



# Topic 7: Why and How Soils Differ

**Introduction** There are many different soils both within a country and worldwide. For example, there are over 700 soils in the UK and many thousands worldwide. The reason that there are so many is that the main things that influence soil formation vary greatly across the world. Take, for example, climate. The rainfall varies from just a few millimetres in the desert areas of the world to several thousand millimetres in the tropics. The rocks of the earth are also very variable from one country to another and these differences mean that soils will also be different. Let us look at soil formation in some of the main climatic zones of the world.



## Soils and the Tropical Rainforest

The soils of the rainforest are generally deep because the hot temperatures help to break down (weather) the rocks and the high rainfall tends to leach (remove nutrients) from considerable depths of the soil. The soils tend to be reddish because the high temperatures tend to convert the iron in soil (the mineral largely responsible for soil colour) into haematite which is the reddish form of iron. Although the trees of the rainforest penetrate deeply, most of the organic matter in the soil is a shallow layer at and near the surface of the soil. This organic rich layer is amazing in that it recycles nutrients and maintains the dense tropical rainforest.



When next you see pictures of the jungle, think about the soils that do such a good job in maintaining this wonderful growth of vegetation and all the wondrous life that resides in the tropical rainforest.





**Desert Soils** Desert soils are very different to the tropical rainforest soils. They contain very little organic matter partly because there is very little vegetation and partly because any organic matter is quickly broken down by the hot sun. The desert soils lack the dark surface organic horizon of most other world soils. There is also usually a big shortage of water in desert soils to support plants. There is very little rainfall so the soil does not receive much water to hold for any plants. Many desert soils are also unstable, with high winds blowing the soils about, so that they do not have time to develop and mature.



Have a look at pictures of deserts. You will see that very little grows there, mainly because of the climate.

**Tundra Soils** These are characteristic of areas like the higher northern latitudes where cold temperatures and frozen conditions for much of the year slow down the rates of soil formation. Thus tundra soils are generally shallow, poorly developed soils which include layers that are frozen for long periods of the year. Because they are covered by snow and ice for much of the year, plant growth is confined to just a few weeks a year. The soils may support scattered shrubs, grasses and lichens during the brief summer. The remains of the vegetation are slow to break down in these cold conditions so the soil can contain much organic matter, much of it largely undecomposed.

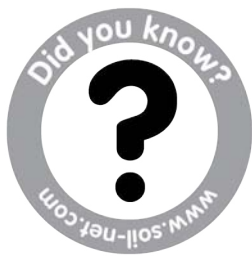


Think of these poor tundra soils trying to form in these icy conditions and think of the poor reindeer that come from these regions, trying to get enough to eat from the sparse vegetation.



## Brown Soils of Temperate Regions

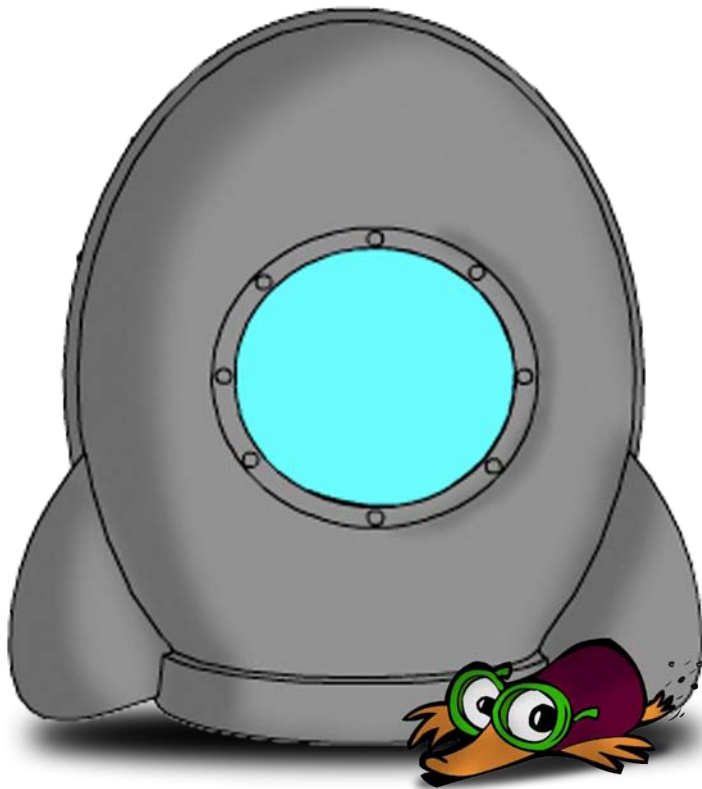
In some ways the brown soils of temperate regions are ideal soils because they are not affected so much by the extremes of climate that desert, tropical and tundra soils are. It is the brown soils that play an important part in feeding the world population. The temperate soils are characterised by sufficient, but not excessive, amounts of rainfall and temperature and a vegetation which is adapted to these moderate conditions. The characteristic soil profile will have a dark upper horizon, a more or less distinctive B horizon and a C horizon with contact with the underlying rock. Many of the soils will be around a metre deep.



These are just some of the main soils in the world but there are many others. Farmers have learned to make the most of their local soils, even poor soils, in the drive to produce food for themselves and for the rest of the world.



It is important to be able to identify and name the different types of soil (just as we name different trees and flowers). For this reason there have been several attempts made to develop soil classifications.



Some classification systems have been developed for single countries, others for the whole world. They tend to use quite complex names and currently are of most benefit to specialist soil scientists. There is a need for popular classification of soil to be developed as well as the more detailed complex one.

Soils are being used for growing all sorts of crops around the world, for example soils of wine regions for growing grapes, soils with olive trees, paddy soils for rice production. We must not forget that soils also sustain a wonderful range of trees and flowers around the world.

