of the fertilizers used by farmers and also capture a larger share of fertilizer subsidies being provided by the government.

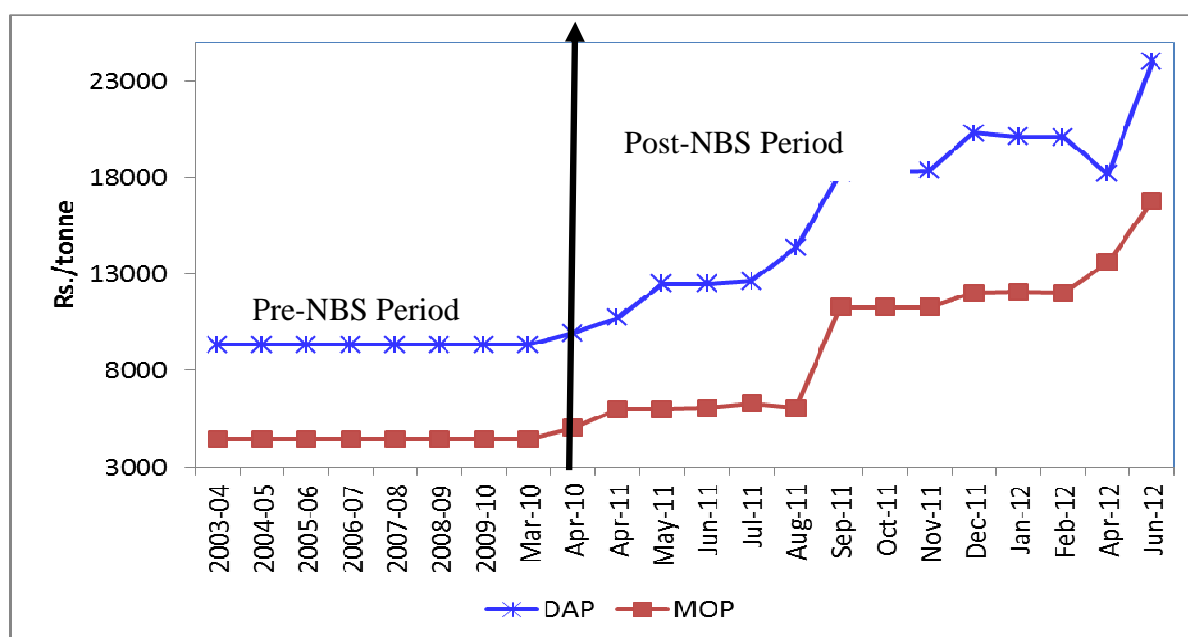
Nutrient Based Subsidy (NBS) Scheme

The government implemented the Nutrient Based Subsidy (NBS) Policy from April 1, 2010 for phosphatic, potassic and complex fertilizers and from May 1, 2010 for Single Super Phosphate (SSP). Under the NBS, the market price is determined based on supply and demand factors and government pays a fixed subsidy. Additional subsidy for fortified fertilizers with secondary and micro-nutrients as per Fertilizer Control Order (FCO) has also been allowed under NBS. The fertilizer companies are required to print Maximum Retail Price (MRP) along with applicable subsidy on the fertilizer bags. Figure 4 presents trends in prices of DAP and MOP in pre- and post-NBS period and Figure 5 gives additional information on changes in fertilizer prices and subsidy during the last decade.

It is evident from the Figure 4 that the retail price of DAP and MOP remained constant (Rs. 9350/tonne for DAP and Rs. 4455/tonne for MOP) in pre-NBS period, from February 2003 to March 2010 but subsidy kept on changing depending on cost of production and import parity prices. The average subsidy on DAP varied from Rs. 2134 per tonne on indigenous DAP in 2003-04 to Rs. 36488 per tonne in 2008-09 (Rs. 53056/tonne the highest in

September 2008) in pre-NBS era. In case of MOP, average subsidy varied from Rs. 2822 per tonne in 2003-04 to Rs. 22528 per tonne in 2008-09 (Rs. 29804/tonne the highest in March 2009). After introduction of NBS policy in April 2010, which moved from 'fixed-price-floating subsidy' regime to 'fixed-subsidy-floating price', the prices of phosphatic and potassic fertilizers registered a sharp increase particularly during the last one year. For example, price of DAP more than doubled between March 2010 and June 2012, from Rs. 9350 per tonne to more than Rs. 24000 per tonne, while subsidy declined from Rs. 19763 per tonne in 2011-12 to Rs. 14350 per tonne in 2012-13 (Figure 5). In case of MOP, prices witnessed a very sharp increase in post-NBS period and price of MOP increased from Rs. 4455 per tonne in March 2010 to about Rs. 17000 per tonne in June 2012, an increase of about 280 per cent.

