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A Bird Eye View of Fertiliser Industry of India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors have read and approved the final manuscript.

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ABSTRACT

This paper attempts to provide a highlight of fertiliser industry of India by focusing on growth rate of industry and demand and supply side of fertiliser in India. Discussion is also made on consumption pattern of fertilisers in Indian states. And at last to know more about the industry porter's five forces model analysis is done. Secondary data is used from published sources and the data which is available at public domain. Various tables and graphs are used to demonstrate the data. Different comparison and relations were made where necessary. After the FAO reports of 2016, India is using 165.85 Kg of fertiliser per hectare of arable land. China stands at 1st rank and India ranks 2nd and in nitrogenous and phosphatic fertiliser consumption. The Indian fertiliser market was worth INR 5,437 Billion in 2018. Looking forward, the market is projected to reach INR 11,116 Billion by 2024, growing at a CAGR of 12.3% during 2019-2024. In case of Urea, India has achieved 80-85% of self-sufficiency, and rest is imported from our joint ventures in abroad. To meet

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the demand of urea by indigenous production and to reduce the imports, Government of India, is investing an amount of Rs. 37971 Crore Rupees for revival of five fertiliser plants in India. Since FY 2016-17, the food grain production is increasing with the fertiliser consumption in India, because use of fertiliser is an important factor which impacts the food grain production in India. Unfortunately the, heavy use of urea is misbalancing the ideal fertiliser application ratio. To improve this ratio farmer's has to move from straight fertilisers towards NPKS complex fertilisers for supplying the essential nutrients required by the plants for growth.

Keywords: Consumption; fertiliser industry; import; production; nutrient misbalancing.

1. INTRODUCTION

India is basically an agricultural based economy like some other developing countries. Agriculture and allied sectors have contributed 14.39% in GDP during 2018-19. As agricultural sector is providing employment opportunities to more than 42 % of total population still contribution of agriculture in Indian GDP is reducing gradually. In the year 1950-51, it is around 51% and rest is of other sectors. The production of food grain has increased from 50.82 Million Tonnes in 1950-51 to 281 Million Tonnes in 2018-19. Food grain basically includes crops like rice, wheat, maize and nutri cereals. There can be several factors which affect the crop yield like High Yielding Varieties (HYV), proper irrigation and other intercultural operations, balanced use of fertilisers and usage of plant protection chemicals against pests and diseases. The population of our country is growing from year to year. So, as of now it is a big challenge for our country to feed this population as we cannot expand the land area of our country. Use of fertilisers can be the possible way to increase the yield up to a certain level. So, this paper attempts to talk about few aspects related to the fertiliser industry. Fertiliser production in India was started in 1960, when EID parry started manufacturing Single Super Phosphate (SSP) in Ranipet, Tamil Nadu. The installed capacity of this plant was 6000 Metric Tonnes per Annum. After this Fertiliser factory, in 1943, The Fertiliser& Chemicals Travancore of India Ltd. (FACT) at Cochin in Kerala and also the Fertilisers Corporation of India (FCI) at Sindri in Bihar were started [1]. Later Green revolution came in India during 1960s and from that we have achieved self-sufficiency in crop production. Before that we have to import our food grain from America and Mexico to feed our population. After almost 50-60 years of Green Revolution we are in a stage of exporting our food grains to other countries also. But if talks about fertiliser production and consumption in our country as of now we have achieved 80-85% self-sufficiency in case of urea. For phosphatic and potassic fertiliser we have to still depends upon imports due to lack of indigenous feedstock for production [2]. To have a particular management of production scenario, transportation of fertilisers to different states as much as required and affordable price and availability to every farmer, there is a central administration in India and that is Department of Fertiliser, Government of India. The Government of India has been constantly pursuing policies conductive to increase availability and balanced use of fertiliser in the country. To ensure timely and adequate availability of and equitable distribution of fertilisers, a host of policy measures has been taken. To take care of fertiliser companies' two types of subsidies are given named production subsidy and freight subsidy [3].

