

5. Fertilizer

Broadly a fertilizer may be defined as any substance (chemical, organic and microbial) that is added to soil to supply element(s) required for the nutrition of plants. In a specific sense, fertilizers are chemicals that occur naturally or are produced in the factory and when added to the soil, supply nutrient elements required for better plant growth. Some examples of different kinds of fertilizers are:

Chemical fertilizers	: Urea, TSP, MOP, Gypsum and Boric acid
Organic fertilizers	: Cowdung, Farmyard manure, Poultry manure and Compost
Bio-fertilizers	: Rhizobium, Azospirillum and Blue-Green Algae

5.1 Types of fertilizer/fertilizer material

1. **Inorganic (Mineral) fertilizer**- Fertilizer contains nutrients in the form of inorganic salts obtained by extraction and/or by physical and/or chemical industrial processes.
2. **Organic fertilizer**- Carbonaceous materials mainly of vegetable and/or animal origin added to the soil specifically for the nutrition of plants.
3. **Straight fertilizer**- A qualification generally given to a nitrogenous, phosphatic, or potassic fertilizer having only one primary plant nutrient, i.e. nitrogen, phosphorus or potassium. .
4. **Micronutrient fertilizer**- Any fertilizer containing micronutrient element(s) (Zinc, Boron, Iron, Manganese, Copper, Molybdenum or Chlorine), which required in small amount but essential for plant growth.
5. **Complete fertilizer**- A fertilizer that contains 3 major plant nutrients, NPK.
6. **Compound fertilizer**- A fertilizer that contains at least two of the plant nutrients nitrogen, phosphorus and potassium obtained chemically or by blending or both.
7. **Complex fertilizer**- A compound fertilizer, containing nutrient elements that have undergone chemical interaction during manufacturing.
8. **Blended fertilizer**- A fertilizer containing at least two of the plant nutrients nitrogen, phosphorus, and potassium, prepared by blending.
9. **Granular fertilizer**- Solid material that is formed into particle of a predetermined mean size.
10. **Coated fertilizer**- Granular fertilizer that is coated with a thin layer of different materials in order to improve the behavior and/or modify the characteristics of the fertilizer.
11. **Slow-Release fertilizer**- A fertilizer whose nutrients are present as a chemical compound or whose physical state is such that the nutrient availability to plants is spread over time.
12. **Biofertilizer**- Biofertilizers are non-pathogenic active cultures of microorganism which benefit the plants by providing nitrogen or phosphorus or rapid mineralisation of organic material.
13. **Liquid fertilizer**- A term used for fertilizers in suspension or solution and for liquefied ammonia. The principal materials used in making liquid fertilizer are ammonia, ammonium nitrate, urea, phosphoric acid, and potassium chloride.
14. **Suspension fertilizers** - A two-phase fertilizer in which solid particles are maintained in suspension in the aqueous phase.
15. **Soil conditioner**- Material added to soils, the main function of which is to improve their physical and/or chemical properties and/or their biological activity.
16. **Liming material**- An inorganic soil conditioner containing one or both of the elements calcium and magnesium, generally in the form of an oxide, hydroxide, or carbonate, principally intended to maintain or raise the soil pH.
17. **Filler material** – A substance added to fertilizer materials to provide bulk, prevent caking or serve some purpose other than providing essential plant nutrients.

18. **Powder-** A solid substance in the form of very fine particles. Powder is also referred to as “non-granular fertilizer” and is sometimes defined as a fertilizer containing fine particles, usually with upper limit such as 3 mm but no lower limit.

5.2 Fertilizer use in Bangladesh

Inorganic fertilizers have been introduced into this country during early 1950's as a supplemental source of plant nutrients. But their use started increasing steadily only from the mid 1960's along with the introduction and expansion of modern varieties accompanied by the development of irrigation facilities. The increasing trend of fertilizer use, particularly urea-N, still continues (Appendix-1). Until 1980, three primary major plant nutrients (N,P & K) along with one secondary major nutrient (Ca) were supplied from fertilizer to our soils. The importance of S and Zn for rice culture in particular was recognized during early 1980's. Gypsum, zinc sulphate and zinc oxy-sulphate were then introduced to supply these nutrients. Very recently, the deficiencies of Mg, B and Mo have been reported for some soils and crops. Of the total nutrients used in the country, nitrogen alone constitutes about 80 percent, which may lead to nutrient imbalance in soil-plant systems. If this trend of fertilizer use continues along with intensive cultivation of high yielding crop varieties, the productivity of our soils is likely to be seriously affected. To avert this potential danger, the limiting nutrients must be identified and the soils should be enriched with the addition of these nutrients in properly balanced fertilization programmes. Prior to 1990, only TSP was used by our farmers as a source of P because it was the only P containing fertilizer available in the market at that time. After 1990, SSP as an alternative source of P was introduced in our fertilizer market and its availability was increasing with time. But granular SSP was banned for sometime in the country due to adulteration. SSP in the name of TSP was largely sold to farmers by dealers that hampered farmers interest and production level. DAP, another source of P was made available and the farmers started to use this fertilizer. Since these materials vary in their P content, variable amounts of these materials would be required to meet a specific P fertilizer recommendation. It is to be noted that SSP contains S and DAP contains N in addition to P. Therefore, there is a need to adjust for S and N fertilizer application if either SSP or DAP is used as P source instead of TSP. A list of commonly used fertilizer is given in Appendix-2.

5.3 Fertilizer use in other countries

The use of fertilizer nutrients in the Asian region has increased considerably in recent years (Appendix-3). Application of fertilizers per unit area is the maximum in Korea followed by China and the minimum in Myanmar. During the past few years, total fertilizer nutrient use in Bangladesh has increased significantly. A further increase in fertilizer use needs to occur in those countries where more production has to be realized from the limited areas of land.