Figure 4: Trends in prices of DAP and MOP in India: Pre-and Post-NBS period

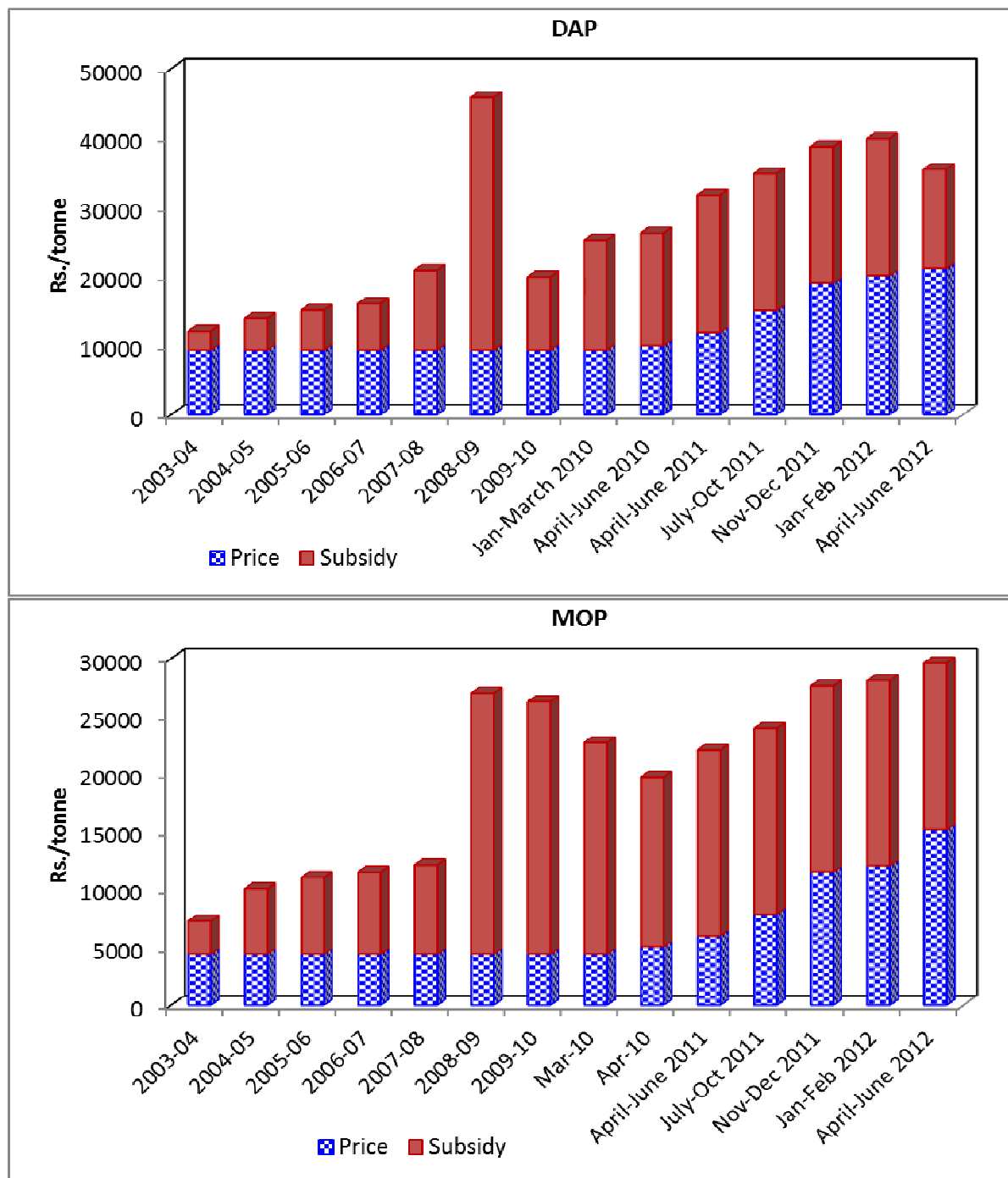


Source: FAI (2012), GoI (2012c) and Industry Sources

The share of subsidy in total cost (retail price + subsidy) of DAP fertilizer was the highest (79.6%) during 2008-09 and has declined in the post-NBS era (about 40% during April-June 2012). In case of MOP, share of subsidy in total cost was as high as 83.5 per cent in 2008-09 and declined significantly during the last two years due to reduction in subsidy under the NBS scheme (Figure 5). In case, subsidy on fertilizers is withdrawn in one go, market price of

DAP would increase to over Rs. 38000 per tonne and MOP to about Rs. 31000, which are pretty high and unaffordable even for large farmers.

