10.1 NECESSITY OF SOIL CONDITIONER

A soil conditioner is a material added to soil to improve its overall condition, especially plant growth and health and simultaneously it corrects the soil’s deficiencies in structure and/or nutrients. It is also called a soil amendment. Physical conditions of soil such as porosity and permeability will be improved by using the materials for agriculture purpose, known as fertilizer. Here the type of conditioner depends on current soil composition and the type of plant. Some soils lack nutrients necessary for proper plant growth. Some examples of soil conditioner include peat, coffee grounds, compost tea, fertilizers, lime, and vermiculite and sphagnum moss. Beside this, mechanical property of soil also needs to be improved for some engineering aspects such as construction of dam, bridge etc. Thus the soil conditioner plays an important role to increase strength of soil.

10.2 ACTIVITIES OF SOIL CONDITIONER

Poor physical condition of soil can restrict water intake into the soil and subsequent movement, plant root development, and aeration of the soil. Producers and researchers alike are interested in improving the physical condition of the soil and, thus, enhance crop production. These goals can be accomplished in part through the use of good management techniques. In addition, there are amending materials that claim to improve the soil physical condition. Soil conditioners vary greatly in their composition, application rate, and expected or claimed mode of action. Claims for various products include, but are not limited to:
• Increased water-holding capacity
• Reduced compaction and hardpan conditions
• Improved soil structure and aeration
• Alkali soil reclamation
• Increased availability of water to plants
• Better root development
• Improved tile drainage effectiveness
• Better chemical incorporation
• Higher yields and quality
• Release of “locked” nutrients

It is important to understand the nature, use and practical benefits of these products. Water-holding capacity, availability of water to plants, and drainage effectiveness are the three properties depending on porosity of soil. Porosity is influenced by presence of soil conditioner.

### 10.3 TYPES OF SOIL CONDITIONERS

Soil conditioners vary in both their origin and composition. Soil conditioners can be synthetic or naturally occurring; organic or inorganic.

**Organic Soil Conditioners**

Organic soil matter is defined as the organic fraction of the soil and includes plant and animal residues at various stages of decomposition, cells and tissues of organisms, and compounds synthesized by the soil organism population. Soil organic matter contains a wide array of compounds ranging from fats, carbohydrates and proteins to high molecular weight humic and fulvic acids. Both the diversity of compounds and the interaction of the different compounds are important in the beneficial effect attributed to organic matter. Soil organic matter is usually less than 10 per cent of the total weight of mineral soils. The beneficial effects of organic matter (humus) in the improvement or maintenance of soil physical properties has long been known. Soil organic matter serves as a reservoir for nutrients; improves soil structure, drainage, aeration, cation exchange capacity, buffering capacity, and water-holding capacity; and provides a source of food for microorganisms. Generally speaking, soils higher in organic matter have improved soil physical conditions as compared to similar soils lower in organic matter. For these reasons, many marketed soil conditioners try to emulate organic matter for improving soil physical properties.

The ratio of carbon to nitrogen (C:N ratio) of organic matter in surface soils commonly ranges between 8:1 and 15:1, with the median C:N ratio between 10:1 and 12:1. The C:N ratio of organic materials (Table 10.1) added to the soil is important in the availability of nitrogen and the rate of decay of