1.1 Objectives

The main objectives of this study about India are follows:-

- To study the growth rate of fertiliser industry
- To find demand and supply position of fertilisers
- To study consumption of fertiliser in Indian states
- To compare consumption of fertilisers and production of food grains
- To have a Porter's five force model analysis of fertiliser Industry

2. MATERIALS AND METHODS

To fulfil those above set up objectives, various data are collected from different government websites, which are available at public domain. Secondary data aretaken from published sources. The data of fertiliser production, consumption is collected from Fertiliser Management System website and analyzed by using MS Excel. The data related to food grains

Chart 1. Classification of fertilisers

Straight fertiliser			Complete fertilisers	Complex fertilisers
Nitrogenous	**Phosphatic**	**Potassic**	**NP Complex**	**NPK&NPKS Complexes**
Urea 46% N	Single Super Phosphate 16% P	Muriate of Potash 60% K	Mono Ammonium Phosphate NPK Grade 11-52-0	NPK Grade 12-32-16
Calcium Ammonium Nitrate 25% N				NPK Grade 10-26-26
Ammonium Chloride 25% N	Triple Super Phosphate 46% P		Di Ammonium Phosphate NPK Grade – 18-46-0	NPK Grade 14-35-14
Ammonium Sulphate 20.6 % N				NPKS Grade 20-20-0-13

are collected from various published reports published by Department of Agriculture Cooperation & Farmers Welfare, Government of India. Tables and graphs are used to demonstrate the data. Different comparison and relations were made where necessary.

As it is clear from the Chart 1 that, fertiliser are classified into three different categories i.e. straight fertiliser, complete fertilisers & complex fertiliser. Straight fertilisers are those fertilisers which containonly one of the major nutrients; whereas complete fertilisers are having two nutrients and complex fertiliser are having three or more plant nutrients (Indian fertiliser scenario 2018). For plant growth basically three main nutrients are required. Those three main nutrients are nitrogen (N), phosphorus (P) and potassium (P). Nitrogenous straight fertiliser includes Urea (46%) widely used by farmers of India. Other straight nitrogenous fertilisers include Ammonium Sulphate (20.6%), Calcium Ammonium Nitrate (CAN) with 25% N and Ammonium Chloride with 25% of Nitrogen. For Phosphate fertiliser we have two straight fertilisers i.e. Single Super Phosphate and Triple Super Phosphate with 16% and 46% of Phosphate respectively. Muriate of Potash is the only straight fertiliser which contains 60% of potassium. In case of complete fertiliserwe are having fertiliser which supplies two major nutrients; it includes Mono Ammonium Phosphate (11-52-0) and Di Ammonium Phosphate (18-46-0). A complex fertiliser includes three of more major nutrients and sometimes they also include the micro nutrients for example 20-20-0-13 contains Sulphur along with Nitrogen, Phosphorus and Potassium. Some of the grades of complex fertilisers which are popular among Indian farmers are, 12-32-16, 10-26-26 and 14-35-15 [4].

3. RESULTS AND DISCUSSION

3.1 An Overview of Indian Fertiliser Industry

At present time, ranking of India population wise is 2nd after China and it is projected that in 2025 India may pass China to become most populated country in the world. To feed such a huge population we have to increase our food grain production. If we talks about major nitrogenous fertiliser consuming countries China stands at 1st rank and India ranks 2nd and same is the case with major phosphatic fertiliser consuming countries, China is at 2nd rank followed by India. When we talks about Potassic fertiliser consumption, China is again at 1st rank while India ranks 4th that is because India is totally dependent on imports as unavailability of feedstock material for production of Potassic fertilisers.

