Indian Minerals Yearbook 2021

(Part- III : MINERAL REVIEWS)

60th Edition

POTASH

(ADVANCE RELEASE)

GOVERNMENT OF INDIA
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February, 2023

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 1.4.2020 have been estimated at 23,091 million tonnes, all of which are placed under Remaining Resource category. Rajasthan alone contributes 89% 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 are located in Nagaur district of Rajasthan, followed by Panna district, Madhya Pradesh and the balance in Sonbhadra & Chitrakoot districts, Uttar Pradesh. 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 1.4.2020
(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	**0**	**18151**	**4125**	**814**	**23091**	**23091**
By Grades						
Glauconite	0	888	1495	766	3149	3149
Polyhalite	0	13985	2179	0	16164	16164
Sylvite	0	2072	452	48	2572	2572
Unclassified	0	1206	0	0	1206	1206
By States						
Madhya Pradesh	0	1206	36	2	1244	1244
Rajasthan	0	16936	3509	127	20572	20572
Uttar Pradesh	0	10	198	685	893	893
Bihar	0	0	230	0	230	230
Jharkhand	0	0	152	0	152	152

Figure 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 3,500 million tonnes of K_2O content. Reserves are located mainly in Canada (31%), Belarus (21%), Russia (11%), China (10%), USA (6%), Germany (4%) and Chile (3%) (Table-2).

The world production of potash in 2020 was 43.9 million tonnes in terms of K_2O content as against 41.6 million tonnes in 2019. Canada is the leading producer of potash with 31% share in total production in 2020, followed by Belarus (17%), Russia (16%), China (12%), Germany (7%), 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)	**3500000**
Canada	1100000
Belarus	750000
Russia	400000
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, 2022*

[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	2018	2019	2020
World:Total (rounded off)	**43800**	**41600**	**43900**
Canada (Chloride)	13944	12851	13784
Belarus	7346	7348	7562
Russia (Chloride)	7015	6771	6893
China	5450	5450	5450
Germany (Potassic salts)	2754	2615	2874
Israel (Chloride)	2345	2057	2375
Jorden	1486	1517	1598
Chile (Chloride)	989	682	951
UK (Polyhalite)	400	635	709
Other countries	2089	1692	1736

Source: *BGS World Mineral Production, 2016-20,*

FOREIGN TRADE

Exports

There is no reported production of potash in the country. However, exports of potash fertilizer decreased substatially by 10% to 26,583 tonnes in 2020-21, as compared to 29,565 tonnes during the previous year. Exports were mainly to Nepal (58%), Netherlands (25%), UAE (5%) and Serbia (2%). Exports of potassium nitrate decreased by 16% to 827 tonnes in 2020-21 from 985 tonnes in the previous year. Exports were mainly to USA (32%), Thailand (31%), China (13%),Indonesia(6%),UAE (5%) and Bangladesh (4%) (Tables- 4 & 5).

Imports

Like exports, imports of potash fertilizer also increased marginally by 30% to 5.25 million tonnes in 2020-21 as compared to 4.04 million tonnes during the previous year.imports were mainly from Canada (31%), Belarus (18%), Russia (14%), Jordan (12%), Lithuania (11%), Israel (9%) and Germany (4%). Imports of potassium nitrate decreased drastically to 58 tonnes in 2020-21 from 208 tonnes in the previous year. China (93%) and Germany (3%) were the main suppliers of potassium nitrate in 2020-21 (Tables- 6 & 7).

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**29565**	**1014818**	**26583**	**673799**
Nepal	5304	271904	15494	345727
Netherlands	6736	205119	6601	193619
UAE	3922	102340	1363	27518
Serbia	520	15457	1040	23810
Saudi Arabia	720	24596	518	17760
Morocco	1880	59877	480	17074
Croatia	2600	74435	546	15429
Mexico	115	7994	60	4291
USA	31	6574	16	3906
Kenya	65	3043	53	3626
Other countries	7672	243479	412	21039

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**985**	**168082**	**827**	**165914**
USA	275	45951	268	71190
Thailand	266	42430	257	38113
China	184	36865	104	16899
Indonesia	34	7959	46	9627
Egypt	47	14450	27	8540
UAE	17	3926	42	7655
South Africa	6	2268	21	5346
Bangladesh	50	3010	33	3387
Korea	22	3573	11	1901
Nepal	2	266	3	928
Other countries	82	7384	15	2328

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**4040268**	**83239621**	**5250814**	**94059271**
Canada	1166314	23700186	1612329	28597032
Belarus	453536	9086784	922089	16620176
Russia	573325	11639377	747928	13133743
Jordan	466363	9586685	629092	11082614
Lithuania	668214	13626964	569610	9768040
Israel	484718	9932847	485631	8555193
Germany	137937	3101808	198887	3877702
Taiwan	10438	353040	21713	724649
UK	1458	112565	26537	469062
China	15808	536605	12841	440408
Other countries	62157	1562760	24157	790652

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**208**	**34447**	**58**	**7553**
China	162	9456	54	3272
Germany	++	615	2	2474
USA	45	23978	1	1234
Italy	1	322	1	370
Spain	-	-	++	157
Switzerland	++	62	++	41
UK	++	9	++	5
Belgium	++	3	-	-
Japan	++	2	-	-

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 turn 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 Tripartite agreement between DGM, Rajasthan, RSMML and MECL was signed.