Effects of Soil Pollution from Fertilizers

Fertilizers are essential for increasing agricultural productivity, but their excessive and unregulated use has become a major source of soil pollution.
Continuous application alters the chemical composition, fertility, and biological activity of soils, leading to environmental and health concerns.

2. Causes of Fertilizer-Related Soil Pollution

- Overuse of Nitrogenous Fertilizers (urea, ammonium nitrate) causes soil acidification.
- Phosphatic Fertilizers lead to phosphate accumulation in soil.
- Potassium Fertilizers disrupt nutrient balance when applied in excess.
- Continuous Fertilizer Application reduces natural humus content.
- Leaching and Runoff introduce nitrates and phosphates into groundwater and rivers.

3. Effects on Soil Quality

- Loss of Natural Fertility as soil becomes dependent on artificial nutrients.
- Nutrient Imbalance due to excess nitrogen or phosphorus.
- Soil Acidification/Alkalinization depending on fertilizer type.
- Decline in Microbial Diversity, especially nitrogen-fixing and decomposer organisms.

4. Effects on Ecosystems and Groundwater

- Eutrophication of water bodies due to phosphate runoff, leading to algal blooms.
- Groundwater Contamination by nitrates causing unsafe drinking water.
- Soil Structure Degradation due to chemical residues altering porosity.
- Loss of Soil Biodiversity reducing natural fertility restoration capacity.

5. Effects on Human Health

- Nitrate Contamination of drinking water causes methemoglobinemia (blue baby syndrome).
- Long-term exposure to fertilizer residues increases risk of cancers.
- Bioaccumulation of toxic chemicals through crops harms organs and nervous systems.

6. Conclusion

Fertilizers, though vital for modern agriculture, **degrade soil health and pollute ecosystems** when used indiscriminately.
Adopting **integrated nutrient management, organic manure application, crop rotation, and controlled fertilizer use** can reduce soil pollution and ensure **sustainable agricultural productivity**.