The Indian fertiliser market was worth INR 5,437 Billion in 2018. Looking forward, the market is projected to reach INR 11,116 Billion by 2024, growing at a CAGR of 12.3% during 2019-2024. Fertilisers have played a key role in the success of India's green revolution and subsequent self-reliance in food-grain production. The increase in fertiliser consumption has contributed significantly to sustainable production of food grains in the country. As a result, the demand of fertilisers has witnessed double digit growth rates over the past several years.Despite a strong growth in recent years, the average intensity of fertiliser use in India remains much lower than most of the developed and emerging countries around the world. As per the FAO reports of 2016, India is using 165.85 Kg of fertiliser per hectare of arable land.

3.2 Demand & Supply Position of Fertiliser in India

After independence, population of India has grown drastically and farmers are unable to produce huge amount of food grains because of natural farming. As, at that farmer don't use fertilisers, pesticides and other better quality of the agricultural inputs. So Government has to import food grains during 1950-60. Later in 1960s, Green Revolution came and food grain production has increased because of Integrated Agriculture Development Program (IADP) [5]. This is the era of a new starting. Farmers started using High Yielding Varieties, which are basically dwarf varieties resistant to lodging. And slowly after some years India has achieved self-sufficiency in food grain production. As fertiliser increases the fertility of soil so it is an important factor in crop cultivation and food grain production. Due to this reason farmers started using it in more and more quantity. And because we are unable to produce that much fertiliser at that time to meet the demand of the farmers so we have to start importing the fertiliser. At current time, because of unavailability of feed stock material we have to completely import MOP and a major portion of that is imported from Morocco and Japan. In case of Urea, India has achieved 80-85% of self-sufficiency, and rest is imported from our joint ventures in abroad. To fulfil the requirements Government has established some joint venture outside India also. Below is the list of them:-

3.3 Government of India is Having Seven Joint Ventures Abroad

- FOSKOR (Pty) Limited South Africa supplying phosphoric acid
- ICS Sengel & ICS Sengel (exp.) for supplying phosphoric acid
- Indo Maroc Phosphore S.A (IMACID) at Morocco for supplying phosphoric acid
- Tunisian Indian Fertilisers (TIFERT), Skhira Tunisia for supplying phosphoric Acid
- Jordan India Fertiliser Company, Eshidiya Jordan for supplying phosphoric acid
- Oman India Fertiliser Company, Muscut Oman for supplying urea
- One more joint venture is proposed names JV at Gabon for urea supply

From this (Table 1), it can be said that demand for all the fertiliser is increasing from 2020-21 to 2022-23 except urea. This is because Government is trying to replace usage of urea with alternate source like NP/NPKS fertiliser, as urea is supplying only one major nutrient i.e. Nitrogen (N).

To meet the demand of urea by indigenous production and to reduce the imports, Government of India, is investing an amount of Rs. 37971 Crore Rupees for revival of five fertiliser plants in India. India's requirement during 2018-19 was about 305LMT of Urea. Different Urea manufacturing companies have collectively produced around 241 LMT of Urea and the rest of 64LMT imported from various joint ventures and from other countries. The government fixes the maximum retail price of urea and manufacturers are compensated by way of subsidies. At present, there are 31 urea units in the country out of which 28 urea units use Natural Gas (using domestic gas/LNG/CBM) and remaining three urea units use Naphtha as feedstock. The government is reviving five closed fertiliser plants of the Fertiliser Corporation of India (FCIL) and Hindustan Fertiliser Corporation Ltd (HFCL). They are FCIL plants at Talcher (Odisha), Ramagundam (Andhra Pradesh), Gorakhpur (Uttar Pradesh), Sindri (Jharkhand) and HFCL's plant at Barauni (Bihar). All those five Fertilisers plants are having a capacity of producing 13LMT of Urea Annum. As per report by DOF, one more fertiliser plant at Panagarh (West Bengal) owned by Matix Fertilisers and Chemical Private Limited is going to start with same production capacity of 13 LMT per Annum.

