

Competitive Exams: World Soil System

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The soil system is the product of environmental and biological processes in interrelation with climate, vegetation (flora), animals (fauna), underlying rocks, topography and time which affect the biosphere.

Components of soil

1. Living organisms and organic matter (5 -12 %)
2. Mineral matter (38- 47 %)
3. Soil solution (15- 35%)
4. Soil atmosphere (10-15 %)
5. Regolith - Loose and unconsolidated weathered rock materials.

Soil Structure

The aggregation of individual soil particles in the form of lumps or clusters is called soil structure.

1. Translocation of materials through illuviation, capillary action upward movements, melanization, leucinization, compaction and induration. Darkening of the colour of a section of soil profile through organic matter is known as Melanization. Lightening of the colour of a section of the soil profile mainly in the of of the soil profile mainly in the zone of maximum eluviation is known as Leucinization. The hardening of a section of the soil profile such as kahkar pan, iron pan, calcrete, alcrete, silcrete etc. is known as Induration. The process through which water percolates downward thereby removing humus, soluble bases and sesquioxides from the upper horizon is known as Leaching.
2. Transformation of materials it includes processes like audification, neutralization, oxidation, reduction, solution precipitation, hydration, dehydration, hydrolysis, decomposition, humification and mineralization. The formation of soluble organic metallic complexes and the dissociation of clay humus thereby making them susceptible to leaching is known as Podzolization. In seasonally heavy rainfall region, the silica is

removed from the upper soil rather than the iron or aluminum thereby leading to Laterization. In an anaerobic or water logged condition, the reduction of iron takes place and this process is known as Gleyisation.

Classification of Soils

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Primarily soils can be classified into Zonal, Azonal and Intrazonal soils,

1. Zonal soils are fully matured soils which have developed under the conditions of good soil drainage over a long period of time.
2. Azonal soils do not have well developed soil horizons but there is uniformity in the soils from top to bottom.
3. Intrazonal soils are those that are formed in waterlogged areas. Intrazonal soils have high content of calcium carbonate soluble salts and sodium.

Zonal Soils

Zonal soils can be classified as follows:

1. Laterite soils these are found in high rainfall areas (e.g. equatorial rain forests) having hot and humid conditions. It is also found in areas of wet and dry conditions. They are characterized by leaching, accumulation of sesquioxides. Crust formation, acidic nature and red color.
2. Red soils these soils are also found in tropical areas having high rainfall. They are highly leached having residues of iron and aluminum oxides. This deeply weathered soil is low in fertility.
3. Red and yellow soils: Found in regions having high temperature and abundant rainfall. This soil is affected by leaching, podzolization and laterization and has a well developed horizon. It is susceptible to erosion and gives a good response to agriculture when mixed with fertilizers.
4. Black soils these soils are formed on the basaltic bed rock formed because of lava flow. Such soils are highly water retentive and are good for production of dry crops.
5. Red Desert soils Found in arid tropical areas and is characterized by underdeveloped horizon, coarse texture, and moderate to high fertility. This soil becomes productive when irrigation is applied and salt content is rationalized. The most important characteristic of

these soils is the saline nature and encrustation of its surface. Because of excessive dryness lime is brought to the surface.

6. Chernozem Found in temperate grassland areas of the world which receives low and light precipitation. Thick accumulation of humus gives it a characteristic black color and therefore it is also known Black Earth. The moderate rainfall which the region receives resulting in balanced leaching and evaporation, does not allow the humus to percolate. Further it is characterized by clayey texture, basic nature and high fertility.
7. Chestnut As these are found in the arid margins of the Chernozem belt they have lower humus content, are of lighter color and fertile than the chernozems.
8. Seirozems These are found in the mid latitude continental deserts of central Asia and N. America and are characterized by poor horizon development, low humus content, lime concentration and grey color . Under irrigation they become productive.
9. Podzols these are found in humid mid latitude forests and the coniferous forest regions having moderate to low rainfall. Melting of snow in these colder regions allow adequate water flow for leaching to take place resulting in high acidity. Thick forest vegetation allows slow organic matter decomposition and subsequent podzolization. Though they have low fertility, but it can be enhanced by the addition of lime and fertilizers.
10. Grey Drown podzolic soils: These are found in the mid latitude deciduous forests on the western margin of continents and parts of East Asia. They are characterized by lesser leaching and acidity and more Humus content than podzols. They are reasonably fertile.
11. Tundra soils These are found along the polar margins in the Tundra region. These are characterized by acidic reaction, slow chemical and organic changes, homogenous soil profile and low fertility. This is a permafrost region arid is affected by water melting and logging during summers.

Azonal Soils

Azonal soils can be classified as follows

Soils of a different classification expressed in terms of soils of above classification.

- Entisols -Azonal soils.
- Inceptisols- Alluvial soils
- Aridisols- Desert soils
- Mollisols- Chestnut and Chernozem
- Spodosols- Podzols
- Alfisols- Grey Brown podzolic

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- Ultisols -Red brown podzolic
- Oxisols- Laterite soils
- Histosols- Peaty or Bog soils.

Discussions & Questions

To Dr. Manishika Jain Madam the recent trend of UPSC paper optional Geography is very tough. I am giving Mains 2016. Can you please resolve this? (- in...@ on 20-Sep-2016)

1 Answer

We are covering the contemporary topics in most of the video sessions, we will be working around more of these. The lectures are based on our postal course available at - <https://www.examrace.com/IAS/IAS-FlexiPrep-Program/Postal-Courses/Examrace-IAS-Geography-Series.htm>

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