

Reforming The Fertiliser Sector

Recent reforms in the fertiliser sector, including neem-coating to prevent diversion of urea to industrial uses, and gas-pooling to induce efficiency in production, are steps in the right direction. Fertiliser accounts for large fiscal subsidies (about 0.73 lakh crore or 0.5 per cent of GDP), the second-highest after food. We estimate that of this only 17,500 crores or 35 per cent of total fertiliser subsidies reaches small farmers. The urea sector is highly regulated which: creates a black market that burdens small farmers disproportionately; incentivises production inefficiency; and leads to over-use, depleting soil quality and damaging human health. Reforms to increase domestic availability via less restrictive imports (“decanalisation”) and to provide benefits directly to farmers using JAM will address many of these problems.

INTRODUCTION

9.1 Since 2014, important reforms have been implemented in the fertiliser sector. These include the neem-coating of urea, which has likely reduced the diversion of fertiliser meant for Indian farmers; and gas-pooling, which should increase efficiency of domestic urea production. Both steps should help small farmers by improving their access to low cost fertiliser. They will also provide good building blocks for further fertiliser sector reform.

9.2 This chapter explores what the next reform steps should be. But before we get to the reform agenda, we first need to understand the long-standing features of the fertiliser sector that induce major distortions which need to be corrected.

9.3 The government budgeted ₹73,000 crore—about 0.5 per cent of GDP—on fertiliser subsidies in 2015-16. Nearly 70 per cent of this amount was allocated to urea, the most commonly used fertiliser, making it the largest subsidy after food.

9.4 Distortions in urea are the result of multiple regulations. First, there are large subsidies based on end use—only agricultural urea is subsidised—which creates incentives to divert subsidised urea to industry and across the border. In fact, subsidised urea suffers from 3 types of leakage: (i) 24 per cent is spent on inefficient urea producers (ii) of the remaining, 41 per cent is diverted to non-agricultural uses and abroad;¹ (ii) of the remaining, 24 per cent is consumed by larger—presumably richer—farmers. These leakages imply that only 35 per cent—about ₹17500 crore of the total

¹ This leakage figure is estimated as the difference between urea allocations and urea consumption as measured by the Cost of Cultivation Survey 2012-13. The urea consumption estimated via the COC survey is scaled up by applying multipliers provided in the summary sheet to the unit level data. Comparing allocations with consumption, and measuring household consumption in this way, is a method that has been used to estimate leakages for kerosene, rice and wheat using NSS consumption and the PDS allocations.

urea subsidy of ₹ 50300 crore—reaches the intended beneficiaries, small and marginal farmers.

9.5 Second, under-pricing urea, relative to other fertilisers, especially P & K, encourages overuse, which has resulted in significant environmental externalities, including depleted soil quality.

9.6 Third, multiple distortions—price and movement controls, manufacturer subsidies, import restrictions—feed upon each other, making it difficult to reallocate resources within the sector to more efficient uses. The fertiliser sector is thus one example of the exit problem that bedevils the Indian economy (see Chapter II).

BASIC FACTS

9.7 This section reviews some basic facts

about the fertiliser sector. There are 3 basic types of fertiliser used—urea, Diammonium Phosphate (DAP), and Muriate of Potash (MOP). Box 9.1 provides more detail, and some basic price and quantity facts about each. In many ways, urea dominates the sector. Of all the fertilisers, it is the most produced (86 per cent), the most consumed (74 per cent share), and the most imported (52 per cent). It also faces the most government intervention. Urea is the most physically controlled fertiliser, with 50 per cent under the Fertiliser Ministry's movement control order compared with 20 per cent for DAP and MOP. It also receives the largest subsidies, in outlay terms (accounting for nearly 70 per cent of total fertilisers subsidy) and as proportion of actual cost of production (75 per cent per kg, compared with about 35 per cent for DAP and MOP).

Box 9.1: The ABC of Fertiliser

Fertiliser provides 3 major nutrients which increase agriculture yields:

Nutrient	Main source
Nitrogen (N)	Urea
Phosphorus (P)	DAP
Potassium (K)	MOP

The optimal N:P:K ratio varies across soil types but is generally around 4:2:1

Table 9.1: Basic Fertiliser quantity facts (2014-15)

	Production		Consumption		Imports	
	Volume ('000MT)	Value (₹ crore)	Volume ('000MT)	Value (₹ crore)	Volume ('000MT)	Value (₹ crore)
DAP	3445	12471	7626	27606	3853	13948
MOP	-	-	2853	7418	4197	10912
Urea	22593	43830	30610	59383	8749	16973

Table 9.2: Basic fertiliser price facts (2014-15)

	Domestic Subsidised Price (₹/50kg)	International price (₹/50kg)	Subsidy (₹/50kg)	Import restriction	% of volume that is under movement control
DAP	1200	1810	618	None	20%
MOP	800	1300	465	None	20%
Urea	270	970	807	Canalised*	50%

Source: Fertiliser Association of India (FAI)

Note: numbers in bold are fixed by the government. The others are market prices.