As per Urea Policy (Pricing and Administration) by Department of Fertiliser, Government of India, The MRP of urea is statutorily fixed by the Government of India and at present it is Rs. 268 for a 50 Kg bag of urea Rs. 242 for a 45 kg bag of urea which includes Rs. 354/MT as dealer margin for private traders/PSUs/Cooperatives and Rs. 50/MT which is paid to retailers for acknowledging the receipt and reporting the stock in mobile Fertiliser Management System as additional incentive. However, in the state of Uttar Pradesh prices due to levy of Additional VAT on natural gas by Government of Uttar Pradesh are Rs. 298 for a 50 Kg bag of Urea and Rs. 269 for a 45 kg bag of Urea. The aforementioned rates are exclusive of the central excise duty, Central Tax, Integrated Tax, Union Territory Tax or Countervailing Duty, state tax and other local taxes wherever levied, whether at the retail sales point or at an intermediate stages and other charges towards neem coating. The

difference between the delivered cost of fertilisers at farm gate and MRP payable by the farmer is given as subsidy to the fertiliser manufacturer/importer by the Indian Government.

3.4 Supply of Fertiliser

The fertiliser manufacturers in India are classified into three different categories. Firstly, Public Sector Company, Co-operative Sector and third are Private Sector. In the FY 2018-19 and 2019-20, in India there are 31 different Urea manufacturing units at various places with total installed capacity of around 207.52 LMT per annum and if we talk about Di Ammonium Phosphate we have only 12 manufacturing set up all across the nation with an installed capacity of around 90 LMT per annum. The reason of les no. of DAP manufacturing plant is because it is little difficult and expensive to produce DAP as compared to other fertilisers. And because of unavailability of raw material we don't have any manufacturing plant for MOP in our country. For manufacturing of NPKS complex fertilisers of different grades totally we are having 20 manufacturing plants at different stares with a total capacity of around 70 LMT per annum. And as SSP production is little cheaper than all and it comparatively less costly we have 110 different manufacturing set up with total installed capacity of 120 LMT per annum. To meet the requirements of fertilisers government is trying to reduce the dependency on imports especially in case of urea because, Government is providing huge subsidies to manufactures. So government is trying to reduce imports as much as possible.

3.5 Installed Capacity of Fertiliser Plants

To make fertiliser available to every farmer present across the nation, Government of India is making serious efforts. It includes revival of old shut down plants, and also by implementing various schemes and policy. New Price Scheme is one of them.& reduction of import of Urea from other countries. Table 2below is the list attached of sector wise capacity of fertiliser production 01-11-2019.

3.6 Production of Fertilisers in India (Last 5 Years Data)

From the graph (Fig. 1) we can see that, Urea is the major fertiliser produced every year, followed by NPKS complex. In the FY 2019-20, India has produced 24455100.9 MT of urea followed by NPKS complex which is 9333630.125 MT, then followed by DAP which is around 4549981.94 MT and at last 4253045.821 MT of Single Super Phosphate (SSP). The demand is not fulfilled by indigenous production, so India has to import fertilizers.

In East Zone states are Assam, Orrisa West Bengal and Jharkhand. In West Zone states are Rajasthan, Gujarat, Maharashtra, Goa and Madhya Pradesh. In North Zone states are Uttar Pradesh, Haryana and Punjab. In South Zone states are Andhra Pradesh, Tamil Nadu and Kerala (Table 3).

