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Reducing soil erosion on farmlands using mulch

Yandiswa Mtimkulu (ARC Infruitec-Nietvoorbij)
Dr Adornis Nciizah (ARC Soil, Climate and Water)

Soil erosion is arguably the most severe agricultural and environmental problem in South Africa, which has huge implications on land and freshwater resources. South African farmers claim that tons of soil evaporate annually for each cultivated hectare. This enormous loss of fertile topsoil from farmlands reduces the sustainability and agricultural productivity leading to yield losses and food insecurity. Whilst reversing soil erosion is a top priority, it is usually very costly, requiring huge investments from farmers and other stakeholders. Therefore, certain sustainable measures need to be put in place to prevent the continued loss of soil and nutrient, which causes huge economic losses.

Clearly, there is a need to implement suitable strategies to control soil erosion given the huge soil loss on South African farmlands. Although soil erosion is a natural process that affects all landforms, it is exacerbated by direct and indirect human activities such as deforestation, excessive and continuous soil tillage, overgrazing etc. Regrettably, the impacts of soil erosion are not only at the farm level but can be offsite as well. These offsite impacts include sedimentation and eutrophication of water bodies, which reduces both quantity and quality of water. Other negative impacts of soil erosion include damage of natural landscapes and infrastructural damage to roads and houses.



Land affected by gully erosion Source: (<https://www.ucsus.org/resources/how-soil-erosion-threatens-food-and-farms>)



Soil eroded by water (Photo by Mahdi Al-Kaisi)

Wind erosion. Source: http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/lwm_land_deg_soil-erosion/wind-erosion

Since poor farming practices are the major originator of soil erosion, preventative practices should therefore start at farm level. It is essential that farmers implement a holistic and integrated approach to rectify the problem because a business as usual approach will worsen the erosion problem thereby causing irreversible damage over time.

The impacts of soil erosion

Soil erosion may get worse in the future due to population growth and potential climatic changes. Soil erosion takes place under the influence of water, wind or tillage and involves different actions such as soil detachment, movement, and deposition. Topsoil, which is high in organic matter, will relocate elsewhere where it builds up over time and fills drainage channels. Consequently, soil erosion decreases soil fertility, which negatively affects crop yields, farmland productivity and contributes to the pollution of adjacent watercourses, wetlands, and lakes. The impacts also include compaction, loss of soil structure, nutrient degradation, and soil salinity. Topsoil, which lies closest to the surface of the land, contains essential nutrients for crops and organic matter.

The results of removal of organic matter and clay minerals leads to reduced water retention of the soil, poor soil structure and disrupts soil microbes that aid in nutrient cycling resulting

in low yields and crop failures. It is therefore important for farmers to prevent soil erosion on their land. There are numerous strategies that farmers can practice preserving soil. Some practices require huge capital and knowledge whilst others are low-cost and relatively easy to implement. Mulching, which falls under plant management practices is a simple and low cost soil conservation practice that farmer can easily adopt

Mulching - a low cost adaptation strategy of improving soil erosion

Mulching is a technology beneficial for the horticulture crops not only for increasing growth and yield but also as method of soil and water conservation. Mulches can be either organic or inorganic, the organic mulches consist of animal and plant remains whilst the inorganic consist of gravel, crushed stones, plastic etc. As the organic mulches slowly decompose, they provide organic matter, which helps keep improve soil physical properties

Selection of specific mulching type for particular purpose is important. For instance, coarse mulches are more beneficial than the finer ones of the same category in controlling the temperature at favourable conditions. Mulching is affordable, sustainable agricultural technology for sustainable soil and land management and reducing soil erosion, which small as well as large



Plastic mulch (Inorganic). Source: (<https://www.greengoldfarms.net/plant-care/8-benefits-plastic-mulch/>)

farmers can easily adopt. Various types of mulches demonstrated to reduce soil erosion and sediment concentration by almost 99% compared to bare agricultural soils, according to researchers that have already done investigations. This clearly displays those farmers can regain sustainability and productivity in food security and defeat soil erosion by using mulches.

Challenges farmers may get in accessing mulch

Mulches have some few shortcomings that can affect farmers such as:

- Cost of some materials can be a drawback to large- scale mulching,
- Not only is mulching expensive when applying on a large field, but it can also be a

- very tedious task, which will require a lot of labour and material
- Some mulches are not readily available.

Nevertheless, there are some cheap mulch ideas to save money like such as investing in chipper shredder also collecting free wood chips in the local tree services etc. The successful findings were different mulches tested from vines, vegetables and fruits verifies that, there is still much potential for farmers to recover the sustainability and productivity in food security and reverse soil erosion. Farmers need to take prior measures before severe visible signs appear to their fields. It is essential to act immediately before problem gets worsen, because water shortage and loss of soil fertility are associated problems limiting productivity.



Straw mulch (organic). (Photo by: Adrian White | 2.15.2021)