

# [***Soil health heartbeat of sustainable agric***](https://advance.lexis.com/api/document?collection=news&id=urn:contentItem:691Y-9WR1-F00C-61R8-00000-00&context=1516831)

The Sunday Mail

August 28, 2023 Monday

Copyright 2023 Zimpapers LTD 1980 All Rights Reserved

**Length:** 1152 words

**Body**

***SOIL*** is not an inert growing medium, but a living and life-giving natural resource. It is the home of billions of bacteria, fungi and other microbes that are the foundation of an elegant symbiotic ecosystem.

Profitable and sustainable agriculture is hinged on healthy ***soil***, which is home to a variety of microbes. The microbes help to enrich the ***soil*** with essential nutrients for bountiful crops.

***Soil health*** determines both the quantitative and qualitative aspects of the yield. It is, therefore, imperative to underscore the need to prioritise ***soil health*** in farming operations so that the land continues to be productive from generation to generation.

***Soil health*** at the farm level is influenced to a larger extent by human activities and the practices farmers adopt in their operations.

A culture of adhering to good agronomic practices helps in achieving a healthy ***soil*** that sustains crop growth. It further helps in mitigating the effects of climate change by capturing and storing significant levels of carbon from the atmosphere.

Poor management of the land resource in farming increases emission of greenhouse gases, which, consequently, contribute to global warming.

This article, therefore, seeks to unbundle ***soil health***, highlight its significance, and show how to maintain it, as well as the consequences of failing to do so.

***Soil health***, in simple terms, is the capacity of the resource to function as a living system that sustains optimum agricultural production without leading to detrimental environmental outcomes.

Intensive agriculture has helped in feeding the ever-growing human population, but on the contrary, it has led to increased ***soil*** disturbance, depletion of organic matter and overuse of inorganic fertilisers.

With the global economic recession currently being experienced, crop yields are decreasing sharply as the cost of production is increasing beyond the reach of many farmers. It should be noted that intensive farming makes the ***soil*** dependent on expensive inorganic fertilisers.

Prioritising ***soil health*** in farming operations helps in saving money on crop inputs as ***soil*** fertility is kept at its optimum and ultimately improves the resiliency of the land.

To ensure ***soil health***, farmers need to consider minimum ***soil*** disturbance, maximum ***soil*** cover and maximum biodiversity as key pillars of maintaining ***soil health***.

Excessive mechanical work on the land and chemical application may help to boost crop production, but it can lead to ***soil*** compaction issues, loss of ***soil*** structure, poor infiltration and decreased ***soil*** biological activity.

Once the ***soil*** has poor infiltration, runoff is increased and chemicals find themselves in rivers and dams, leading to water quality issues and loss of aquatic life.

Making the ***soil*** more dependent on heavy machinery, inorganic fertilisers and pesticides has made agriculture a very expensive venture that requires a huge capital outlay. This makes it difficult to feed the rising human population in developing countries.

Additionally, crops cannot thrive in compacted ***soils*** as root development is compromised, exposing them to abiotic stress due to drought conditions often experienced every season.

Minimum ***soil*** disturbance is, therefore, of fundamental importance as it maintains a good ***soil*** structure that allows easy root penetration into the ***soil***, good water infiltration and proper functioning of ***soil*** microbes.

Minimising ***soil*** disturbance helps to keep the ***soil*** porosity at its maximum, enhancing aeration that supplies oxygen to microbes for decomposition of organic matter into humus.

Ploughing the whole land aids in the release of carbon dioxide into the atmosphere, leading to global warming. With respect to reduced tillage, farmers should consider using machinery that only disturbs the land where they want to plant their seeds. Such equipment is now available; it is suitable for both large-scale farmers and resource-constrained communal farmers.

Land that is less disturbed often has good drainage, which helps farmers with a good moisture bank and, on the other hand, poorly drained ***soil*** often leads to waterlogging that gives crops physiological stress and, worse still, leads to denitrification.

Denitrification is the conversion of nitrates from the ***soil*** into gaseous nitrogen, which cannot be used by the plants and often happens when oxygen is driven out of the ***soil*** due to waterlogging.

Excessive use of pesticides and fertilisers also disturbs the ***soil*** ecosystem by killing beneficial organisms and decreasing ***soil*** biological processes that help in the recycling of ***soil*** nutrients.

***Soil*** cover helps in protecting the ***soil*** from wind and water erosion. Farmers who burn crop residues after harvesting are making the mistake of exposing their ***soil*** to wind and water erosion.

This leads to the loss of the productive topsoil as it is replaced by infertile subsoil. ***Soil*** cover acts as a mulch that enhances moisture retention and provides a substrate for microbial activity, resulting in good ***soil*** fertility.

Cover cropping in winter helps to maximise living roots, in ***soil*** in addition to providing ***soil*** cover.

A field with good ***soil*** cover in the form of crop residues often has organic matter that also helps as a ***soil*** pH buffer, hence creating a good environment for crop and ***soil*** micro-organisms. ***Soil*** that is too acidic makes crop growth unsuccessful as essential nutrients like phosphorus are not available and aluminium becomes toxic to plants.

It, therefore, goes without saying that good ***soil*** cover is indispensable as it helps in creating a favourable growing medium for crops and a variety of ***soil***-enriching organisms. Mulch also helps in creating good ***soil*** temperature for the growth of a diversity of organisms.

***Soil*** is a complex ecosystem with different organisms living and interacting together, each providing different services to the ecosystem.

There is need to keep maximum biodiversity through good farming practices such as crop rotation to build healthy ***soils*** and prevent diseases build up.

The symbiotic interactions of legumes and Nitrobacter help to enrich the ***soil*** with nitrogen that will benefit the next crop in a rotation system thereby lessening the use of chemical fertilisers.

Crop rotation systems that use both fibrous and tap root crops help in accessing more of the ***soil*** profile, break up compaction issues, and help cycle ***soil*** nutrients. There is also need to integrate crop farming with livestock rearing as livestock helps in the breaking down of plant residues into organic forms of nutrients that are basically urine and manure.

Besides helping to diversify the economic income of the farm, livestock enhances biological activity in the ***soil*** by helping to inoculate the ***soil*** with beneficial microbes.

The overarching goal of feeding the rising population at a profit can, therefore, be achieved sustainably by religiously following good agronomic practices and taking a systems approach in managing the ***soil***.

**Load-Date:** August 28, 2023

**End of Document**