Soil Ameliorants

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In news: National Food Security Mission (NFSM) has been able to achieve around 110 lakh ha area to be treated with Micronutrients, Bio-fertilizers, soil ameliorants/ (Gypsum/Lime/others) from 2014-15 to 2019-2020.

What is soil ameliorant/ (Gypsum/Lime/others)?

An ameliorant is chemical that is applied to improve the quality of the soil and thereby improve plant growth

Gypsum is an ideal soil ameliorant for hard compacted soils with poor water penetration or sodicity.

How does adding Gypsum/Lime help in the treatment of degrading Soil?

- Adding gypsum to the soil reduces erosion by increasing the ability of soil to soak up water after precipitation, thus reducing runoff.
- Gypsum application also improves soil aeration and water percolation through the soil profile
- In the right conditions, adding lime or gypsum to dispersive soils decreases the sodium exchange percentage, reduces dispersion, and increases stable soil structure.
- Calcium ions displace some of the sodium ions on the surface of soil particles, creating better soil structure which allows sodium ions to leach out.

About Gypsum

- Gypsum is a soft sulfate mineral composed of calcium sulfate dihydrate, with the chemical formula $CaSO_4 \cdot 2H_2O$.
- It is a mineral found in crystal as well as masses called gypsum rock.
- **Massive gypsum rock forms within layers of sedimentary**

rock, typically found in thick beds or layers.

- **It forms in lagoons where ocean waters high in calcium and sulfate content** can slowly evaporate and be regularly replenished with new sources of water.
- The result is the accumulation of large beds of sedimentary gypsum
- Gypsum is deposited from lake and sea **water**, as well as in hot springs, from volcanic vapors, and **sulfate** solutions in veins

Lime

Lime is a soil amendment made from ground limestone rock, which naturally contains calcium carbonate and magnesium carbonate. When lime is added to soil, these compounds work to increase the soil's pH, making soil less acidic and more alkaline.

Mineral nutrients for soil

Plants must obtain the following mineral nutrients from their growing medium:

- **The macronutrients:** nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), sulfur (S), magnesium (Mg), carbon (C), oxygen (O), hydrogen (H)
- **The micronutrients** (or trace minerals): iron (Fe), boron (B), chlorine (Cl), manganese (Mn), zinc (Zn), copper (Cu), molybdenum (Mo), nickel (Ni)

National Food Security Mission (NFSM)

- It was launched in 2007-08 to increase the production of rice, wheat and pulses through area expansion and productivity enhancement; restoring soil fertility and productivity; creating employment opportunities; and enhancing farm level economy. Coarse cereals were included from 2014-15 under NFSM.
- NFSM presently comprises of the sub-components viz.,

NFSM-Rice, NFSM-Wheat, NFSM-Pulses, NFSM-Coarse Cereals, NFSM-NFSM-Nutri-Cereals and NFSM-Commercial Crops.Currently, NFSM is being implemented in identified districts of 28 States & 2 Union Territories (UTs)

- Under the Mission, Seed distribution of HYVs, farm machineries/resources conservation machineries/tools, efficient water application tools, plant protection, nutrient management, cropping system based training to the farmers etc. are provided.
- From the year 2020-21, primary processing units/small storage bins/flexibility interventions have been added as per local requirements with the aim of increasing the income of the farmers.

Achievements of the Mission

- The Mission has been able to achieve around 110 lakh ha area to be treated with Micronutrients, Bio-fertilizers, soil ameliorants/ (Gypsum/Lime/others) from 2014-15 to 2019-2020.
- Around 120 lakh ha area under Integrated Pest Management (IPM) were achieved during from 2014-15 to 2019-20.
- To strengthen mechanization at farmer’s field about 15 lakh improved farm implements were distributed under NFSM from 2014-15 to 2019-2020