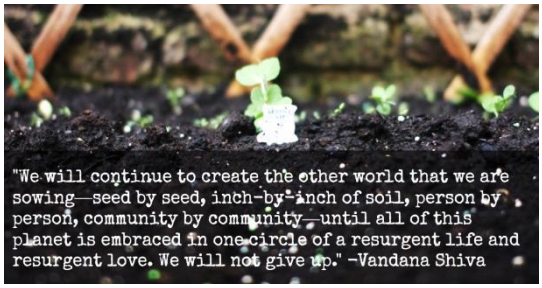
Kenyan Connections

Connecting Classrooms and Gardens in Kenya and Scotland

Soils of the Shambas and Crofts



2015 is the UN International Year of Soils. *To celebrate the partnership between NECOFA Kenya School Gardens Initiative and Crofting Connections, we commissioned a soil analysis of three different soils from Kenya by the James Hutton Institute. This is an opportunity to compare the soils in the* ***Eastern Rift Valley of Kenya*** *and* ***the Highlands and Islands of Scotland.***

The Gardens

The principle focus of this partnership is **the school garden.**

In both **Crofting Connections** and **NECOFA Kenya School Gardens Initiative,** the school garden is a model of small-scale agriculture practised in the rural areas served by these projects. It is a way of ensuring that the next generation will be equipped with the knowledge and skills needed to maintain and increase local food production in the 21st century, by learning from the wisdom of the older generation and incorporating new skills and techniques in ecological horticulture. At the heart of this learning is ***care of the soil.***

Soil Analysis by the James Hutton Institute of three soil types from the Eastern Rift Valley.

The methods used to analyses soil fertility are often different around the world as they are specifically developed for the types of soils found locally therefore the results may not be totally suited to Kenyan soils . We have based the comparisons between the Kenyan soils and Scottish soil typically found in crofting areas. The results of the soil analyses are shown in Table 1.

Table 1: Data obtained from soils samples from Kenya.

Sample	pH	P	K	Mg	Organic Matter
		mg/kg			%
Marioshoni Area of East Mau Forest - Nakuru County	5.55	2.31	375.1	371.6	16.3
Karunga Women's Group in Molo District of Nakuru	6.32	1.29	753.6	419.7	8.53
Kailer Village of Semi-Arid Marigat District	7.36	527	656.2	964.3	3.3

Phosphorus (P), potassium (K) and **magnesium (Mg)** are major plant nutrients. They are required by the plant for sustain strong growth. **Soil pH** is a measure of how acid or alkaline a soil is. In general, crops prefer soils that are neither too acid, nor too alkaline. The pH of the Kenyan soils show considerable variation.

The soil from the Marioshoni Area of East Mau Forest has an acidic pH of 5.55. This would be typical of large areas of Scotland.

The soil from the Karunga Women's Group in Molo District of Nakuru has an acidic pH of 6.32, but would be more typical of a Scottish soil under good management for grass and some crops.

The soil sample from the Kailer Village of Semi-Arid Marigat District has a pH close to neutral (neither acid nor too alkaline) but slightly alkaline at pH 7.36. This would be typical of soils of the **Machair on the west coast of Scotland**. These Machair soils are derived from shell fragments and have a neutral to alkaline pH and are quite unusual. They are rare, but are an important habitat for a wide biodiversity. The Machair soils are often associated with crofting within Scotland. Historically, farmers living close to the coast within Scotland would add crushed shells to the soil as a source of 'lime' to increase the soil pH of acidic soils to improve the fertility and produce healthier crops. Other areas would add crushed limestone rock to increase the soil pH.

Soil Fertility

"The joint crises of climate change and biodiversity erosion can both be addressed by planting gardens everywhere - full of biodiversity; full of the celebration of life, well-being, and abundance. Gardens of hope everywhere. Farms that give real food."
Scientist, writer and environmental activist, Dr Vandana Shiva, Founder of ***Navdanya,*** which has a learning centre Bija Vidyapeeth (School of the Seed / Earth University) on its biodiversity conservation and organic farm in Doon Valley, Uttarakhnad, North India.
See - http://www.navdanya.org/

The samples from **Marioshoni Area of East Mau Forest** and **Karunga Women's Group in Molo District of Nakuru** both have very low concentrations of available phosphorus (P) and high concentrations of potassium (K) and magnesium (Mg). This is probably due to either local management techniques, for example the application of fertilisers containing K and Mg or the soils naturally having low concentrations of P. Many tropical soils are low in nutrients as they are often quite old and have had the nutrients removed by rainwater. The parent material (rocks) from which the soil is derived can have a big influence on the amount and types of nutrients in the soil.

The Scottish agricultural community, including the crofting areas, manage soil fertility by applying either synthetic fertiliser or natural fertilisers such as animal dung or seaweed. Before synthetic fertilisers were available the crofter would have added animal dung / manure or seaweed to the soil regularly as well as allowing land to rest between crops..

The sample from Kailer Village of Semi-Arid Marigat District has high concentrations of P, K and Mg. Again this probably reflects either local management techniques, for example the application of fertilisers or naturally very fertile soils.

Organic Matter

Soil organic matter is estimated using a technique called 'loss on ignition'. The samples are heated in a muffle furnace at 450 °C. At this temperature the weight lost from the sample is used to estimate the organic material that is present within the soil.

The organic matter content of the Kenyan soils varies from 16.3% of the soil from **Marioshoni Area of East Mau Forest** to 8.53% of the **Karunga Women's Group in Molo District of Nakuru** soil and finally 3.3% from the soil obtained from **Kailer Village of Semi-Arid Marigat District**.

Typical mineral soils in the crofting areas of Scotland would have organic matter contents of between 7-12%, most similar to that found in the sample from **Karunga Women's Group in Molo District of Nakuru.**

Soil organic matter can naturally vary greatly across soil types depending on how and where the soil forms and climate can play an important role. Dry arid regions will not have as much plant growth as wetter regions, which may account for the higher concentrations of organic matter present in the soil derived from **Marioshoni Area of East Mau Forest** as compared to **Kailer Village of Semi-Arid Marigat District.**

However, soil management can also affect the amount of soil organic matter. Soils that are continually cropped with no organic matter inputs (such as animal dung or green manure) will typically have lower organic matter contents than those getting inputs or those left fallow for periods of time.

Scotland has a considerable amount of peat soils due to the cold wet climate which reduces the rate of decomposition. These soils are almost 100% organic matter. Crofters used to cut and dry blocks of peat during the summer to burn in the fires during winter.

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