Figure 5: Trends in price and subsidy⁵ of DAP and MOP during pre- and post-NBS period: 2003-04 to June 2012

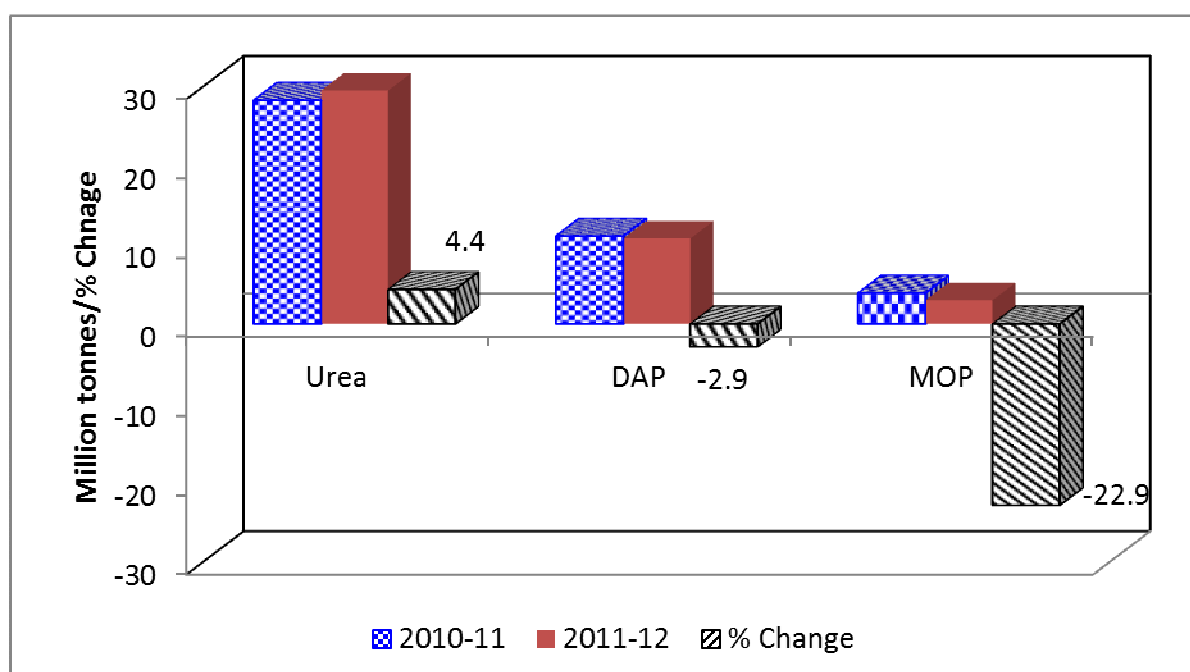


Source: FAI (2012), GoI (2012c) and Industry Sources

⁵ Subsidy on DAP for the period 2003-04 to 2007-08 is average of imported and indigenous DAP.

The partial decontrol of fertilizer sector which has led to sharp increase in prices of phosphatic and potassic fertilizers and relatively cheaper nitrogenous fertilizers resulted in sharp fall in demand and consumption of phosphatic and potassic fertilizers. The sale of urea increased by 4.4 per cent during 2011-12 compared with 2010-11 while sale of DAP declined by 2.9 per cent and MOP by nearly 23 per cent (Figure 6). This has led to deterioration in the N:P:K ratio, which will adversely affect the productivity of soil. A similar trend was observed after decontrol of phosphatic and potassic fertilizers in August 1992, when the prices of the phosphatic and potassic fertilizers registered a sharp increase and nitrogenous fertilizers became relatively cheaper, a sharp decline in consumption of phosphatic and potassic fertilizers skewed the NPK balance from 5.9:2.4:1 (normally accepted ratio being 4:2:1) in 1991-92 to 9.7:2.9:1 in 1993-94 (FAI, 2012). Therefore, there is a need to check spiralling prices of phosphatic and potassic fertilizers and increase urea prices to maintain NPK balance.

