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How can Indian farmers be weaned away from urea, DAP and potash?

All these three fertilisers are imported, whether directly or as inputs for domestic manufacturing. Capping or even reducing their consumption has become a strategic imperative of sorts for India. Can their use go down? If yes, how? We explain.

EXPRESS RESEAR
The story of community: dwindling

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A farm labourer sprays fertiliser in a field. (Express photo by Gurmeet Singh)

Capping or even reducing the consumption of urea, di-ammonium phosphate (DAP) and muriate of potash (MOP) has become a strategic imperative of sorts for India.

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The primary reason: All these fertilisers are imported, whether directly or as inputs for domestic manufacturing.

MOP is wholly imported from countries such as Canada, Russia, Jordan, Israel, Turkmenistan and Belarus, as India has no mineable potash reserves. In urea, India's production meets over 85% of its consumption demand, but the plants mostly run on liquefied natural gas imported from Qatar, US, UAE or Angola.

DAP is imported in the form of finished fertiliser (mainly from Saudi Arabia, China, Morocco, Russia and Jordan) as well as raw material (rock phosphate from Jordan, Morocco, Togo, Egypt and Algeria; sulphur from UAE, Qatar and Oman) and intermediate chemicals (phosphoric acid from Jordan, Morocco, Senegal and Tunisia; ammonia from Saudi Arabia, Qatar, Oman and Indonesia).

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Import dependence – made worse by the rupee's depreciation – apart, a second reason for limiting urea, DAP and MOP usage is that they are high-analysis fertilisers: Urea and MOP contain 46% nitrogen (N) and 60% potash (P) respectively. DAP has 46% phosphorous (P) plus 18% N.

Most crops don't require fertilises with such high percentage of individual nutrients. They need balanced fertilisation – products with nutrients in the right quantities and ratios for effective absorption through the plant roots and leaves.

These include not only N, P and K, but also secondary nutrients (sulphur, calcium and magnesium) and micronutrients (zinc, iron, copper, boron, manganese and molybdenum). Weaning away farmers from high-analysis fertilisers also translates into more efficient use of imported material and scarce foreign exchange.

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An effective DAP replacement

A good example is 20:20:0:13 or ammonium phosphate sulphate (APS). A complex fertiliser with 20% N, 20% P, 0% K and 13% sulphur (S), it has emerged as an effective substitute for DAP, despite having less than half of the latter's P content.

DAP is manufactured by importing merchant-grade phosphoric acid with 52-54% P content and reacting it with ammonia (the source of N). The end-product has 18% N and 46% P.

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But companies can, instead, import rock phosphate with 28-36% P and react it with sulphuric acid. The resultant "weak" phosphoric acid, with only 27-29% P, is further reacted with ammonia and sulphuric acid to produce 20:20:0:13. Alternatively, they can import normal "strong" phosphoric acid, while using less of it for

simultaneously reacting with sulphuric acid (the source of S) and ammonia to make APS.

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"The idea is not to waste expensive phosphoric acid. Making one tonne of DAP requires about 460 kg of phosphoric acid and 220 kg of ammonia. Here, you use only 220-230 kg of phosphoric acid, 220 kg of ammonia and 1,200 kg of sulphuric acid to get one tonne of 20:20:0:13," explained G. Ravi Prasad, a fertiliser industry veteran.

Substitution drivers

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APS, according to Prasad, is good enough for oilseeds, pulses, maize, cotton, onion, chilly and all such "sulphur-hungry" crops. Even the P and K nutrient requirement of potato can be effectively met through 10:26:26:0 or 12:32:16:0 complex fertilisers: "We should reserve DAP use only for wheat, rice and sugarcane".

Sales of 20:20:0:13 recorded a 32.4% jump, from 4.9 million tonnes (mt) in April-January 2024-25 to 6.5 mt in April-January 2023-24, while dipping by 14.1% for DAP (*see table*). The current fiscal (April-March) could end with all-time-high APS sales of 7 mt and DAP at 9 mt, the lowest since 2016-17.