* Only 3 firms allowed to import.

9.8 Government interventions in urea and DAP/MOP differ not just in scale, but also in kind. DAP and MOP producers and importers receive a Nutrient Based Subsidy (NBS) based on a formula that determines the amount of N, P and K in a given amount of fertiliser. Per kg subsidies on DAP and MOP fertiliser are hence fixed—they do not vary with market prices. Imports of DAP and MOP are also not controlled. The prices farmers face are thus deregulated market prices adjusted by fixed nutrient subsidy. Government involvement in DAP and MOP is limited to paying producers and importers a fixed nutrient based subsidy which works out to be roughly 35 per cent of the cost of production.

9.9 The case of Urea is very different. The government intervenes in the sector in five ways:

1. It sets a controlled Maximum Retail Price (MRP) at which urea must be sold to farmers. This price is currently ₹ 5360 per metric tonne—approximately ₹268 per 50 kg bag—less than one-third the current imported price (₹18600 per tonne);
2. It provides a subsidy to 30 domestic producers that is firm-specific on a cost-plus basis, meaning that more inefficient producers get larger subsidies² ;
3. It provides a subsidy to importers that is consignment-specific;
4. Imports are canalised—only three agencies are allowed to import urea into India;

² The government introduced the new urea policy in 2015 covering the period 2015-16 to 2018-19. Under this policy gas-based urea plants are placed in three categories based on energy norms. In the first 3 years, energy norms are plant specific but from 2018-19 plants are expected to adopt group/category specific energy norms.

³ Urea is used as one of the ingredients in chemical industry, explosives, automobile systems, laboratories, medical uses, flavour enhancing additive in cigarettes and others.

⁴ A 50kg bag of urea in India costs around ₹ 268 while it is Tk 800 (₹685) in Bangladesh and NPR 996 (₹622) in Nepal.

⁵ The Comprehensive Cost of Cultivation(CoC) Survey is a mechanism for data generation on cost structure of crops and various inputs which are used for cultivation of different crops in India. The survey has been designed by the Central Statistics Office (CSO) and the data collection is performed annually by the Department of Agriculture and Cooperation. The 2012-13 round of the CoC survey covered over 1000 villages spanning 17 different states in India. Each village comprised 10 preprational holdings and was sampled randomly under a stratified sampling scheme. We did not have a more recent round of CoC data and our estimates are for 2012-13.

5. Finally, about half of the movement of fertiliser is directed—that is, the government tells manufacturers and importers how much to import and where to sell their urea.

9.10 Thus nearly all actors—consumers, producers, importers, distributors—are controlled. These distortions feed upon each other, and together create an environment that leads to a series of adverse outcomes which we describe below.

Leakage 1 – Black Market

9.11 Urea is only subsidised for agricultural uses. Subsidies like this violate what we call the *One Product-One Price* principle—the intuition that products which are essentially the same should be charged essentially the same price, else there will be incentives to divert the subsidised commodity from eligible to ineligible consumers. The 75 per cent subsidy on agricultural urea creates a large price wedge which feeds a thriving black market diverting urea to industry³ and possibly across the border to Bangladesh and Nepal⁴. Comparing urea allocation data with estimates of actual use from the Cost of Cultivation Survey⁵ 2012-13, we estimate that 41 per cent of urea is diverted to industry or smuggled across borders.