Figure 6: Sale of urea, DAP, and MOP fertilizers during 2010-11 and 2011-12



Source: FAI (2012a)

New Pricing Scheme (NPS) for Urea

Urea, which accounts for about 78 per cent of N consumption and about 50 per cent of total fertilizer consumption, remains the most regulated sector. Until March 2003, the subsidy to

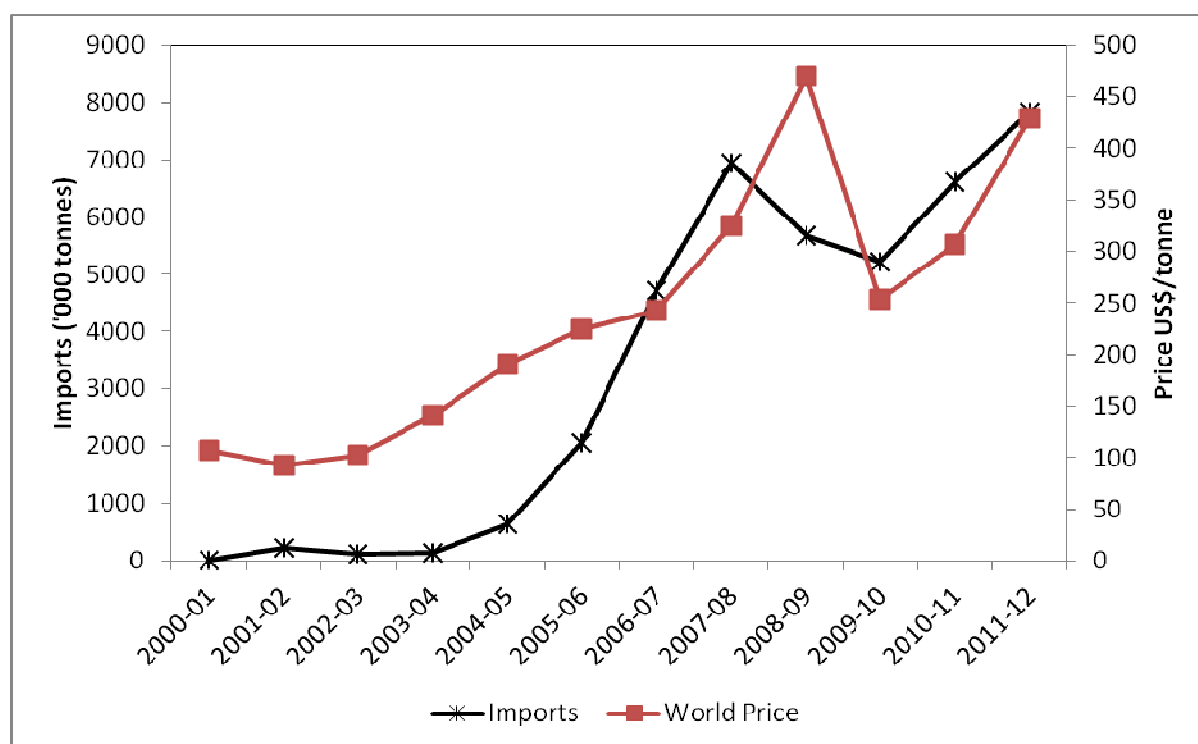
urea was regulated under Retention Price Scheme (RPS), wherein the difference between retention price (cost of production as assessed by the Government plus 12% post tax return on networth) and the statutorily notified farm gate price was paid as subsidy to each urea unit. The incentives under the RPS attracted significant investment in the Indian fertilizer sector, which led to enhanced fertilizer production as well as consumption but the policy has been criticized for not encouraging cost-efficiency, competition and fertilizer industry getting disproportionately large share of fertilizer subsidy.

Gulati (1990), Gulati and Sharma (1995) and Gulati and Narayanan (2003) calculated the implicit fertilizer subsidy accruing to industry and farmers and argued that about half of fertilizer subsidy goes to fertilizer industry. Panagariya (2001) wrote an article on fertilizer subsidy in the Economic Times on 28th February 2001 in which he stated that bulk of fertilizer subsidy rewards the gross inefficiency of urea manufacturers so all subsidies to fertilizer manufacturers must go and imports opened up. These arguments were based on the fact that international prices of urea were very low and varied from US\$70 to US\$140 per tonne between January 1998 and February 2001 and assumed that import price of urea will remain at about US\$150 per tonne.