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CONSUMPTION/SALE OF MAJOR FERTILISER PRODUCTS

	UREA	DAP	20:20:0:13@	SSP	MOP	NPKS*
2013-14	306	73.57	33.37	38.79	22.8	72.64
2014-15	306.1	76.26	38.02	39.89	28.53	82.78
2015-16	306.35	91.07	37.82	42.53	24.67	88.21
2016-17	296.14	89.64	37.14	37.57	28.63	84.14
2017-18	298.94	92.94	35.47	34.39	31.58	85.96
2018-19	314.18	92.11	36.9	35.79	29.57	90.28
2019-20	336.95	101	42.25	44.03	27.87	98.57
2020-21	350.43	119.11	51.63	44.89	34.25	118.11
2021-22	341.8	92.72	50.7	56.81	24.56	114.79
2022-23	357.25	104.18	50.42	50.17	16.32	100.74
2023-24	357.8	108.12	53.94	45.44	16.45	110.73
Apr-Jan '23-24	317.5	101.47	49.1	42.37	13.96	100.12
Apr-Jan '24-25	345.73	87.13	65	45.12	18.76	128.38

*fig. in (lakh tonnes) *Includes 20:20:0:13; @Includes 20:20:0:0*
Source: The Fertiliser Association of India.

Fertiliser consumption and sale data.

APS has become India's third largest-consumed fertiliser after urea and DAP. It has overtaken single super phosphate (SSP), previously the most popular alternative to DAP. SSP, which contains 16% P and 11% S, is manufactured by reacting rock phosphate directly with sulphuric acid.

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"APS was traditionally consumed in the South (60% share) and West (Maharashtra, Madhya Pradesh and Gujarat). But in the last 4-5 years, its acceptability has increased inthe East and even North, and across crops. It is a stable product with P in water-soluble form, besides having N (not present in SSP) and S (absent in DAP)," said N. Suresh Krishnan, chairman of the Fertiliser Association of India.

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Leading APS producers are Coromandel International, Paradeep Phosphates, Mangalore Chemicals & Fertilizers, Fertilisers and Chemicals Travancore (FACT), Indian Farmers Fertiliser Cooperative and Gujarat State Fertilizers & Chemicals. While FACT was the pioneer – marketing 20:20:0:13 as FACTAMFOS and also in

zincated (0.5% zinc) form – the others, too, have been aggressively marketing this fertiliser.

A key driver has been the short supply of DAP and the government not providing enough subsidy to cover import/production costs.

The Centre has informally fixed a maximum retail price (MRP) of Rs 27,000 per tonne for DAP. That, along with a subsidy of Rs 21,911 and a special concession of Rs 3,500, takes the gross realisation for to Rs 52,411 per tonne. As against this, the ruling landed price of imported DAP alone is around $636 or Rs 55,150 per tonne.

Adding customs duty, port handling, bagging, interest, dealer margin and other expenses pushes up the total cost to over Rs 65,000 per tonne, making imports unviable. These have fallen, from 5.1 mt in April-January 2023-24 to 4.3 mt in April-January 2024-25.

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On the other hand, the MRP of APS is just Rs 1,000 lower at Rs 26,000 per tonne. And by selling twice the number of bags from the same quantity of phosphoric acid, companies are making some money – not losing, as they are with DAP now.

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The road ahead

This fiscal (2024-25) should see sales of NPKS complex fertilisers touch 14 mt, almost double the 7.3 mt of 2013-14. Much of it is courtesy of 20:20:0:13, which is steadily replacing DAP.

A similar marketing push is necessary for 10:26:26:0, 12:32:16:0, 15:15:15:0 and 14:35:14:0, so as to minimise direct application of MOP and selling only after incorporating into these complexes.

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The ultimate goal, to repeat, must be to cap, if not reduce, consumption of all high-analysis fertilisers. That includes urea; farmers need to be nudged towards nutrient use efficiency with a view to maximise the bang for the buck (read foreign exchange).