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POTASH

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GOVERNMENT OF INDIA
MINISTRY OF MINES
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23 Potash

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 fertlizer - 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.

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 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 if any 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% K_2O.

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 K_2O equivalent. Other salts, for fertilizer use, are potassium sulphate, potassium magnesium sulphate and potassium nitrate. Potassium chloride and

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 fertiliser (in K_2O 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	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.

WORLD REVIEW

The world reserves are estimated at approximately 3,900 million tonnes of K_2O 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 2016 was 37.80 million tonnes in terms of K_2O content as against 40.00 million tonnes in 2015. Canada continued to remained the leading producer of potash with 27% share in total production in 2016, followed by Russia (17%), Belarus & China (16% each), Germany (7%), Israel (4%), Jordan & Chile (3% each) (Table-3).

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

(In '000 tonnes of K_2O content)

Country	Reserves
World: Total (rounded off)	**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.*

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

(In '000 tonnes of K_2O content)

Country	2014	2015	2016
World: Total(Rounded off)	**42000**	**40000**	**37800**
Belarus	6340	6468	6180
Canada (Chloride)	11345	11506	10208
Chile (Chloride)	1108	1119	1237
China[e]	6110	6200	6200
Germany (Potassic salt)	3178	3110	2751
Israel (Chloride)	2213	950	1457
Jordan	1276	1437	1222
Russia (Chloride)	7402	6954	6588
USA (Potassic salt)	850	740	520[(e)]
Other countries	1775	1551	1404

Source: *World Mineral Production, 2012-2016.*

FOREIGN TRADE

Exports

Exports of potash fertiliser decreased marginally by 9% to 24,388 tonnes in 2016-17, as compared to 26,715 tonnes during the previous year. Exports were mainly to Pakistan (28%), Netherlands (18%), Peru (12%), UAE and Chile (9% each), Brazil (6%), Jordan and Saudi Arabia (3% each) and Morocco & Kenya (2% each). Exports of potassium nitrate also decreased slightly to 1,015 tonnes in 2016-17 from 1,103 tonnes in the previous year. Exports were mainly to Thailand (34%), USA (20%), Bangladesh (19%), China (15%) and Egypt (5%) (Tables- 4 & 5).

Imports

Imports of potash fertiliser increased by 16% to 4.18 million tonnes in 2016-17 as compared to 3.59 million tonnes during the previous year. Canada (25%) and Israel & Russia (17% each) were the main suppliers followed by Lithuania & Belarus (13% each), Jordan (12%) and Germany (2%). On the other hand imports of potassium nitrate also increased drastically by 34% to 345 tonnes in 2016-17 from 257 tonnes in the previous year. China (62%), Israel (18%) and Korea, Rep. of (17% each) were the main suppliers of potassium nitrate in 2016-17 (Tables- 6 & 7).

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

Country	2015-16 (R)		2016-17 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**26715**	**986880**	**24388**	**737111**
Pakistan	879	27774	6889	194678
Netherlands	3530	119679	4414	133816
Peru	1853	65684	2909	84218
Chile	1	111	2121	59407
UAE	4633	175246	2237	54028
Brazil	1563	58526	1560	44796
Jordan	336	11910	816	30795
Saudi Arabia	1988	74245	743	23764
Morocco	584	22966	600	20199
Kenya	243	9736	465	16605
Other countries	11105	421003	1634	74805

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

Country	2015-16 (R)		2016-17 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**1103**	**181931**	**1015**	**213902**
USA	178	54212	200	66747
Thailand	402	59948	344	66421
China	81	18154	149	34049
Egypt	35	10831	55	16540
Bangladesh	284	15886	191	10780
UAE	4	805	36	9563
Pakistan	41	9714	18	3795
Turkey	-	-	6	1929
Netherlands	5	1588	5	1541
Saudi Arabia	2	704	3	902
Other countries	71	10089	8	1635

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

Country	2015-16 (R)		2016-17 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**3594923**	**78216424**	**4185124**	**69662647**
Canada	904148	19639067	1050044	17184083
Israel	379529	8243646	695586	11425375
Russia	896162	19239559	692311	11176542
Belarus	409222	8514369	535389	8905092
Lithuania	409471	8689081	541031	8846653
Jordan	274462	6043406	505115	8520198
Germany	138352	3344540	75239	1550983
Uzbekistan	29701	601138	43710	692827
China	5601	240271	11956	373882
Chinese Taipei/Taiwan	7954	355581	7488	246135
Other countries	140321	3305766	27255	740877

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

Country	2015-16 (R)		2016-17 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**257**	**24820**	**345**	**30157**
China	233	20666	214	12960
Korea, Rep. of	-	-	60	10852
Israel	21	1682	63	5152
UAE	1	349	7	449
Italy	1	978	1	351
Germany	1	631	++	228
USA	++	423	++	123
Chile	-	-	++	28
Belgium	++	60	++	9
Switzerland	-	-	++	5
Other countries	++	31	-	-