With rising fertilizer subsidy, low international prices compared with domestic cost of production and debate about who benefits from fertilizer subsidies (farmers or fertilizer industry) during the 1990s, government set up various committees such as High Powered Fertilizer Pricing Policy Review Committee (HPC) in 1998, Expenditure Reforms Commission in 2000, Alagh Committee in 2001, Committee on Efficient Energy Levels for Urea units in 2003, etc. to suggest long-term alternative fertilizer policy. Based on recommendations of various committees, New Pricing Scheme (NPS) for urea was introduced from April 1, 2003. The policy was expected to contain subsidy through group-based concession scheme for urea units based on feed-stock and vintage of plants to create more competitive environment and improve efficiency, and cheaper imports. However, some of the underlying assumptions of these committees such as low international prices (long run benchmark import price of urea at US\$150/tonne assumed by ERC), import parity price of urea less than domestic cost of production and perceived gross inefficiency of urea manufacturers have turned out to be untrue. For example, Indian imports of urea were very

small (about 2.6 lakh tonnes per year) during the period 1998-99 to 2003-04 and the international prices varied from US\$70 per tonne in 1999-00 to US\$141 per tonne in 2003-04. Imports of urea, which started picking up since 2004-05 and reached about 6.9 million tonnes in 2007-08, declined marginally during the next two years but again increased to 6.6 million tonnes in 2010-11 and about 7.8 million tonnes in 2011-12 (Figure 7). On the other hand, international prices of urea (f.o.b.) also witnessed a steep increase from less than US\$150 per tonne in 2003-04 to about US\$470 per tonne 2008-09 (peak of US\$770/tonne in August 2008). These results show that there is a very strong relationship between Indian imports and international prices. The recent price rise and increasing imports underline the dangers of over-dependence on the volatile world market. Therefore, if the sector is completely deregulated as happened in case of phosphatic and potassic fertilizers, urea prices would also increase substantially.

Figure 7: Trends in India's imports and international prices of Urea during 2001-02 to 2011-12

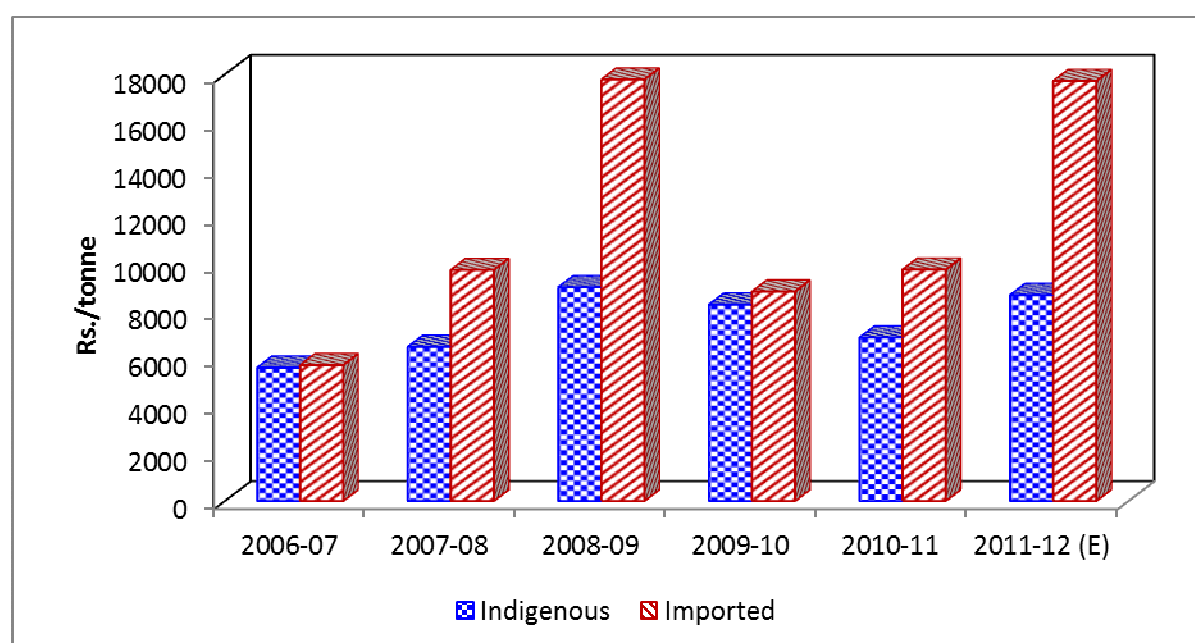


Source: FAI (2012), PIB (2012) and World Bank (2012)

As discussed earlier, a common perception of domestic urea industry being over-protected and less efficient than imports does not hold true. In order to establish this fact, we compared average subsidy on indigenous and imported urea in the post-NPS era and the

results are presented in Figure 8. It is quite evident from the Figure that average subsidy per tonne of imported urea is much higher than indigenously produced urea. Average subsidy on imported urea varied from about Rs. 5729 per tonne in 2006-07 to about Rs. 18000 per tonne in 2008-09 and 2011-12. In contrast, subsidy on domestic urea varied from Rs. 5624 per tonne in 2006-07 to about Rs. 9020 per tonne in 2008-09, much lower than imported urea. As the domestic urea is cheaper and more competitive vis-à-vis imported urea, the Government must encourage domestic production which will insulate Indian farmers from highly unpredictable, cartelized and volatile world fertilizer markets.