Table 1. Projection of fertiliser demand in India(In 000' tonnes)

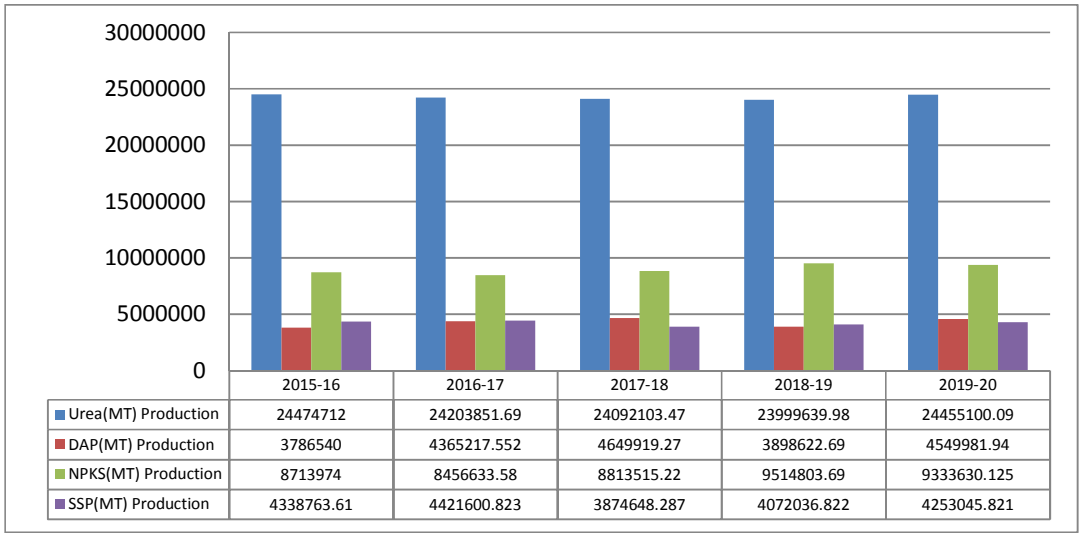
Year	Urea	DAP	NP/NPKS	SSP	MOP
2020-21	36064	13179	13284	7248	5195
2021-22	36808	13392	13558	7566	5224
2022-23	36720	13710	14224	7814	5395

Source: -Working Group Report on Fertiliser Industry for 12th Five year Plan (2012-13 to 2016-17)

Table 2.Sector wise capacity of fertiliser production(production capacity in 000' tonnes)

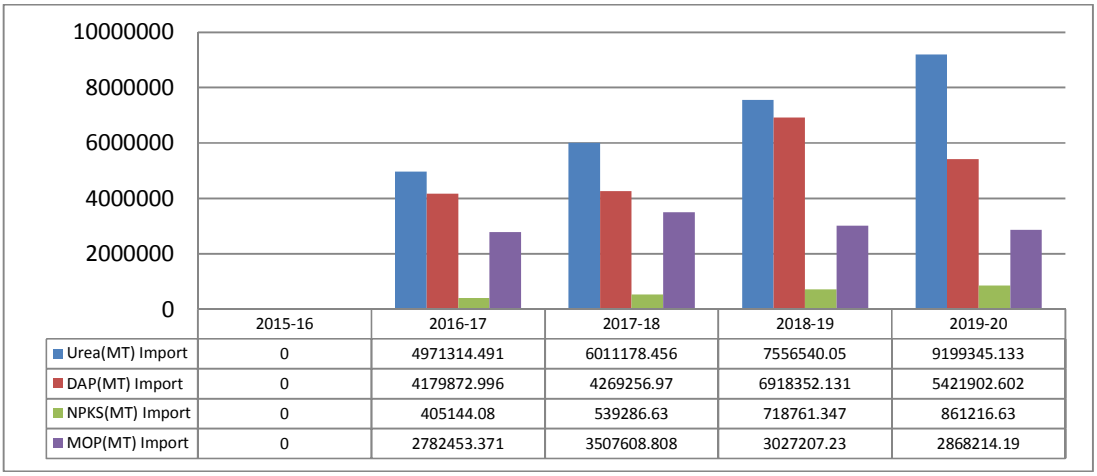
Sector	Urea	NPKS Fertiliser (Including DAP)	SSP	Total
Public	6894.4	2163.5	-	9057.9
Private	12774.3*	9318.1	12240.0	34332.4
Co-operative	6436.6	4335.4	-	10772
Total	26105.3	15817.0**	12240.0	54162.3

