

POTASH



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POTASH

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

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All commercial potash deposits come originally from evaporite deposits and are often buried deep below the earth's surface. Potash ores are typically rich in Potassium Chloride (KCl) and Sodium Chloride (NaCl) and are generally obtained by conventional shaft underground mining, with the extracted ore ground into a powder. Other method includes dissolution mining and evaporation methods from brines. In the evaporation method hot water is injected into the potash which is dissolved and then pumped to the surface where it is concentrated by solar induced evaporation. Potassium is the third major plant and crop nutrient after nitrogen and phosphorus. There are four common kinds of straight potash fertilizer - Muriate of Potash (MOP), Sulphate of Potash (SOP), Potassium Magnesium Sulphate and Potassium Nitrate.

The principal ore is sylvinite, a mixture of sylvite (KCl) and rock salt (NaCl). In India, 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 and Karauli districts of Rajasthan. It is in the form of Glauconitic (a potassium bearing green mica) sandstone. However, reported occurrences in the country are not commercially exploitable and hence no production of potash is reported from India. The entire requirement of potash to be utilised as fertilizer is, therefore, met by imports.

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 in remaining resource category. Rajasthan alone contributes 91% to the total resources, followed by Madhya Pradesh (5%) and Uttar Pradesh (4%). (Table- 1)

EXPLORATION AND DEVELOPMENT

Exploration and development details are given in the review on EXPLORATION & DEVELOPMENT in "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% K₂O.

In India, glauconite is commonly associated with sand/sandstones, shale, marl and occasionally with limestone. Glauconitic sandstones of Vindhyan Group represent oldest glauconite deposits which are well developed in Son Valley region covering parts of Madhya Pradesh and Uttar Pradesh. In Madhya Pradesh, occurrences are in Sidhi and Satna districts. The deposits of same origin are located in Banda, Sonbhadra and Mirzapur districts of Uttar Pradesh. Glauconite occurs in shale, limestone and Tal formations at Duggad and Tal Valley in Garhwal and Mussoorie in Dehradun district, Uttarakhand. 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 sea bed sediments of Thiruvananthapuram coast.

USES

Potash is an essential nutrient for protein synthesis and it aids plants to use water more efficiently. Glauconitic sandstones/greensands are used directly in acidic soils in eco-friendly manner, as glauconitic sand mixes homogeneously with the soil and provides potash as nutrients for plants. It also increases soil fertility and improves soil texture, porosity and permeability due to more or less uniform grain size. Potassium chloride (KCl) is the principal fertilizer product with 60-62% of K₂O equivalent. Other salts, for fertilizer use, are potassium sulphate, potassium magnesium sulphate and potassium nitrate. Potassium chloride and

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potassium nitrate are used in manufacture of glass, ceramics, soap, 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 2,508 thousand tonnes during 2016-17, whereas it was 2,401 thousand tonnes in the previous year.

**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		
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.

WORLD REVIEW

The world reserves are estimated at approximately 3,900 million tonnes of K₂O content. Deposits are located mainly in Canada (26%), Belarus (19%), Russia (13%), , China (9%), Israel, Jordan (7% each), Chile & Germany (4% each) (Table-2).

The world production of potash in 2015 was 37.90 million tonnes in terms of K₂O content as against 39.90 million tonnes in 2014. Canada remained the leading producer of potash with 30% share in total production in 2015, followed by Russia (18%), Belarus (17%), China (11%), Germany (8%), Jordan (4%) and Chile & Israel (3% each) (Table-3).

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

(In '000 tonnes of K ₂ O content)	
Country	Reserves
World: Total (rounded)	3900000
Belarus	750000
Brazil	24000
Canada	1000000
Chile	150000
China	360000
Germany	150000
Israel	270000
Jordan	270000
Russia	500000
Spain	44000
UK	40000
USA	210000
Other countries	90000

Figures rounded off

Source: Mineral Commodity Summaries, 2018.

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

(In '000 tonnes of K₂O content)

Country	2013	2014	2015
World: Total	34179	39911	37914
Belarus	4179	6340	6468
Canada (Chloride)	10140	11345	11350
Chile (Chloride)	1158	1108	1119
China	3600	4400 ^(e)	4200 ^(e)
Germany (Potassic salt)	3075	3178	3110
Israel (Chloride)	2155	2213	950
Jordan	1064	1276	1437
Russia (Chloride)	6104	7402	6954
USA (Potassic salt)	960	850	770 ^(e)
Other countries	1743	1799	1557

Figures rounded off.

Source: World Mineral Production, 2011-2015.