Figure 8: Trends in average subsidy (Rs./tonne) on domestic and imported urea in India⁶: 2006-07 to 2011-12



Source: FAI (2012); Gol (2012b) and PIB (2012a)

Since partial decontrol of fertilizer industry has led to several problems including very sharp increase in prices of phosphatic and potassic fertilizers leading to a problem of imbalance in use of nutrients, there is a need to increase farm gate prices of urea periodically. On the other hand, for decontrolled fertilizers, there is a need to smoothen prices and link subsidy to a specific price band of fertilizer products and raw materials rather than fixed subsidy irrespective of changes in world prices and domestic cost.

⁶ Estimated from urea production and import figure from Fertilizer Statistics- 2007-08 to 2010-11) and subsidy data on indigenous and imported urea from Expenditure Budget Vol. I – 2007-08 to 2012-13

Direct Transfer of Subsidy to Farmers

To ensure greater efficiency, cost effectiveness and better delivery for kerosene, LPG and fertilizers, the government constituted a committee in February 2011 under the Chairmanship of Shri. Nandan Nilekani, Chairman, Unique Identification Authority of India (UIDAI) to recommend and implement a solution for direct transfer of cash subsidies. The committee in its interim report recommended fertilizer subsidy to be provided to the retailers and ultimately to the intended beneficiaries (farmers) in a phased manner, a shift from the existing system of subsidy being given to the manufacturers/importers directly (GoI, 2011a). In the first phase, online database of the movement of fertilizers along the supply chain from the manufacturer till the retailer will be created and in Phase II, the subsidy will be transferred directly to the retailers on receipt of fertilizers from the wholesaler and in the long run, once the coverage of Aadhaar is extensive throughout the country, and Aadhaar enabled payments are operational, the committee envisaged direct transfer of subsidy to the intended beneficiary, i.e. farmers. The report also mentions about targeting of fertilizer subsidy based on size of holding, nature of crop such as subsistence versus commercial crops, ceiling on amount of subsidy and/or fertilizers per beneficiary but does not provide roadmap for its implementation. However, there are some other issues which need to be addressed before rolling out direct transfer of fertilizer subsidy policy.

Access to Working Capital

We need to understand and appreciate lack of purchasing power as well as access to institutional credit of small and marginal farmers and tenant cultivators. Smallholders are credit-constrained and rural credit markets are relatively underdeveloped in many regions. If subsidies are to be released after the purchase at full cost, there would be problem of getting money for buying fertilizers and it might adversely affect fertilizer use. The possibility of delay in reimbursement of subsidy to farmers due to multiple levels of interventions in distribution of fertilizers is another issue that needs attention. Similarly, working capital requirement of dealers/retailers will increase manifold and that needs to be taken care of.

Informal Tenancy

According to the 59th Round of the National Sample Survey 2003, about 7 per cent of total operated area is leased-in and 11.5 per cent of rural households lease-in land (Gol, 2006). But various field studies have pointed out the problem of underestimation of these numbers and it has been reported that area under informal/oral tenancy varies from 15 to 35 per cent of cultivated area and more than 85 per cent of tenants are landless labourers and small and marginal farmers (Gol, 2006 and Gol, 2009). The restrictions on land leasing in many States have forced the tenant farmers to enter into informal arrangements, which restrict their access to various inputs and services like institutional credit, subsidised seeds, fertilizers, etc. So the issue is how direct transfer of subsidy will take care of informal tenants, who have no legal right to cultivation and therefore poor access to inputs and services.

Targeting and Rationing of Subsidies

The economic theory suggests that the efficiency of an input subsidy programme can be improved by (i) targeting subsidy to specific types of farmer/regions, e.g. who would otherwise use very little or no inputs as a result of poor access to institutional credit, high prices, information failures, etc. and will increase their input use substantially as a result of the subsidy and (ii) rationing through fixed quantity per household (Dorward, 2009). The targeting of subsidies to different groups or regions is better option but is very difficult, with problems of diversion and leakage, e.g. from small and marginal farmers to large farmers, and across regions/states/borders to neighbouring countries. Similarly rationing, whether targeted or universal, is only effective where there are no secondary markets in which beneficiary households can sell subsidised fertilizers to non-recipients. Rationing is a better option compared with targeting as targeting of subsidies leads to exclusion of target households/wrong selection of beneficiaries, leakages, corruption, etc. However, once all farm households are covered under Aadhaar, rationing of fertilizer subsidies based on operational holding can be implemented on pilot basis and up-scaled. If rationing could be implemented effectively, it would lead to significant saving on fertilizer subsidy and reduce over-use of fertilizers in high-use areas.