- ** includes capacity of Matix Fertiliser& Pvt. Ltd. which is not in operation phase due to unavailability of feedstock material*
- *** includes DAP production is which is 7546.9 thousand tonnes*



	2015-16	2016-17	2017-18	2018-19	2019-20
Urea(MT) Production	24474712	24203851.69	24092103.47	23999639.98	24455100.09
DAP(MT) Production	3786540	4365217.552	4649919.27	3898622.69	4549981.94
NPKS(MT) Production	8713974	8456633.58	8813515.22	9514803.69	9333630.125
SSP(MT) Production	4338763.61	4421600.823	3874648.287	4072036.822	4253045.821

Fig. 1. Production of fertilisers in India



	2015-16	2016-17	2017-18	2018-19	2019-20
Urea(MT) Import	0	4971314.491	6011178.456	7556540.05	9199345.133
DAP(MT) Import	0	4179872.996	4269256.97	6918352.131	5421902.602
NPKS(MT) Import	0	405144.08	539286.63	718761.347	861216.63
MOP(MT) Import	0	2782453.371	3507608.808	3027207.23	2868214.19

Fig. 2. Import of fertiliser in India

Table 3. Zone wise fertiliser production in India

ZONE	Product	Production Capacity (in 000'MT)	Produced (2018-19)
East Zone	Urea	1780.5	310.2
	DAP	2760	1611.6
	NPKS	2700	1632.2
West Zone	Urea	12426.1	12985
	DAP	2859	1465.1
	NPKS	10016.8	3246
North Zone	Urea	7541.1	7996.4
South Zone	Urea	3336.7	2908.8
	DAP	2491.9	940.8
	NPKS	12098.7	2858.4

3.7 Import Scenario

As it is possible to see, from graph (Fig. 2) that there was no import of fertilisers of India during 2015-16. And afterwards import of urea was increased from 4971314.491 MT in 2016-17 to 9199345.133 in FY 2019-20. Same is the case with NPKS Complex fertilisers, amount of fertiliser increases from 405144.08 to more than double in 2019-20.

Table 4. State wise& zone wise consumption of fertiliser in India –during FY2018-19 & 2019-20

Zone	States	Amount of fertilisers used during 2018-19 (IN MT)					Amount of fertilisers used during 2019-20 (IN MT)				
		Urea	DAP	MOP	NPKS	SSP	Urea	DAP	MOP	NPKS	SSP
East	Assam	391671	63898	78069	16541	90601	348931	64986	76180	16517	96477
East	Bihar	2183646	677576	222777	332243	77435	2275480	713147	246945	302211	86679
East	West Bengal	1306224	315259	265080	985926	366331	1289713	323241	261531	944756	339273
East	Jharkhand	229368	83887	4667	41240	3641	251204	85760	4805	34653	3127
East	Manipur	27423	156	175	0	2599	20226	6572	1615	127	5902
East	Mizoram	11501	0	66	0	1300	7728	500	84	0	0
East	Nagaland	387	50	0	0	0	1233	200	0	100	0
East	Odisha	558045	192401	133020	261574	17218	532989	206157	123637	262747	13604
East	Puducherry	11261	1025	1812	3754	495	10254	1128	1135	7391	424
East	Tripura	15517	4535	6191	1186	18218	19319	1336	6483	691	20614
West	Dadra Nagar Haveli	191	140	0	0	0	579	444	0	34	0
West	Goa	2188	1644	594	2548	12	1832	178	511	3473	0
West	Gujarat	2103348	462633	143002	559718	109684	2289032	523119	139028	705712	136912
West	Madhya Pradesh	2561290	1298535	114733	334272	957787	2907338	1305651	113158	329687	1046693
West	Maharashtra	2180378	608631	400292	1958099	863260	2344063	587247	314920	2061719	781781
West	Chhattisgarh	757515	323026	91396	114185	188267	797047	341925	88290	88927	200524
North	Haryana	2158213	578144	71114	37590	167154	2030373	624469	64357	22439	152656
North	Himachal Pradesh	66948	1073	8354	31580	4052	70441	1152	7960	33679	3167
North	Jammu and Kashmir	134161	61278	24635	1501	0	153164	60928	34745	855	0
North	Delhi	21118	2783	710	0	199	25521	4513	583	43	0
North	Punjab	3048772	762766	59536	59180	106382	2865751	731722	73147	33762	106668
North	Uttarakhand	268489	32503	7303	33032	10044	244519	42346	7654	26641	10554
North	Uttar Pradesh	6564731	1964683	210482	657238	387444	7172601	2372445	259266	564465	432253
North	Rajasthan	2031547	702875	32456	95111	384799	2291324	864238	26988	59845	455656
South	Karnataka	1340889	559160	302829	1341068	49710	1502230	527293	269123	1499682	50000
South	Kerala	100536	22333	99737	131075	853	112385	17768	79788	123698	1087
South	Tamil Nadu	902316	245619	281940	528618	58554	867533	240006	242835	628049	56158
South	Telangana	1375452	228461	151170	1057202	40172	1611059	252743	188672	1249597	47082
South	Andhra Pradesh	1365970	300068	242097	1036910	159103	1527211	377070	257930	1424900	161381
Total		31719094	9495140	2954235	9621391	4065312	33571078	10278282	2891370	10426399	4208671