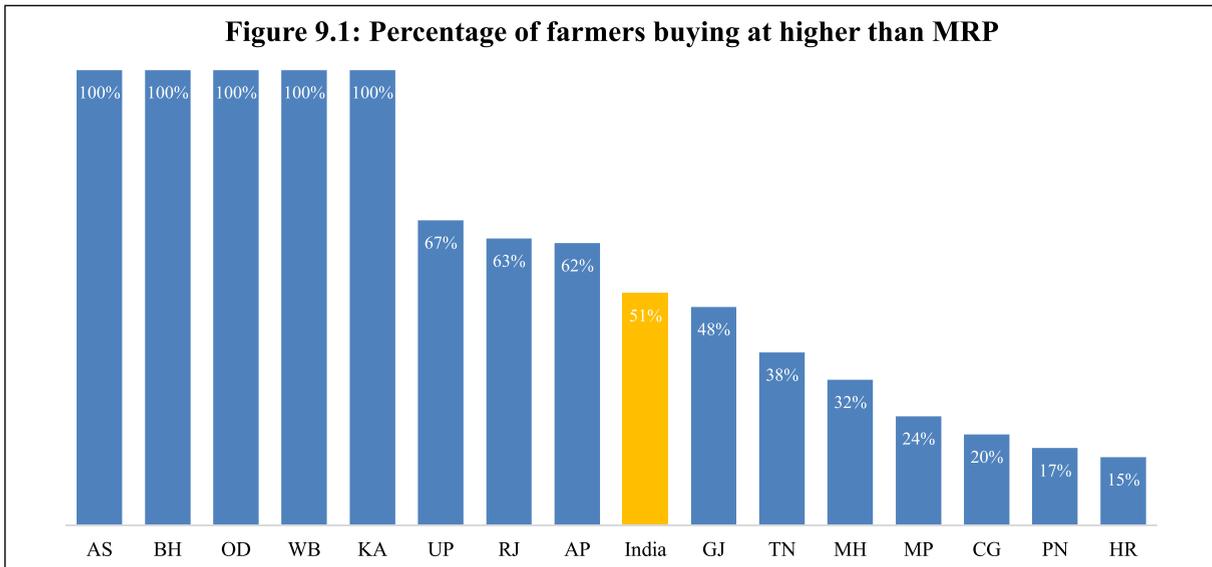
9.12 Figure 9.1 shows the extent of black marketing in urea in the year 2012-13. It is estimated that about 51 per cent of Indian farmers buy urea at above-MRP. Figure

9.1 also presents some evidence of cross-border smuggling. In the three eastern states bordering Bangladesh, 100 per cent of farmers had to buy urea at above MRP in the black market. Similarly, in Uttar Pradesh, which borders Nepal, 67 per cent of farmers had to buy urea in the black market at above the stipulated MRP.

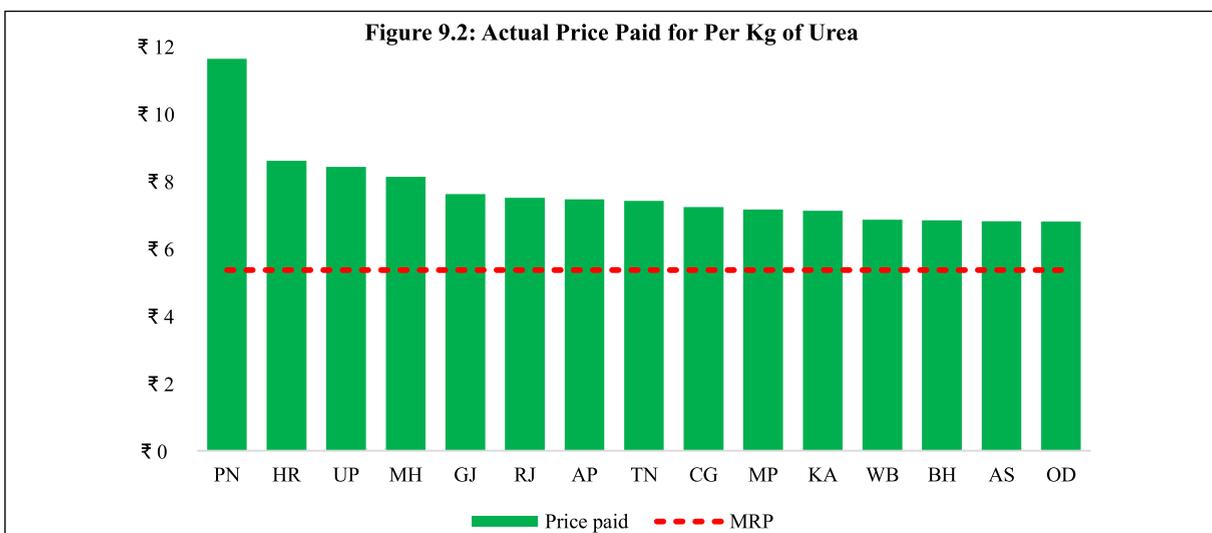
9.13 Figure 9.2 shows that these black market prices are, on average, about 61 per cent higher than stipulated prices (i.e. MRP plus local taxes), indicating that black marketing

imposes significant pecuniary costs on farmers—in addition to creating uncertainty of supply.

9.14 Black market effects are aggravated by a further regulation—canalisation. Only three firms⁶ are allowed to import urea into India, and the canalisers are also instructed when to import, what quantities to import, and in which districts to sell their goods. Every season the Fertiliser Department estimates how much imports are required by forecasting domestic supply and demand. Forecasting



Source: Calculated from Cost of Cultivation Survey (2012-13).



Source: Calculated from Cost of Cultivation Survey (2012-13).