V. Impact of NBS and Proposed Withdrawal of Fertilizer Subsidies on Farm Income

This section estimates the impact of removal of fertilizer subsidies on farm income. A simple exercise using cost of production data from the Commission for Agricultural Costs and Prices reports of Price Policy for Kharif and Rabi Crops – the Marketing Season 2012-13 (CACP, 2011 and 2012) explores an important question. What will be the impact of proposed withdrawal of fertilizer subsidy on income from wheat and rice farming in major producing states? In order to examine impact of removal of fertilizer subsidy on farm profitability, we have examined changes in net income (gross value of output from main and by-product - cost C_2^*) and farm business income (gross value of output (main and by-product) - cost A_2 +Family Labour) and results are presented in Table 4.

The share of fertilizers in total cost of production of wheat varied from about 5.4 per cent in Rajasthan to 9 per cent in Gujarat, while in case of rice, fertilizer costs accounted for 1.2 per cent of total cost in Assam and 8.8 per cent in Karnataka. It is observed from the Table that the average net income per hectare of wheat production varied from Rs. 705 in Maharashtra to Rs. 20357 in Rajasthan, while farm business income was the highest (Rs. 35568) in Haryana. In case of rice, farmers in Assam incurred a net loss of Rs. 2234 per hectare in 2009-10 while Haryana farmers realized the highest net income (Rs. 20966/ha), closely followed by Punjab (Rs. 20844/ha) and the lowest in Chhattisgarh (Rs. 2478/ha).

Alternative I assumes that fertilizer subsidy was withdrawn and farmers paid actual market price (exclusive of local taxes) for all fertilizers in 2009-10. The results show that net income from wheat becomes negative in Maharashtra and farmers on an average incur a net loss of Rs. 3648 per hectare. In other states, net income falls by about 27 per cent and main losers are Uttar Pradesh (-51.6%), Bihar (-47.2%), Punjab (-39.7%), Haryana (-28.5%), Madhya Pradesh (-23.1%) and Gujarat (-20.8%). The effect of fertilizer price rise is more severe in case of rice. Rice farmers in states like Assam, Odisha and West Bengal incur a net loss of Rs. 2492, Rs. 578 and Rs. 294 per hectare, respectively. The average reduction in net income in other major producing states was about 50 per cent and main losers were Uttar Pradesh (-77.2%), Chhattisgarh (-72.1%), Tamil Nadu (-69.5%), Andhra Pradesh (-49.5%), Karnataka (-40%), and Punjab (-25.4%).

Since fertilizer prices were normally low during 2009-10 and have increased significantly during 2010-11 and 2011-12, we considered total withdrawal of fertilizer subsidy and actual market prices (retail price + subsidy) during April-June 2012 under Alternative II. The results show that wheat cultivation becomes unprofitable in some states and farmers in Bihar, Maharashtra and Uttar Pradesh incur a loss of Rs. 765, Rs. 8723 and Rs. 1696 per hectare, respectively. Other states also witnessed a significant decline in farm income. The net income in Punjab declined by 92.4 per cent, followed by Haryana (-66.2%), Madhya Pradesh (-53.7%), Gujarat (-49.2%) and Rajasthan (-32.6%). The income situation of rice farmers is more disturbing as rice farmers in 7 out of 10 major rice producing states realise negative net income. For example, rice farmers in Uttar Pradesh will incur a net loss of Rs. 4179 per hectare, followed by West Bengal (Rs. 3964), Tamil Nadu (Rs. 3264), Odisha (Rs. 3049), and Chhattisgarh (Rs. 1921). In other states, net income recorded a significant decline ranging from about 47 per cent in Haryana to 55 per cent in Punjab and 90 per cent in Karnataka. Comparing alternative I and II, we note that Haryana farmers, who received a net income of Rs. 35910 per hectare from rice-wheat cultivation in 2009-10, declined to Rs. 27364 under alternative I and Rs. 16056 per hectare under alternative II. In Punjab the net income fell from Rs. 33571 to Rs. 23326 and Rs. 10376 under alternative I and II, respectively. Uttar Pradesh farmers would incur a net loss of Rs. 5876 per hectare under scenario II.

