

POTASH



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(Part- III : MINERAL REVIEWS)

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POTASH

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**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES**

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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). The end-product is sold in fertilizer markets and can take a number of forms, all of which include the critical nutrient potassium. 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 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. 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 & Chitrakut district, Uttar Pradesh (4%). Occurrences of potash are also reported from Tirap districts 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, Chitrakut, 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

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**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 (B)	Total Resources (A+B)
		Indicated STD332	Inferred STD333	Reconnaissance STD334		
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.

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.

CONSUMPTION

As per FAI, the all India consumption of Potassic fertilizer (in K₂O content) was at 2.53 million tonnes during 2018-19, whereas it was 2.78 million tonnes in the previous year.

WORLD REVIEW

The world reserves are estimated at approximately 3,600 million tonnes of K₂O content. Reserves are located mainly in Canada (28%), Belarus (21%), Russia (17%), China (10%), USA (6%), Germany (4%) and Chile (3%) (Table-2).

The world production of potash in 2018 was 43.2 million tonnes in terms of K₂O content as against 42.7 million tonnes in 2017. Canada is the leading producer of potash with 28% share in total production in 2018, followed by Belarus (21%), Russia (17%), China (10%), USA (6%), Germany (4%), & Chile (3%) (Table-3).

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

(In '000 tonnes of K₂O content)

Country	Reserves
World: Total (Rounded off)	>36,00,000
Canada	10,00,000
Belarus	7,50,000
Russia	6,00,000
China	3,50,000
USA ¹	2,20,000
Germany	1,50,000
Chile	1,00,000
Spain	68,000
Brazil	24,000
Israel	⁶ Large
Jordan	⁶ Large
Laos	20,000
Other countries	3,00,000

Figures rounded off

Source: Mineral Commodity Summaries, 2020

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

⁶Israel 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 ₂ O content)			
Country	2016	2017	2018
World: Total (rounded)	38500	42700	43200
Canada (Chloride)	10208	12634	13802
Belarus	6180	7102	7346
Russia (Chloride)	6588	7320	7015
China	5780*	5510*	5500*
Germany (Potassic salts)	2694	2964	2830
Israel (Chloride)	2307	2479	2345
Jordan	1222	1415	1486
Chile (Chloride)	1237	1197	989
Spain (Chloride)	667	557	567
USA (Potassic salts)	510	480	500*
UK (Polyhalite)	200	500	400
UK (Chloride)	432	216	210
Brazil (Chloride)	501	306	201

Source: World Mineral Production, 2014-18, BGS.

*Estimate

FOREIGN TRADE

Exports

There is no reported production of potash in the country. However, exports of potash fertilizer increased slightly to 41,327 tonnes in 2018-19, as compared to 41,325 tonnes during the previous year. Exports were mainly to Nepal (18%), Netherlands (13%), UAE, Belgium & Peru (12% each) and Pakistan (9%). Exports of potassium nitrate decreased slightly to 805 tonnes in 2018-19 from 920 tonnes in the previous year. Exports were mainly to Thailand (36%), USA (23%), China (13%), Bangladesh (7%), and Egypt (5%) (Tables- 4 & 5).

Imports

Imports of potash fertilizer decreased by 10% to 4.6 million tonnes in 2018-19 as compared to 5.11 million tonnes during the previous year. Canada (31%), Belarus (16%), Israel (15%), Jordan (13%), Lithuania (11%) and Russia (10%). On the other hand imports of potassium nitrate

decreased drastically by 15% to 92 tonnes in 2018-19 from 108 tonnes in the previous year. China (88%) and USA (10%) are the main suppliers of potassium nitrate in 2018-19 (Tables- 6 & 7).

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

Country	2017-18		2018-19	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	41324	1105978	41327	1223814
Nepal	2522	47884	7605	196503
Peru	6022	164908	4916	157925
Netherlands	16190	431592	5500	151221
Belgium	-	-	5008	148600
UAE	3470	86640	5032	138493
Pakistan	5653	160327	3539	111315
Morocco	975	27030	2530	80241
Saudi Arabia	643	18798	1028	35917
Serbia	-	-	1014	31419
Tunisia	456	11949	863	25287
Other countries	5393	156850	4292	146893

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

Country	2017-18		2018-19	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	921	165183	805	154987
Thailand	366	61170	288	57318
USA	102	19472	188	34717
China	203	44544	108	26155
Egypt	39	10860	39	12170
Bangladesh	21	1374	57	4454
Korea, Rep. of	-	-	23	4388
Pakistan	46	10526	18	4137
UAE	19	4416	17	3821
Sri Lanka	++	15	24	1667
South Africa	5	1741	4	1588
Other countries	120	11065	39	4572

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

Country	2017-18		2018-19	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	5114248	78745036	4576732	86989503
Canada	1288514	19418403	1419533	26950754
Belarus	690387	10496601	743689	14198371
Israel	736346	11308858	688101	13258899
Jordan	544694	8297176	598439	11471069
Lithuania	548722	8346190	487433	9178119
Russia	1019450	15320327	439533	7131262
Germany	214942	3765320	113150	2342793
USA	6513	148462	35441	786032
Singapore	1515	50101	23790	545613
Taiwan	8958	275978	6951	238396
Other countries	54207	1317620	20672	888195

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

Country	2017-18		2018-19	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	108	9520	92	11722
China	77	4026	81	5805
USA	++	408	9	4666
Germany	++	401	++	614
Spain	++	2	1	538
UAE	-	-	1	54
Switzerland	-	-	++	19
Belgium	-	-	++	15
South Africa	-	-	++	10
UK	-	-	++	1
Korea, Rep. of	30	4218	-	-
Other countries	1	465	-	-

FUTURE OUTLOOK

Agriculture is the backbone of India's Economy. However, declining soil fertility impacts crop productivity. The appropriate application of fertilizer is a key factor in enhancing soil fertility and productivity and for over coming potassium depletion. The market of potash is expected to increase year-on-year globally. The domestic demand met almost entirely by imports require a turn around, initiatives to promot indenous

mining of potash in India must be encouraged. The investment opportunities for potash mining in India as an import substitute mineral could be utilised for the development of mineral wealth. To carry out the pre-feasibility and pilot plant studies for potash exploration in state of Rajasthan for which a Triparlite Memorandum of understanding (MoU) between DGM, Rajasthan, RSMML & MECL have been initiated by Governmet of Rajasthan.