⁶ State Trading Corporation of India (STC), Metals and Minerals Trading Corporation of India (MMTC) and India Potash Limited (IPL).

fertiliser demand is a difficult business, and misestimates— especially shortages— are difficult to correct because the system to procure imports is time consuming. The entire process—from the time the Fertiliser Department decides to import to the time urea reaches consumer centres—takes about 60-70 days. These delays can exacerbate shortages, and are particularly costly during the peak demand period when timely availability of urea is essential for proper plant growth. Farmers are thus pushed to purchase in the black market. In 2014, for example, slow imports are likely to have caused delays which triggered increases in black market prices.

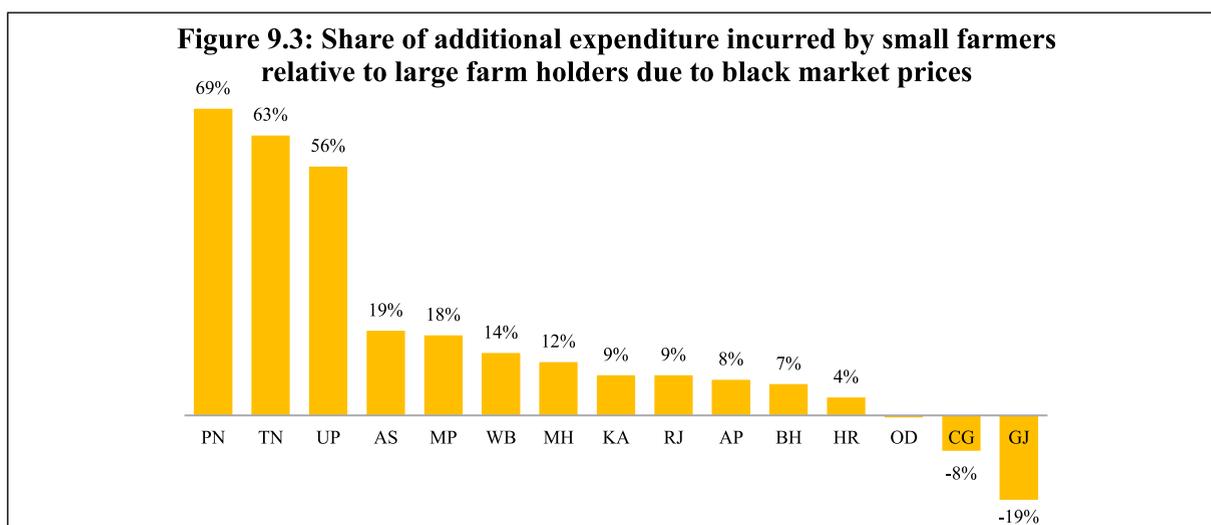
Leakage 2 – Small Farmer Inability to derive full benefits

9.15 The black market hurts small and marginal farmers more than large farmers since a higher percentage of them are forced to buy urea from the black market. This regressive nature is characteristic of black market rationing and happens because large farmers are typically better connected and

therefore able to secure scarce subsidised urea. Figure 9.3 shows how much additional cost the black markets imposes on small farmers relative to larger farmers. On average this extra expenditure is 17 per cent, and in some states—Punjab, UP and Tamil Nadu— it is between 55 and 70 percent.⁷

Leakage 3 – Inefficient Fertiliser Manufacturers

9.16 A third source of leakage arises from some of the urea subsidy going to sustaining inefficient domestic production instead of going to the small farmer. Today, there are 30 manufacturing units with varying levels of efficiency. The objective of self-sufficiency has meant a preference for survival and an associated willingness to countenance inefficiency. This has led to a model where the subsidy a firm receives is based on its cost of production: the greater the cost, the larger the subsidy. As a consequence, inefficient firms with high production costs survive and the incentive to lower costs is blunted.



⁷ The Cost of Cultivation Survey uses five different classifications: less than 1 ha., between 1 and 2 ha., between 2 and 4 ha., between 4 and 6 ha., and greater than 6 ha. In Figure 9.3, we compare the percentage share of additional expenditure incurred due to black market prices for first two size classes (defined as small farmers) with the last two size classes (defined as large farmers). In other words:

$$\text{Share of additional expenditure}_i = \frac{\text{Total expenditure on urea}_i - (\text{Expenditure based on MRP} + \text{local taxes})_i}{\text{Total expenditure on urea}_i} * 100$$

$$\text{Regressivity} = \text{Share of additional expenditure}_i (i = \text{small farmer}) - \text{Share of additional expenditure}_i (i = \text{larger farmer})$$

9.17 Figure 9.4 depicts this practice. It plots the production cost of a firm against the subsidy it receives. The fit is perfect, signifying that the more inefficient the firm, the more subsidies it receives. This year, the government has revised its policy, taking steps in the right direction, but the essential features of being firm-specific and inversely related to efficiency remain as described in footnote-2.

