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POTASH

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GOVERNMENT OF INDIA
MINISTRY OF MINES
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23 Potash

Potash is an impure combination of potassium carbonate & potassium (K) salts. Over 90% of potash is used as fertilizer and is one of the three primary agricultural nutrients (N-P-K). All commercial potash deposits come originally from evaporite deposits and are often buried deep below the earth's surface.

The principal ore is sylvinite, a mixture of sylvite (KCl) and halite (NaCl). In India, a few deposits of potash mineral are reported from Sidhi district of Madhya Pradesh, Sonbhadra district of Uttar Pradesh, Kaimur district of Bihar and Sawai Madhopur & Karauli districts of Rajasthan. It is in the form of Glauconitic (a potassium-bearing green mica) sandstone. The entire requirement of potash mostly utilised for producing fertilizer products is met through imports.

RESERVES/RESOURCES

As per NMI database, based on UNFC system, the total resources of potash as on 1.4.2015 have been estimated at 22,508 million tonnes, all of which are placed under Remaining Resource category. Rajasthan alone contributes 91% to the total resources, followed by Madhya Pradesh (5%) and Uttar Pradesh (4%) (Table- 1).

EXPLORATION & DEVELOPMENT

The exploration and development details, if any, are covered in the Review on Exploration & Development under "General Reviews".

OCCURRENCES

Glauconitic sandstones/greensands deposits can be used as an alternative indigenous resource for potash. Glauconite is essentially a complex hydrous silicate of iron and potassium chiefly with ferric oxide and partly with ferrous oxide. It contains about 4–7% K_2O.

Major part of these resources (91%) are located in Nagaur district of Rajasthan, followed by Panna district, Madhya Pradesh (5%) and the balance in Sonbhadra & Chitrakoot districts, Uttar Pradesh (4%). Occurrences of potash are also reported from Tirap district of Arunachal Pradesh; Rohtas district of Bihar; Kachchh district of Gujarat; Rohtak & Sirsa districts of Haryana; Leh district of Jammu & Kashmir; Sidhi district of Madhya Pradesh; Bhatinda district of Punjab; Bhilwara & Nagaur districts of Rajasthan; Tanjavur district of Tamil Nadu and Banda, Chitrakoot, Sonbhadra & Etah districts of Uttar Pradesh.

In Rajasthan, glauconitic sandstones/shales occur in Chittorgarh, Kota, Karauli, Jaisalmer and Barmer districts. In Gujarat, glauconite is found in Ukra Formation at Guneri in Kachchh district. In Himachal Pradesh, glauconite of hydrothermal origin is found in Kumla-Kathwar area of Sirmaur district. In Kerala, glauconite occurs in Quilon Limestone and seabed sediments of Thiruvananthapuram coast.

USES

Potash is the general name given to various inorganic compounds that contain potassium in a water-soluble form. A number of common potassium compounds exist, including potassium carbonate and potassium chloride. Before the industrial era, potash was obtained by leaching wood ashes in a pot (hence the name 'pot-ash'). This product was used to manufacture soap, glass, and even gun powder.

Potassium chloride (KCl) is the principal fertilizer product with 60–62% of K_2O equivalent. Other salts that are used as fertilizer and that which are known to improve nutrient value & disease resistance in food crops are potassium sulphate, potassium magnesium sulphate and potassium nitrate. Potassium chloride and potassium nitrate are used in manufacture of glass, ceramics, soap & detergent, dye, synthetic rubber and chemicals. Potassium nitrate is used in explosive manufacture. Potash is also used as a raw material for manufacturing complex fertilizers.

Potash can be used on all plants to boost plant health and nutrition as well as to increase crop yields. While all potash fertilizers contain potassium there are a number of different forms in which it exists. The

Table – 1 : Reserves/Resources of Potash as on 1.4.2015
(By Grades/States)

(In million tonnes)

Grade/State	Reserves Total (A)	Remaining Resources				Total Resources (A+B)
		Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
All India : Total	**–**	**18142**	**3660**	**707**	**22508**	**22508**
By Grades						
Glauconite	–	878	1076	707	2662	2662
Polyhalite	–	13985	2179	–	16164	16164
Sylvite	–	2072	404	–	2477	2477
Unclassified	–	1206	–	–	1206	1206
By States						
Madhya Pradesh	–	1206	–	–	1206	1206
Rajasthan	–	16936	3462	22	20419	20419
Uttar Pradesh	–	–	198	685	883	883

Figures rounded off

two most common forms are Muriate of Potash (MOP) and Sulphate of Potash (SOP). Sulphate of Potash (SOP) is a premium potash fertilizer free of chloride (unlike MOP) which is harmful to plants. SOP is used primarily on high value crops, usually leafy plants, fruits and vegetables. MOP is commonly used on carbohydrate type crops, such as, wheat.

CONSUMPTION

As per FAI, the all India consumption of Potassic fertilizer (in K_2O content) was at 2.61 million tonnes during 2019-20, whereas it was 2.53 million tonnes in the previous year.

WORLD REVIEW

The world reserves are estimated at approximately 3,700 million tonnes of K_2O content. Reserves are located mainly in Canada (30%), Belarus (20%), Russia (16%), China (9%), USA (6%), Germany (4%) and Chile (3%) (Table-2).

The world production of potash in 2019 was 41.6 million tonnes in terms of K_2O content as against 43.8 million tonnes in 2018. Canada is the leading producer of potash with 31% share in total production in 2019, followed by Belarus (18%), Russia (16%), China (13%), Germany (6%), Israel (5%), Jordan (4%) and Chile (2%) (Table-3).