Table 5. Fertiliser consumption &food grain production of India

S. No.	Year	Fertiliser consumption (In 000' tonnes)	Food grain production(In 000' tonnes)
1	2010-11	28,122.2	2,44,490
2	2011-12	27,790.0	2,59,290
3	2012-13	25,536.2	2,57,130
4	2013-14	24,482.4	2,65,048
5	2014-15	25,581.3	2,52,025
6	2015-16	26,752.6	2,51,542
7	2016-17	25,949.9	2,75,112
8	2017-18	26,593.4	2,85,014
9	2018-19	27,228.2	2,81,300
10	2019-20	28,262,3*	2,91,950*

- ** provisional data*
- *Fertiliser consumption data includes all three major nutrients N, P_2O_5, and K_2O*
- *Food grain includes rice, wheat, maize and nutri cereals; (Source: - Department of Fertilisers & Department of Agriculture Annual Reports)*

3.8 State Wise & Zone Wise Consumption of Fertiliser in India

In Financial Year2019-20, Top three urea consuming states are Uttar Pradesh, Madhya Pradesh & Punjab. 72% of the total consumption of urea is done by top eight states namely, Uttar Pradesh, Madhya Pradesh, Punjab Maharashtra, Rajasthan, Gujrat, Bihar and Haryana. Top 3 Di Ammonium Phosphate consuming states are Uttar Pradesh, Madhya Pradesh and Rajasthan. Top 3 Muriate of Potash consuming states are Maharashtra, Karnataka and West Bengal. For NPKS Complex fertilisers top three states are Maharashtra, Karnataka and Andhra Pradesh. And for Single Super Phosphate top 3 states Madhya Pradesh, Maharashtra and Rajasthan (Table 4).

Seven Indian States and Union Territories namely Andaman and Nicobar Islands, Arunachal Pradesh, Chandigarh, Daman and Diu, Lakshadweep, Meghalaya, Sikkimare not using any kind of fertiliser. This is because there is no agriculture or their farming practices are totally dependent on organic farming.

3.9 Fertiliser Consumption & Food Grain Production of India

From the table (Table 5) we can see that, from last 4 years, since Financial Year 2016-17, the food grain production is increasing with the fertiliser consumption in India. Because use of fertiliser is an important factor which impacts the food grain production in India.