9.18 We estimate that in 2012-13, about 24 per cent of the urea subsidies went to sustaining inefficient production. A consequence of fixing retail prices—combined with the cost-plus subsidy regime—is that even though urea consumption has increased steadily over the last 15 years, no new domestic production capacity has been added, leading to a large dependence on imports. A few plants stopped production, while some big conglomerates like Tata Chemicals, which owns one of the most energy-efficient urea units, have threatened exit.

EXTERNALITIES OF UREA PRICES

Worsening soil quality

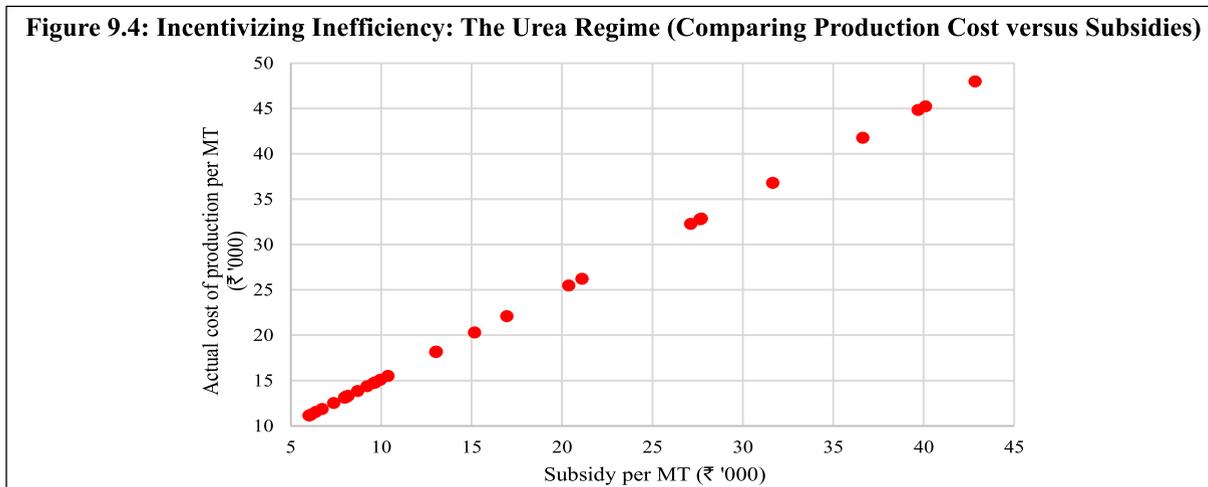
9.19 The previous section argued that urea subsidies suffer from significant leakages—to the black market, large farmers, and inefficient manufacturers—which combine to hurt the small farmer. This section discusses

some environmental and health externalities of under-priced urea. The first is urea overuse which leads to the detriment of the soil. Agricultural scientists recommended that for Indian conditions, Nitrogen, Phosphorus and Potassium—N, P and K—should be used roughly in the ratio of 4:2:1.

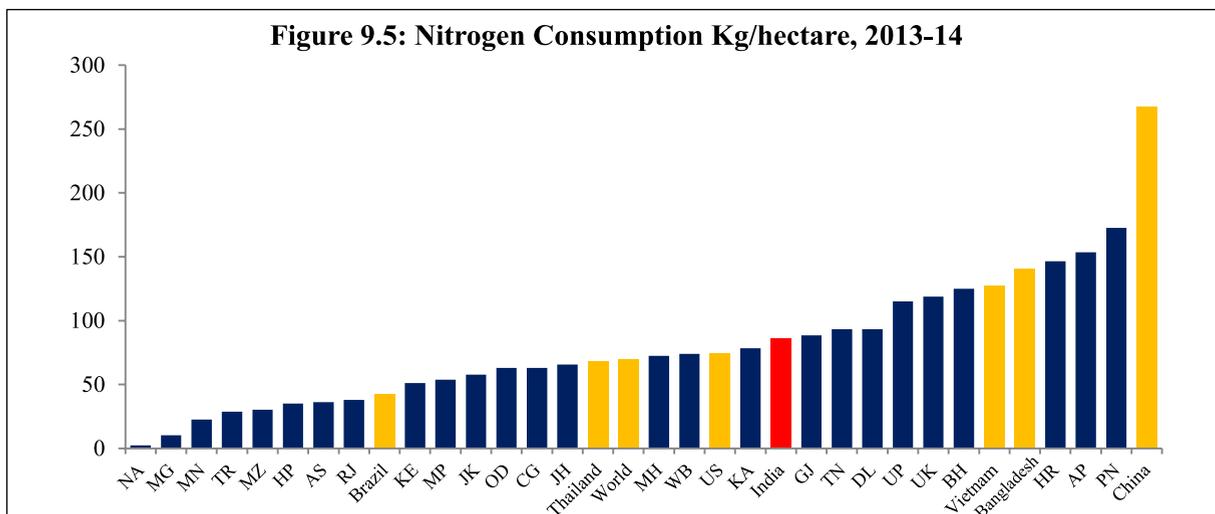
9.20 Figure 9.5 indicates that in absolute amounts, there seems to be over-use of urea in many of the larger states, especially in Punjab, Haryana, and Uttar Pradesh. The over-use is pronounced compared with the US, the world and many Asian countries. Two exceptions are noteworthy: overuse in China is even greater than in India, while not all states overuse urea. Indeed many, especially in the North East, use less nitrogenous fertiliser per hectare than the world average.

