

**EMERGING TRENDS**  
**IN**  
**SOIL MANAGEMENT**

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## SOIL MANAGEMENT: KEY ISSUES

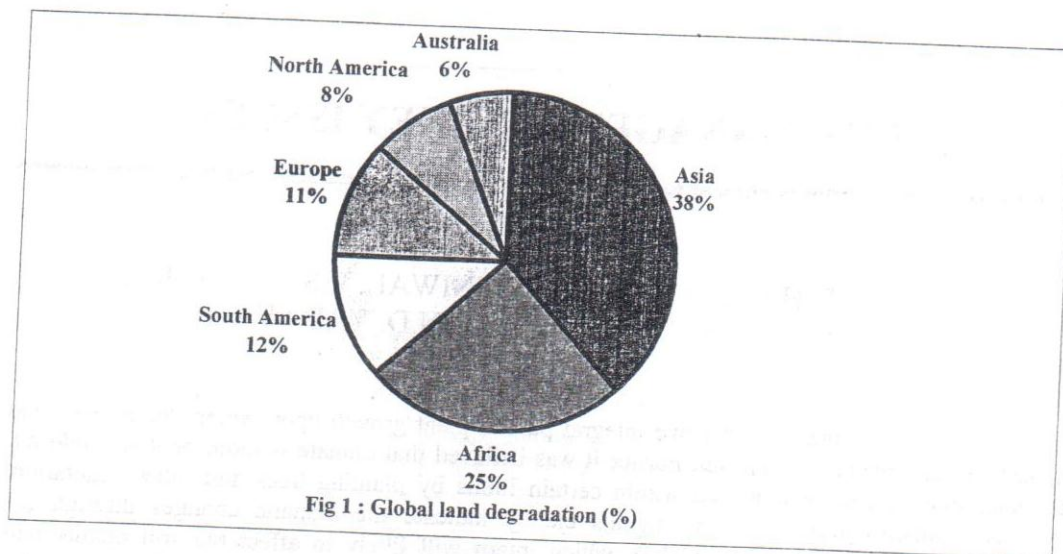
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Soils and climate are the two integral part of plant growth upon which the animals and human beings depend for survival. Earlier it was believed that climate is more or less stable but the microclimate can be modified within certain limits by planting trees and other vegetation. However, present global warming signals clearly indicate the climatic changes through the emission of green house gases (GHG), which intern will likely to affect the soil quality and agricultural productivity. Soil, which is a non-renewable resource, takes hundreds of years to build one cm of soil. But this quantity can be lost within a year through human negligence. Human activity can exhaust the soil in a short time through exploitative agriculture if the balance of nutrient input-out put relations is not maintained.

Previous studies have shown that the problems of soil degradation have come up due to the over enthusiastic efforts in exploitation of soil resources. Although most soil degradation in the world is chemical in nature, but there are also severe soil physical limitations to productivity including factors like seal and crust formation, compaction, erosion etc. (Lal and Stewart, 1995). Worldwide especially Aridisols, Alfisols, Ultisols and Vertisols exhibit poor soil physical properties with high erosion risks (Eswaran, *et al.*, 1993; Lal and Stewart, 1995). There are many examples in the past where bad management turned good soils into deserts and vice versa. For example excess application of water through Indira Gandhi Nahar Pariyojana (IGNP) in western Rajasthan, India has ruined thousands of hectares of land by the problems of water logging and soil salinization. The over exploitation of vegetation in the form of grazing, fuel woodcutting etc. have aggravated the problems of desertification and soil degradation. According to an UNEP (1997), the global land degradation is estimated as 1964.4 million hectare, out of which Asia has highest (38%), followed by Africa (25 %), South America (12%), Europe (11%), North America (8%) and Australia (6%) (Fig. 1). Pimentel *et al.*, (1995) have estimated that nearly 10 million hectare (Mha) land is destroyed every year due to erosion, salinization, water logging and

cultivation of marginal lands in dry climates. The problem is very severe in India with 187 Mha (57 % of total geographic area) being affected by various soil degradation problems (Sehgal and Abrol, 1994). Therefore, there is a vital need to improve the degraded soil by using suitable management practices and the various technologies available. A degraded soil can be improved and made suitable for profitable production using suitable management practices and input applications.



## PARAMETERS FOR ESTIMATION OF SOIL QUALITY

Soil quality is a measure of the condition of soil relative to the requirements of one or more species and/or to any human needs or purposes (Johnson *et al.*, 1997). It is influenced by a number of physical, chemical and biological attributes and processes. The decline in soil quality over time would obviously lead to unsustainability of an agricultural system. Following are some of the important soil quality parameters which needs to be monitored for increased productivity and least degradation:

1. Soil depth and sub soil constraints
2. Sub soil hardpan
3. Soil crusting
4. Soil cracking
5. Soil erosion
6. Soil organic matter and nutrient availability
7. Soil salinity and water logging
8. Soil sodicity
9. Soil acidity
10. Soil biology, microorganisms and integrated activity
11. Soil pollution /Toxicant accumulation.