3.10 Porters Five Force Model Analysis of Indian Fertiliser Industry

Rivalry among existing competitors is high. Due to following reasons:-

Major market captured by private sector companies and then followed by public sector and co-operative sector. Different suppliers of raw material used by different 'companies' leads to cost competitiveness & quality of products. Companies come up with different products such as completely water soluble fertilisers, spray fertilisers, fertilisers with micro nutrients so by use of these products less wastage & more efficiency of fertilisers increases.

Threat of new entrants is moderate. Due to following reasons :-

Fertiliser production is capital intensive and presently the cost of production of indigenous material is high and returns on investment are low. Lack of availability of domestic natural gas for production of urea. India does not have potential rock phosphate reserve; it is completely dependent on import of either rock phosphate or phosphoric acid or Di Ammonium Phosphate. Present public & co-operative fertiliser industries captured almost full rural market giving fertiliser subsidies from government so it is difficult for new entrants to maintain low price with high production cost.

Bargaining power of suppliers is high. Due to following reason:-

Main source of the raw material for fertilisers production are the natural products. Natural gas suppliers are very few & mostly outside the

country so it is difficult to cope up with the prices of Natural gas for the production of Urea, as it is the main fertiliser used in large quantity by farmers. For production of phosphatic fertilisers, in India there are very few sources of rock phosphate & phosphoric acid available so this production completely dependent on import of rock phosphate.

Bargaining power of buyers is low. Due to following reason:-

In India about 70% population depends on agriculture so there is always high demand of fertilisers. Very high differentiation of crops grown, area of production, climatic variations, so it is difficult to provide optimum supply of all fertilisers. Less availability offertilisers in peak season. The costs of fertilisers are high (except urea).Bargaining power of buyer (farmers) is low because of less collective action shown by the farmers. And also around 85% of Indian farmers are having less than 2 hectare of land so they are not in this position of bargaining.

Threat of substitutes is moderate. Due to following reason:-

Bio fertilisers are introduced into the market by private players. Farmers are also using Organic fertilisers like cattle dung and Farm Yard Manure (FYM) as they have their availability with them. Also farmers are growing green manures crops like Daincha and doing vermi compost side by side. Other source of growth promoters are provided by pesticides, herbicides companies. Organic fertiliser is sold together but attaching them with chemical fertilisers like urea.

4. CONCLUSION

Crop productivity is increased by fertiliser application as it provides essential nutrients to the soil. Three basic plant nutrients are essential for plant growth Nitrogen (N), Phosphorus (P), and Potassium (K). The Indian fertiliser market was worth INR 5,437 Billion in 2018. Looking forward, the market is projected to reach INR 11,116 Billion by 2024, growing at a CAGR of 12.3% during 2019-2024. In case of Urea, India has achieved 80-85% of self-sufficiency, and rest is imported from our joint ventures in abroad. Just to reduce the import of urea, Government is reviving five closed fertiliser plants. Increasing the installed capacity of fertilisers plant by latest technology is also an alternate method. For MOP we are totally dependent on imports due to lack of raw material. Urea is most heavily used fertilisers by farmers that lead to misbalancing the ideal fertiliser usage ratio. The idea ratio is 4:2:1 for N, P & K respectively. So government is trying to educate farmers to move from straight fertiliser towards NPKS complex. That's the different thing that price of all NPKS complexes are higher than Urea. But by use of them soil inherent fertility can also be increased as they supports sustainable agriculture. Urea, DAP and MOP fertiliser consumption is highly dominated by the states of North zone followed by West zone followed by South and at last East zone.In case of NPKS complexes fertilisers, South zone is having highest consumption followed by West zone, East zone and North zone respectively at 2^{nd}, 3^{rd} and 4^{th} position. In fertiliser industry threat of new entrants is moderate and bargaining power of suppliers is high but bargaining power of buyers (farmers) is low. Threat of substitutes is moderate and rivalry among existing competitors is high because large no. of players is there in industry.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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