9.21 What is striking and uniform is the distortion in the proportions in which the fertilisers used are skewed. Figures 9.6-9.8 present actual fertiliser use in comparison with the 4:2:1 recommended.

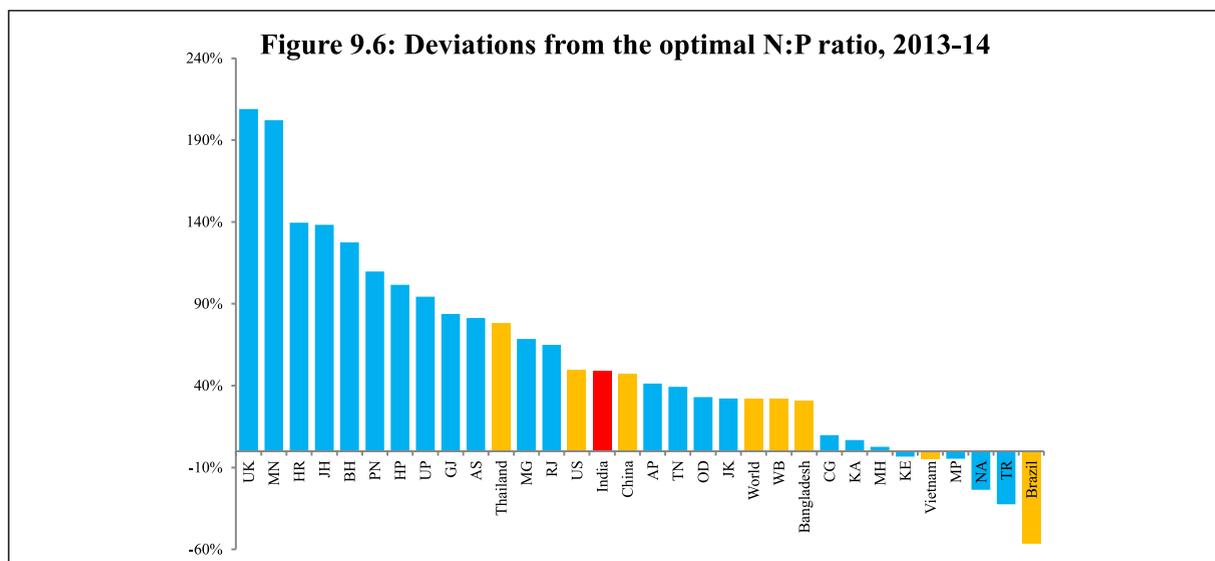
9.22 Figure 9.6 plots deviations from the optimal N:P ratio. Most states use almost twice more nitrogen as compared to phosphorous than is recommended. This pattern is also observed in the most productive states like Punjab, Haryana, UP and Gujarat. The distortions are less in Maharashtra, Karnataka, and Kerala, which consume close



Source: Department of Fertiliser



Source: Agriculture Statistics at a Glance 2014, Ministry of Agriculture. Data for other countries is for 2011-12.



Source: Agriculture Statistics at a Glance 2014, Ministry of Agriculture.

to the optimal ratio, although this could simply be the result of different crop mixes.

