6. Radioactive Cesium Technology for measuring Soil Erosion

Prelims: Environment- Conservation & Mitigation; Science & Technology

Mains:
GS-III- Conservation, Environmental Pollution and Degradation, Environmental Impact Assessment.
GS-III- Science and Technology - Developments and their Applications and Effects in Everyday Life

Why in News?

 Indian scientists have now developed a method to measure the rate of soil erosion and associated decrease in organic content in soil by assessing levels of radioactive cesium in soil.

Radioactive Cesium Technology:

 Researchers at the ICAR-Indian Institute of Soil and Water Conservation, Dehradun have developed a way to monitor soil erosion and decrease in carbon content in soil by relating it with levels of radioactive cesium in soil.
 Carbon concentration is soil correlates with levels of isotope of cesium.
 Different sites were found to have varying levels of cesium pointing at different degrees of soil degradation in different sites.
 By applying various formulas, the cesium loss was then used to calculate erosion and associated carbon loss in soil.
 For measuring cesium levels in soil, gamma spectroscopy technique was used.

Significance:

 Radioactive cesium technology is a more rapid and less expensive method for soil erosion studies in the severely intensive croplands.
 It gives more accurate results for all types of erosion studies including historic, comparative and long-term soil and soil organic carbon erosion.
 This method can help in monitoring the effects of soil erosion and effectiveness of soil conservation strategies.

Why Monitor Soil Erosion?

 Soil supports plants, insects and microbial life and is formed by natural forces over a long period of time.
 Carbon reaches soil through the microbial action on withering plant parts and remains in soil, changing its physio-chemical properties and also enhancing its fertility.
 This way soil also sequesters carbon helping in regulating carbon levels in the atmosphere.
Soil erosion, which involves disaggregation and displacement of soil, leads to decrease in its organic content and eventually its fertility.

Natural and human activities are contributing to soil erosion and posing problems for both food production and climate change.

Therefore, monitoring of soil erosion induced-carbon loss from soil is important.