FOREIGN TRADE

Exports

Exports of potash fertilizer were about 24,388 tonnes in 2016-17. Exports were mainly to Pakistan (28%), Netherland (18%), Peru (12%), UAE and Chile (9% each), Brazil (6%), Jordan and Saudi Arabia (3% each) and Morocco & Kenya (2% each). Exports of potash fertilizer decreased considerably to 26,715 tonnes in 2015-16 as against 39,052 tonnes in the previous year. Exports were mainly to Turkey (21%), UAE (17%), Netherlands & Belgium (13% each), Saudi Arabia & Peru (7% each) and Brazil (6%). Exports of potassium nitrate also decreased slightly to 1,103 tonnes in 2015-16 from 1,133 tonnes in the previous year. Exports were mainly to Thailand (36%), Bangladesh (26%), USA (16%), China (7%) and Pakistan (4%) (Tables- 4 to 6).

Imports

Imports of potash fertilizer were about 4.18 million tonnes in 2016-17. Canada (25%) and Israel & Russia (17% each) were the main suppliers followed by Lithuania & Belarus (13% each), Jordan (12%) and Germany (2%). Imports of potash

fertilizer also decreased drastically to 3.59 million tonnes in 2015-16 from 4.62 million tonnes in the previous year. Canada & Russia were the main suppliers (25% each) followed by Lithuania, Belarus & Israel (11% each) and Jordan (8%). On the other hand imports of potassium nitrate increased considerably to 257 tonnes in 2015-16 from 182 tonnes in the previous year. China (91%) and Israel (8%) were the main suppliers of potassium nitrate in 2015-16 (Tables- 7 to 9).

**Table-4: Export of Potash Fertilizers
(By Countries)**

Country	2016-17	
	Qty (t)	Value (₹'000)
All Countries	24388	737107
Pakistan	6889	194678
Netherlands	4414	133816
Peru	2909	84218
UAE	2237	54028
Chile	2121	59407
Brazil	1560	44796
Jordan	816	30795
Saudi Arabia	743	23763
Morocco	600	20199
Kenya	465	16604
Lebanon	335	9262
Other countries	1299	65541

**Table – 5: Exports of Potash Fertilizers
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	39052	1122425	26715	986882
Turkey	2	106	5611	191545
UAE	5643	190294	4633	175246
Belgium	-	-	3470	128272
Netherlands	-	-	3530	119679
Saudi Arabia	572	24850	1988	74245
Peru	550	23080	1853	65684
Brazil	1800	80630	1563	58526
Pakistan	3706	118821	879	27774
Iran	561	22813	673	24732
Morocco	300	12504	584	22966
Other countries	25919	649327	1931	98213

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**Table –6: Exports of Potassium Nitrate
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1133	169325	1103	181930
Thailand	470	65182	402	59948
USA	142	43691	178	54212
China	67	12786	81	18154
Bangladesh	182	10796	284	15886
Egypt	118	14607	35	10831
Pakistan	10	1906	41	9714
Oman	1	384	10	2905
Bahrain	5	2035	5	2263
Saudi Arabia	++	51	25	1805
Netherlands	-	-	5	1588
Other countries	138	17887	37	4624

**Table – 7: Imports of Potash Fertilizers
(By Countries)**

Country	2016-17	
	Qty (t)	Value (₹'000)
All Countries	4185125	69662648
Canada	1050044	17184083
Israel	695586	11425375
Russia	692311	11176541
Lithuania	541031	8846653
Belarus	535389	8905092
Jordan	505115	8520198
Germany	75239	1550983
Uzbekistan	43710	692827
China	11956	373882
Spain	9909	162345
Other countries	24835	824669

**Table – 8: Imports of Potash Fertilizers
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	4620668	92745062	3594923	78216423
Canada	1145382	22538185	904148	19639067
Russia	1275123	24710551	896162	19239559
Lithuania	277715	5324208	409471	8689081
Belarus	456711	8908105	409222	8514369
Israel	658061	12994608	379529	8243646
Jordan	346880	7780427	274462	6043406
Germany	180626	4585504	138352	3344540
Indonesia	87317	1809835	66288	1470220
Uzbekistan	12099	247777	29701	601138
Unspecified	16000	310426	62999	1336358
Other countries	164754	3535436	24589	1095039

**Table – 9: Imports of Potassium Nitrate
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	182	21501	257	24821
China	129	9499	233	20667
Israel	-	-	21	1682
Italy	-	-	1	978
Germany	1	270	1	631
USA	++	276	++	423
UAE	-	-	1	349
Belgium	++	5	++	60
Netherlands	1	236	++	31
Korea, Rep. of	50	10611	-	-
Austria	1	589	-	-
Other countries	++	15	-	-