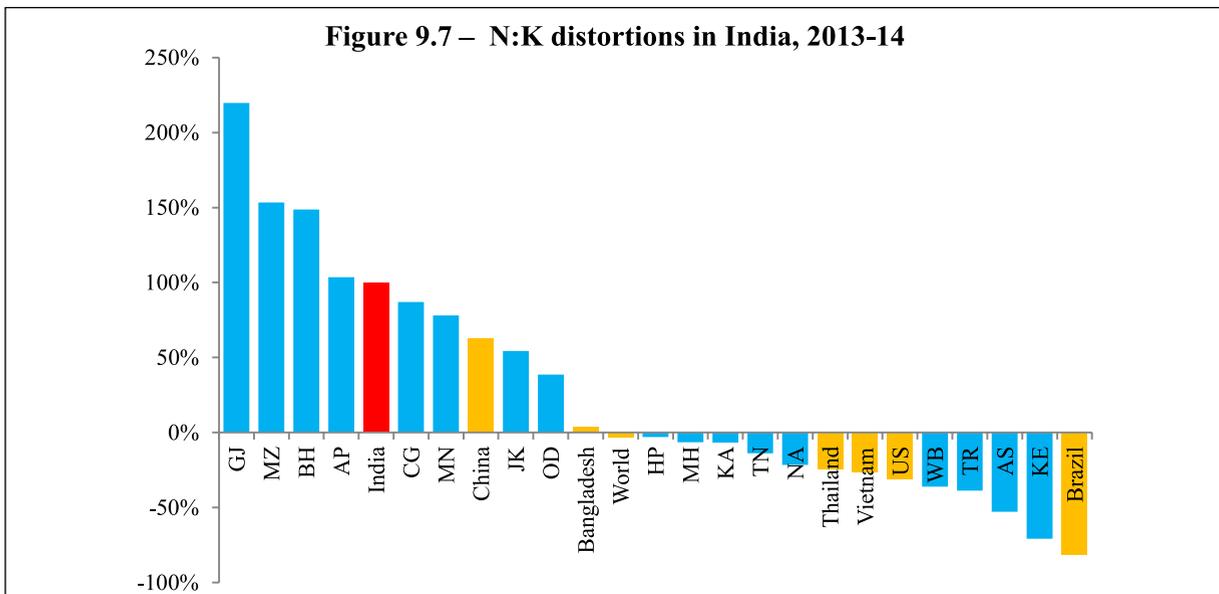
9.23 The overuse of nitrogen as compared to potash is even more extreme. Figure 9.7 shows India’s nitrogen overuse in comparison to other countries. Bangladesh uses only 4 per cent more nitrogen than potash while on average India uses 100 per cent more than recommended. Figure 9.8 is necessary because in some Indian states the distortions are so extreme—4500 per cent more N than K in Rajasthan, 1300 per cent high in Punjab

and Haryana—that a separate graph and scale are required.

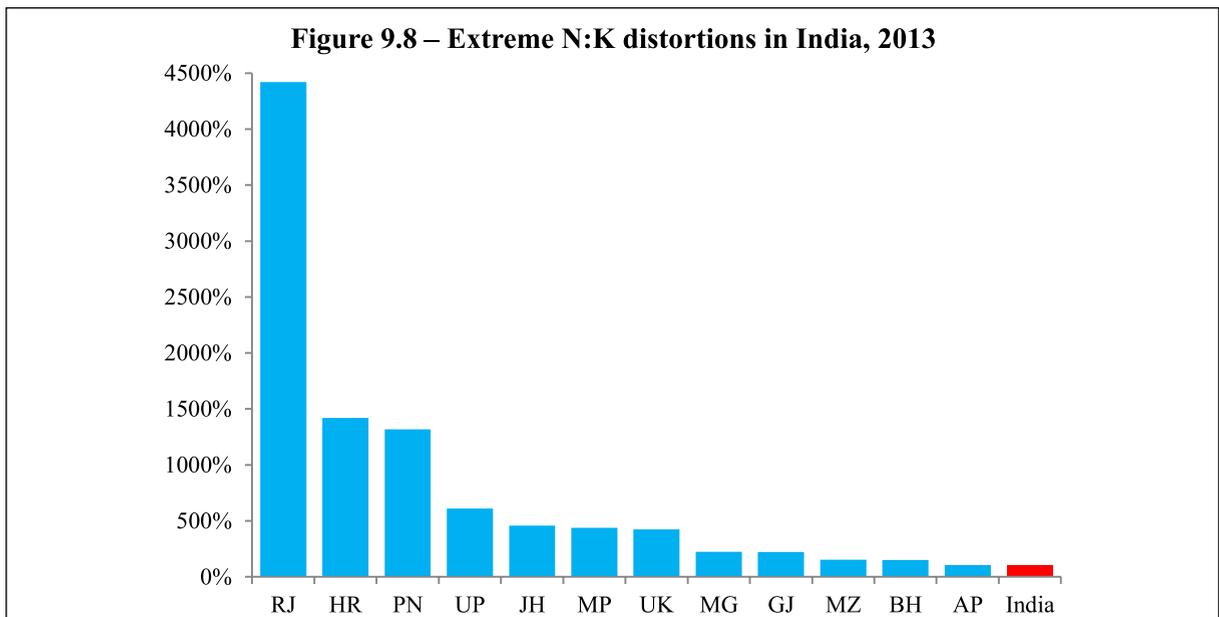
REFORMS

9.24 A reform package would address each of the problems identified above—the three leakages and skewed mix of fertiliser use—with the primary aim of benefiting the small farmer⁸. First, decanalising urea imports—which would increase the number of importers and allow greater freedom in import decision--would allow fertiliser

⁸ Fertiliser manufacturing is not an employment-intensive industry, as about 75-80 per cent of production costs are due to energy. In this sense, fertiliser is different from other sectors with exit problems—like banking or civil aviation—where employment is high.