Table – 2: World Reserves of Potash
(By Principal Countries)

(In '000 tonnes of K_2O content)

Country	Reserves
World: Total (rounded off)	**>3700000**
Canada	1100000
Belarus	750000
Russia	600000
China	350000
USA[1]	220000
Germany	150000
Chile	100000
Spain	68000
Brazil	2300
Israel	[*]Large
Jordan	[*]Large
Laos	75000
Other countries	300000

Figures rounded off

Source: *Mineral Commodity Summaries, 2021*

[1]*Data are rounded to not more than two significant digits to avoid disclosing company proprietary data*

[*]*Israel and Jordan recover potash from the Dead Sea, which contains nearly 2 billion tonnes of potassium chloride*

Table – 3: World Production of Potash (By Principal Countries)

(In '000 tonnes of K_2O content)

Country	2017	2018	2019
World:Total (rounded off)	**43100**	**43800**	**41600**
Canada (Chloride)	12624	13944	12851
Belarus	7102	7346	7348
Russia (Chloride)	7320	7015	6771
China	5510	5450	5450
Germany (Potassic salts)	2964	2754	2615
Israel (Chloride)	2479	2345	2057
Jorden	1415	1486	1517
Chile (Chloride)	1197	989	682
UK (Polyhalite)	500	400	635
Other countries	2029	2089	1692

Source: *BGS World Mineral Production, 2015-19,*

FOREIGN TRADE

Exports

There is no reported production of potash in the country. However, exports of potash fertilizer decreased substatially by 28% to 29,569 tonnes in 2019-20, as compared to 41,327 tonnes during the previous year. Exports were mainly to Netherlands (23%), Nepal (18%), UAE (13%), Croatia (9%), Morocco (6%) and Peru (5%) . Exports of potassium nitrate increased by 22% to 985 tonnes in 2019-20 from 805 tonnes in the previous year. Exports were mainly to USA (28%), Thailand (27%), China (19%), Turkey (7%), Bangladesh (5%) and Indonesia (3%) (Tables- 4 & 5).

Imports

Like exports, imports of potash fertilizer also decreased marginally by 12% to 4.04 million tonnes in 2019-20 as compared to 4.58 million tonnes during the previous year. Canada (29%), Lithuania (17%), Russia (14%), Israel & Jordan (12% each), Belarus (11%) and Germany (3%) on the other hand, imports of potassium nitrate increased drastically to 208 tonnes in 2019-20 from 92 tonnes in the previous year. China (78%) and USA (22%) were the main suppliers of potassium nitrate in 2019-20 (Tables- 6 & 7).

Table – 4: Exports of Potash Fertilizers (By Countries)

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**41327**	**1223814**	**29569**	**1014821**
Nepal	7605	196503	5304	271904
Netherlands	5500	151221	6736	205119
UAE	5032	138493	3922	102340
Croatia	-	-	2600	74435
Morocco	2530	80241	1880	59877
Peru	4916	157925	1450	41805
Mozambique	532	15731	1089	34648
Pakistan	3539	111315	1020	33660
Tunisia	863	25287	890	25900
Sudan	-	-	840	25640
Other countries	10810	347099	3837	139494

Table – 5: Exports of Potassium Nitrate (By Countries)

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**805**	**154987**	**985**	**168081**
USA	188	34717	275	45951
Thailand	288	57318	266	42430
China	108	26155	184	36865
Egypt	39	12170	47	14450
Indonesia	6	1416	34	7959
Turkey	24	1552	72	4622
UAE	17	3821	17	3926
Korea, Rep.of	23	4388	22	3573
Bangladesh	57	4454	50	3010
South Africa	54	1588	6	2268
Other countries	51	7408	13	3027

Table – 6 : Imports of Potash Fertilizers (By Countries)

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**4576732**	**86989503**	**4040269**	**83239621**
Canada	1419533	26950754	1166314	23700186
Lithuania	487433	9178119	668214	13626964
Russia	439533	7131262	573325	11639377
Israel	688101	13258899	484718	9932847
Jordan	598439	11471069	466363	9586685
Belarus	743689	14198371	453536	9086784
Germany	113150	2342793	137937	3101808
USA	35441	786032	31542	633600
China	2632	110256	15808	536606
UAE	3839	112549	16258	409827
Other countries	44943	1449399	26254	984938

Table – 7 : Imports of Potassium Nitrate (By Countries)

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**92**	**11722**	**208**	**34447**
USA	9	4666	45	23978
China	81	5805	162	9456
Germany	++	614	++	615
Italy	-	-	1	322
Switzerland	++	19	++	62
UK	++	1	++	9
Belgium	++	15	++	3
Japan	-	-	++	2
Spain	1	538	-	-
UAE	1	54	-	-
Other countries	++	10	-	-

FUTURE OUTLOOK

Agriculture is the backbone of India's Economy. However, declining soil fertility impacts on crop productivity. The appropriate application of fertilizer is a key factor in enhancing soil fertility and productivity and for overcoming potassium depletion. The market of potash is expected to increase year-on-year globally. The domestic demand met almost entirely by imports require a turnaround, initiatives to promote indigenous mining of potash in India must be encouraged. Prospects of potash mining in India could mitigate the issue of import of the mineral and consequently will have positive impact in the investment opportunities in the sector which in term could be utilised for the development of mineral wealth. To carry out the feasibility study of solution mining of potash in the State of Rajasthan, a Triparlite agreement between DGM, Rajasthan, RSMML and MECL was signed.