The above results clearly indicate that if fertilizer subsidies are withdrawn in one go it is going to have very severe adverse effect on net income of rice and wheat farmers in many States and consequently farming would become unprofitable, leading to serious agrarian crisis. An optimistic view on the role of market forces and imports in fertilizer pricing and distribution and removal of the fertilizer subsidy would eventually lead to increased exposure to volatile global markets and compromise on social goals of poverty reduction, self-sufficiency and equity. Therefore, there is a need to have long-term consistent fertilizer policy without compromising food security and livelihood of millions of smallholders in the country.

Table 4: Likely impact of fertilizer subsidy withdrawal on farm income in major states: Paddy and Wheat

<i>Crop/State</i>	<i>Actual 2009-10</i>		<i>Alternative I</i>		<i>Alternative II⁷</i>	
	<i>Net Income⁸</i>	<i>Farm Business Income⁹</i>	<i>Net Income</i>	<i>Farm Business Income</i>	<i>Net Income</i>	<i>Farm Business Income</i>
Wheat						
Bihar	5308	12840	2801	10332	-765	6766
Gujarat	18642	27891	14761	24010	9478	18727
Haryana	14944	35568	10691	31315	5051	25675
Madhya Pradesh	9377	20240	7210	18073	4344	15207
Maharashtra	705	10162	-3648	5809	-8723	734
Punjab	12907	31313	7778	26184	982	19388
Rajasthan	20357	32493	17543	29680	13725	25861
Uttar Pradesh	7167	20355	3472	16660	-1696	11492
Paddy						
Andhra Pradesh	10653	30162	5378	24887	-396	19113
Assam	-2234	4165	-2492	3908	-2948	3451
Chhattisgarh	2478	9365	691	7577	-1921	4965
Haryana	20966	46357	16673	42063	11005	36396
Karnataka	15901	28939	9525	22563	1585	14623
Odisha	1800	11579	-578	9201	-3049	6730
Punjab	20844	42462	15548	37167	9385	31004
Tamil Nadu	9269	21406	2831	14968	-3264	8873
Uttar Pradesh	5809	17770	1324	13285	-4179	7782
West Bengal	3032	13041	-294	9715	-3964	6046

Source: Computed from CACP (2011, 2012)

⁷ *Alternative II* considers Import Parity Price (IPP) under NPS-III for urea during the quarter January-March 2012 and actual market prices of phosphatic and potassic fertilizers during April-June 2012

⁸ *Net Income* = Gross value of production (main and by-product) – Cost C_2

⁹ *Farm Business Income* = Gross value of production (main and by-product) – Cost A_2+FL

VI. Summing Up

Fertilizer subsidy accounts for a large share (about 37%) of total subsidies that the government provides and has increased by about 560 per cent during the last decade between TE2003-04 and TE2010-11. Though subsidy has contributed to an increase in use of fertilizers that has helped in achieving self-sufficiency in foodgrains production but in some cases it has resulted in an overuse, which has an adverse effect on productivity. The twin problems of rising subsidies and concerns about declining efficiency of fertilizer use that are currently prominent in the policy agenda, need to be addressed. There is a need to contain these subsidies without hurting millions of smallholders including tenant cultivators who produce for self-consumption and have no/very small marketed surplus, hence do not benefit from high output prices but higher fertilizer price would certainly reduce their income. The findings indicate that withdrawal of subsidies will make farming unprofitable, particularly for small and marginal farmers and in less developed states/regions. Therefore, there is a rationale for subsidizing fertilizers in case of small and marginal farmers as well as less developed regions. Targeting and rationing are important tools to contain the subsidies and ensure that these are largely provided to those farmers/regions/crops, where fertilizer use is constrained by high prices, insufficient institutional credit support, low productivity levels, etc. Rationing, for example by limiting the volume of subsidized fertilizer which a farmer can get, is better option compared to targeting and also politically and administratively more acceptable. It will provide proportionately greater benefits of fertilizer subsidy to small and marginal farmers compared to large farmers and promote fertilizer consumption on small and marginal farms but would not solve the problem of informal tenants. Sharp increases in both domestic and imported fertilizer prices as well as raw material/feedstocks, rising imports and reduction in subsidy on phosphatic and potassic fertilizers have made markets more volatile and, to the extent that higher prices have led to a decrease in consumption of phosphatic and potassic fertilizers and deterioration in the N:P:K ratio. There is a need for periodic and affordable increase in fertilizer prices, particularly urea, to contain subsidy and promote balanced use of nutrients.

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