

## LECTURE 20

### FERTILIZERS - USE AND LEGISLATION

*Definition, Classification, Indian Scene, products, consumption, Legislation*

#### **Fertilizers**

Fertilizers are the materials either natural or manufactured, containing nutrients essential for normal growth and development of plants. It may also be defined that any material or substance intended for use as a nutrient carrier in soil or crops for boosting crop yields.

In India, the use of artificial fertilizers was first initiated in 1896 when imported Chilean nitrate was used as a fertilizer. By about 1905 calcium nitrate, calcium cyanamide, ammonium sulphate, super phosphate and potassium sulphate were also imported and used.

After the World War I, the Imperial Chemical Industries carried out valuable field experiments on different crops particularly on rice with ammonium sulphate during the period 1920-30, which established the general superiority over other nit<sub>26 (2/2)</sub> fertilizers. The manufacture of ammonium sulphate in India was first started at **Belegolla in Mysore** in 1938 on a small scale.

Share of total fertilizer consumption (%) in India	
Rice	40.5
Wheat	24.2
Sugarcane	8.7

Later in 1947, its manufacture was started at **Alwaye**. In 1951, the Government of India set up fertilizer factory at **Sindri** for the production of ammonium sulphate in the public sector. Gradually several factories were established and use of fertilizers become increasingly popular.

Presently India is the **Third** producer of N and P fertilizers in the world.

### **Classification of fertilizers**

The fertilizer materials may be classified in several ways

#### ***Based on fertilizer mixture behavior***

- Straight or simple nitrogenous, phosphatic or Potassic fertilizers;
- Complex fertilizers having more than one nutrient in single material and fertilizers having more than one nutrient in single material
- Fertilizer mixtures home mixed or factory mixed materials.

#### ***Based on their chemical reaction and nature***

- Acidic, neutral, and basic fertilizers

#### **Based on nutrients present**

- Simple fertilizers which contain only one nutrient (Single carrier)
- Compound fertilizers which contain more than one nutrient (Multinutrient carrier)

### **Physical properties** of fertilizers:

Physical properties of fertilizers have bearing on bagging storage, transportation, handling, and application. They are properties include –

hygroscopic nature, free moisture content, particle size, melting point, solubility, specific gravity, segregation, granule hardness, angle of response, drillability etc.,

### **Chemical properties** of fertilizers:

Chemical properties include the nature and amount of **nutrients** present, **associated elements**, their **chemical reaction**, and **salt index**. These make a basis for their selection by the cultivators so that they may achieve highest productivity with least damage to soil fertility and least unit cost of fertilizers.

## **INDIAN FERTILIZER SCENE**

India is the **Third** largest producer and consumer of fertilizers in the world. At present, there are 59 large size fertilizer plants in the country manufacturing range of fertilizers. The current installed capacity is 12.1 m tonnes per annum (tpa).

This fertilizer sector is highly subsidized. It relies heavily on imports to meet domestic demand. Indian Government incurs a total subsidy bill about 14% of fiscal deficit every year.

The major grades of fertilizers are Nitrogenous (N), Phosphatic (P) and Potassic (K). N accounts for 71%, P for 22%, and K for 7% of the total fertilizer consumption. Potassic grade of fertilizer is totally imported and is not manufactured in India.

Urea (85% of N fertilizer consumption) constitutes 58% of the total consumption of fertilizers in India. Di-ammonium phosphate (DAP) accounts for approximately 66% of consumption of phosphatic fertilizers.

The N based fertilizer uses indigenously available feedstock (raw material) to produce ammonia, which is processed further to make urea.

