

Environmental problems facing soil

PART 2

JO-ANNE NINA SEWLAL

BSc., MPhil., FL.S., AMSB.
Dept of Life Sciences,
University of the West Indies



SOIL is a major component of ecosystems around the world, however, their importance in ecosystems is overlooked, but they face serious environmental problems.

Last week I looked at two of the main environmental problems facing soil, which were erosion and contamination.

In the second part of this article I will be looking at another environmental problem facing soil which is soil salinity and finally some conservation methods used to protect this essential component of many ecosystems.

First of all with respect to soil salinity, I must stress that salt is a natural element found in soil so that its presence is not a bad thing. Also, when we speak of soil salinization we are not only dealing with sodium and chloride which we find in ordinary table salt, but we are also dealing with elements like calcium, potassium and magnesium.

What is bad is too much salt in the soil makes it difficult for plants to extract water from the soil, thereby becoming water stressed. This condition, is referred to as a chemical drought and the affected plants exhibit the usual signs of a plant lacking water, so that plants not tolerant of this soil condition will eventually die.

This is especially detrimental if it occurs on land used for agriculture or pastureland for livestock. Therefore, soil salinity simply means that there is excess accumulation of salt in the soil. This can occur both naturally and because of human activities.

Natural occurrence of soil salinisation includes the transport of salt from a salt laden water table to the soil surface through capillary action.

In this method of transport, the tiny spaces or channels between the soil particles actually act as a vacuum pulling the salt water from the water table to the surface. Over time weathering also releases salts, which are leached into the soil when it rains. Salts can also be transported to an area via dust.

Human activities that have led to soil salinity include farming

practices like irrigation. Over time, all water both from rainfall and if it is pumped from another source like a river or stream, dissolve the salts in the soil and as the water is absorbed by the crops, the salts are left behind.

Poor drainage and the use of saltwater for irrigation add to the soil salinity problem.

This problem can also occur in urban areas as in temperate countries which have large gardens and recreation areas that need to be irrigated.

Soil salinity results in soil erosion when the crops are damaged and die so that there is no vegetation to hold the soil together. The salts can also cause damage to infrastructure like roads, to building materials like bricks and the corrosion of pipes and cables.

Now that we have gone through the main environmental problems that soil faces, let's turn to how this vital component can be conserved.

There are many ways of soil conservation, some of which I have already discussed in the first part of this article with respect to soil erosion and contamination.

However, there are some addi-

tional methods. In lands susceptible to erosion there are soil conservation methods used with agricultural land, which includes growing a wind break-this is a dense stand of trees usually of evergreen species which would not lose their leaves and thus provide year round protection against wind erosion.

Other tree types like conifers are also used as windbreaks as well as shorter varieties of vegetation like shrubs and grasses. Other farming practices to prevent against erosion especially on hillsides, is forming terraces along the contours of hillsides and planting on these terraces.

When it comes to soil salinisation the excess soluble salts can be leached out of the area by flooding it or the use of sprinklers that are cycled on and off to reduce run-off in the area.

This treatment takes place over a period of a few days. However, in cases where salinisation is due to compaction of the soil, for instance in a pasture due to the constant movement of livestock, the soil must first be tilled and organic matter added to improve the drainage of the soil before the area is flooded.

But in areas where it cannot

be helped, one might have to use plants that have a tolerance for high levels of salinity.

Soil conservation is not only vital to plants, especially food crops but it is also important to the organisms that call the soil home, for example, earthworms that are vital for aeration of the soil and promotion of nutrient availability.

Therefore, we can see that soil although viewed as a simple component of some ecosystems is very important and also faces serious environmental problems, such as erosion, contamination and salinisation.

Also one problem can also lead to another, for instance the death of vegetation due to soil salinity causes erosion as there is little or no vegetation to hold the soil together.

The effects of these problems are also felt by humans since a major portion of the crops we consume are grown in soil and not using soil-less technology of hydroponics.

Also contaminants in the soil can also affect man-made structures like bricks, pipes in houses and roads. So that we have to recognise what happens to our environment also affects us.