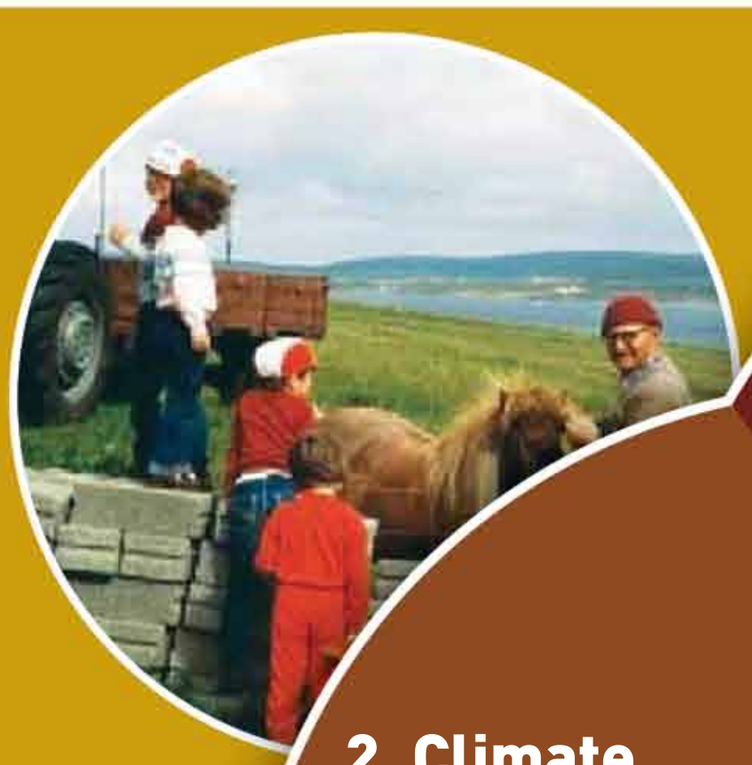
SOILS OF THE CROFTS

How are soils formed?

To help us understand our soils, let us first find out how they are made.

Soils are formed from the interactions between five factors:



1. Parent material

This gives the soil its characteristics such as grain size and chemistry. It can be bedrock, sand or sediments left by glaciers or rivers.

Rocks contain elements useful for plants, such as potassium (K), aluminium (Al), iron (Fe) and manganese (Mn) useful for plant growth. When rocks weather, these elements are released into the newly formed soil. The variety of rocks is called 'geo-diversity'.

2. Climate

The climate affects soil formation by temperature and moisture. Extremely cold temperatures will freeze the soil, stopping it from developing, whilst very hot temperatures slow down soil formation. When the climate is temperate (milder and usually wetter) conditions for soil development are more favourable.

If soil becomes too wet, nutrients can be dissolved and transported (leached) deep into the lower soil horizons.

3. Topography

Topography is the study of the shape of the Earth. This includes elevation, slope and aspect. On steep slopes soil can move down the slope with gravity whilst peat can form in shallow, water-logged hollows in the landscape.

Height affects temperature. Mountains tend to be cooler than low lying coastal zones. Mountains can also help clouds form, and so increase rainfall. This is part of the reason why parts of the crofting counties are so wet.

On low-lying areas soils tend to be deeper than in uplands and generally the steeper the slope, the thinner the soil.

SOIL

4. Biota

Soil is an amazing ecosystem for a wide variety of plants, bugs and microbes to live.

Large organisms such as earthworms ingest organic material near the surface of the soil and then burrow down, excreting organic material as they move. This releases nutrients from organic matter such as nitrogen (N) and carbon (C) into the soil. Micro-organisms (bacteria/fungi) are responsible for decomposing organic material that enters the soil.

Vegetation also plays a part in shaping our soils. For example, acidic litter from pine forests leads to the formation of an acid soil whereas litter from deciduous trees increases the pH helping to make a more fertile soil.

5. Time

Soils take time to form. Parent material weathers as the seasons change and the temperature fluctuates. The topography of the Earth changes as mountains are built and erosion occurs. Erosion can take millions of years or happen suddenly during a storm. It takes time for micro-organisms and plants to colonise the soil and start mixing it.

All of these soil-forming factors work together to make soil. The type of soil found in an area is therefore dependent on a range of different combinations of factors. Scotland has very diverse soils, with over 1000 soil types recorded.

DID YOU KNOW?

Most Scottish soils are 'young' i.e. less than 10,000 years old, while some soils in the tropics can be several million years old.

DID YOU KNOW?

There are more micro-organisms in a teaspoon of soil than there are people living on planet Earth.

People also influence soils in many ways, e.g., by adding organic material and ploughing

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