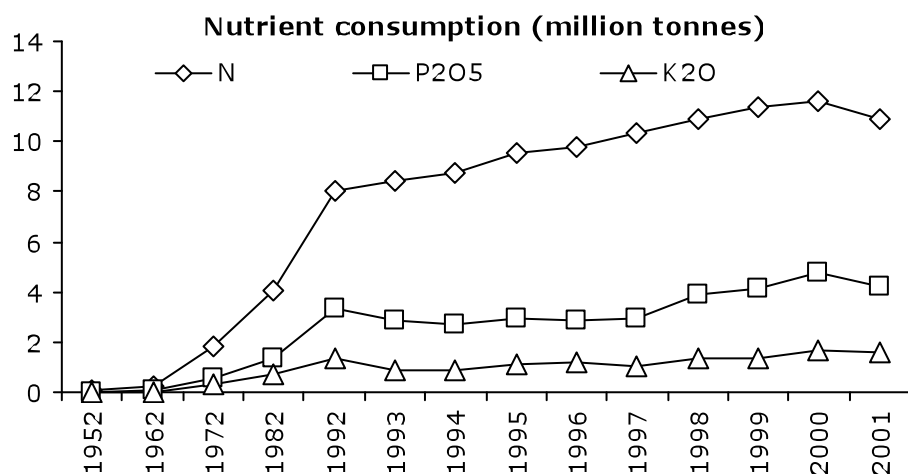
Rock phosphate and potash, the key raw materials for Phosphatic and Potassic fertilizers respectively are **imported** into India, due to lack of domestic availability.

Before April 1, 1997, the State Governments fixed fertilizer prices at non-remunerative levels. In addition, there were procedural delays in fixing prices for each crop season, and delays in reimbursing subsidy to the producers.

The reimbursement price fixation is now done by the Central Government, which may lead to more realistic price levels, and faster disbursements of subsidies.

### Consumption of Fertilizer by Nutrients ('000 tonnes)

Year	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Total
1951-52	58.7	6.9	-	65.6
1961-62	249.8	60.5	28.0	338.3
1971-72	1798.0	558.2	300.6	2656.8
1981-82	4068.7	1322.3	676.2	6067.2
1991-92	8046.3	3321.2	1360.6	12728.0
1992-93	8426.8	2843.8	883.9	12154.5
1993-94	8788.3	2669.3	908.7	12366.3
1994-95	9507.1	2931.7	1124.8	13563.6
1995-96	9822.8	2897.5	1155.8	13876.2
1996-97	10301.8	2976.8	1029.6	14308.1
1997-98	10901.8	3913.6	1372.5	16187.8
1998-99	11353.8	4112.2	1331.5	16797.5
1999-00	11592.7	4798.3	1678.7	18069.7
2000-01	10861.9	4212.4	1557.1	16631.4



## Important Fertilizer Products in India

	Grade (%)	Consumption (1999-2000) '000 tonnes
Produced in India		
<b>Straight Nitrogenous</b>		
Urea	46 N	20277.66
Ammonium sulphate	20.6 N	638.10
Ammonium chloride	25 N	75.19
Calcium ammonium nitrate	25 N	347.25
<b>Straight Phosphatic</b>		
Single super phosphate	16 P <sub>2</sub> O <sub>5</sub>	3600.99
Diammonium phosphate	18-46-0	6937.68
<b>NP/NPK Complex Fertilizers</b> N: P <sub>2</sub> O <sub>5</sub> : K <sub>2</sub> O		
Ammonium Phosphate Sulphate	16-20-0	220.89
Nitro Phosphate with Potash	15-15-15	341.82
Urea Ammonium Phosphate	27 (4/8) 28-0	173.66
	14-35-14	184.32
Nitro Phosphate	20-20-0	1531.56
	23-23-0	222.19
Others	10-26-26	529.79
	12-32-16	499.45
	17-17-17	681.00
	19-19-19	126.63

	14-28-14	11.47
Imported Fertilizers		
Straight Potassic		
Muriate of potash	60 K <sub>2</sub> O	2049.24
Sulphate of potash	50 K <sub>2</sub> O	17.50
Straight Phosphatic		
Rock phosphate	12-18 P <sub>2</sub> O <sub>5</sub>	102.96