Source: Agriculture Statistics at a Glance 2014, Ministry of Agriculture.



Source: Agriculture Statistics at a Glance 2014, Ministry of Agriculture.

supply to respond flexibly and quickly to changes in demand. This would be timely as climatic fluctuations are making it much more difficult for governments to forecast agricultural conditions and centrally manage supply. This would reduce the likelihood and severity of shortages, decrease black marketing and thereby benefit the small farmer.

9.25 Second, bringing urea under the

Nutrient Based Subsidy program currently in place for DAP and MOP would allow domestic producers to continue receiving fixed subsidies based on the nutritional content of their fertiliser, while deregulating the market would allow domestic producers to charge market prices. This would encourage fertiliser manufacturers to be efficient, as they could then earn greater profits by reducing costs and improving urea quality. And this in turn would benefit farmers.

Turning fertiliser into JAM

9.26 The case for implementing direct transfers in fertilisers is to reduce leakages to the black market. The government's policy of neem-coating urea is a step in exactly this direction. Neem-coating makes it more difficult for black marketers to divert urea to industrial consumers. Neem-coating also benefits farmers by reducing nitrogen losses from the soil by providing greater nutrient to the crop. As a result, farmers need less urea to achieve the same effect. Technology could be further used to curtail leakages and improve targeting of fertiliser subsidies. As discussed in Chapter III, fertiliser is a good sector to pursue JAM because of a key similarity with the successful LPG experience: the centre controls the fertiliser supply chain.

9.27 Ideally fertiliser subsidies would be targeted only at small and marginal farmers. But targeting the poor is difficult at the best of times, and assessing poverty—based on landholdings or some other measure—will be difficult. A second problem emerges with targeting tenant farmers and sharecroppers. The Situational Assessment Survey of Agricultural Households reveals that a little over 10 per cent of all farmers are tilling someone else's land, and cash transfer design should be careful not to exclude these typically landless farmers who would need the subsidy most. The relatively low levels of last-mile financial inclusion in much of rural India (see Chapter III) also suggest that it would be risky to replace subsidised fertiliser with cash, due to beneficiaries' weak connection to the banking system.

Universal subsidy with cap on number of bags

9.28 A preferred option would be to set a cap on the number of subsidised bags each household can purchase and require biometric authentication at the point of sale (POS). This is the approach adopted for kerosene and food in Andhra Pradesh. Requiring biometric

authentication would make it harder to conduct large-scale diversion. Imposing a cap on the total number of subsidised bags each farmer can purchase would improve targeting. Small farmers would still be able to get all their urea at subsidised prices but large farmers may have to pay market prices for some of the urea they buy. A number of states, like Andhra Pradesh and Gujarat, with high Aadhaar penetration and POS devices in rural areas might be good candidates to start pilots based on this model. Though we have discussed the effect for this policy for urea, it could easily be extended to DAP and MOP as well.

9.29 While many details will need to be worked out, the time is ripe for starting the DBT experiment in fertiliser. This would help the poor farmers, reduce leakage and also reduce the government's subsidy burden, releasing resources to plough back into agriculture in a way that can help a greater number of poor farmers.

CONCLUSION

9.30 Fertiliser subsidies are very costly, accounting for about 0.8 per cent of GDP (including arrears). They encourage urea overuse, which damages the soil, undermining rural incomes, agricultural productivity, and thereby economic growth. The current subsidy design—uncapped, varying by end use, and larger for more inefficient producers—incentivises diversion, creates a black market that hurts farmers most and does not encourage producers to operate efficiently.

9.31 Reform of the fertiliser sector would not only help farmers and improve efficiency in the sector. It would also show that India is prepared to address exit constraints that bedevil reform in other sectors. Decanalising imports will ensure timely availability of fertilisers, and universal Direct Benefit Transfer (DBT) to farmers based on biometric identification with physical offtake (see Chapter III) can

reduce diversion of urea. Given the sensitivity of urea, the DBT could be started for DAP and MOP to create confidence that DBT is workable in fertiliser. Rationalising subsidies to domestic firms would release fiscal funds to spend more effectively on schemes that help poor farmers, such as drip irrigation and connectivity through the Pradhan Mantri Gram Sadak Yojana.

9.32 Finally, to secure long term fertiliser supplies from locations where energy prices are cheap, it might be worth encouraging Indian firms to locate plants in countries such as Iran following the example of the Fertiliser Ministry's joint venture in Oman, which allowed India to import fertiliser at prices almost 50 per cent cheaper than the world price.