



## CONSERVATION AGRICULTURE FOR SOIL HEALTH IMPROVEMENT

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Conservation agriculture (CA) is a method that is being used to promote sustainability in agriculture. Conventional agriculture has brought up concerns that include land degradation, destruction of habitats and loss of biodiversity. The quality of the natural resource base, especially of soil and water, plays an extremely critical role in enhancing productivity and crop quality, and sustainability of various production systems. To meet the ever increasing demands for food, feed and fiber in a sustainable manner the maintenance of soil health is a prerequisite. Soil is a limited natural resource on which agrarian activities (agriculture, livestock and forestry) are carried out. It is interconnected with other natural resources, which are also essential for human life, such as the air, water, fauna and flora. From when it can be said that if the soil is well managed, the effects of agriculture on the environment will be acceptable and, conversely, if it is badly managed agriculture will deteriorate other resources needed by humans (water, fauna, flora, and atmosphere).

Sustainable soil fertility management is the key to food and livelihood security of millions of people living in semi-arid regions (Nyagumbo, 1998). Although chemical fertilizers are a ready source of nutrients that bring about fast results and good yields for some farmers, the poor and marginal farmers are much reliant upon SFM practices that are based on local resources and knowledge. Unfortunately, most agriculture researchers and extension agencies focus their activities on chemical fertilizers, which do not facilitate livelihood opportunities. Conservation agriculture reduces the risks and improves the sustainability of agriculture (Mtambanengwe, 2005). Livestock are crucial for maintaining soil fertility, supply of draught power, food for the family and increasing the agricultural productivity of dry lands. Hence, a better integration of crop and livestock system is essential.

Importance of conservation agriculture	Principal of conservation agriculture
Increase in soil organic matter	Minimal mechanical soil disturbance
Improve soil structure	Surface crop residue retention
Increase microbial activity and biomass	Crop rotation
Reduces soil erosion	
Increase water holding capacity of soil	

**Conservation practices:**

<b>Agronomical practices</b>	<b>Mechanical practices</b>
Integrated nutrient management	Grassed waterways
Tillage	Contour bunding
Trop rotation	Water harvesting ponds
Organic sources	Graded bunding
Green manuring	Broad bed and furrow
Contour cultivation	Bench terracing
Mulching	Zing terracing

**Modern concepts of conservation tillage**

- Stubble mulch tillage
- Minimum tillage
- Zero tillage

**Benefits of conservation Agriculture**

- Reduction in cost of cultivation
- Enhancement in the long-term C sequestration and build up in soil organic matter constitute.
- Reduction of the incidence of weeds
- Enhancement of soil quality, i.e soil physical, chemical, and biological condition
- Enhancement of water and nutrient use efficiency
- Enhancement of production and productivity
- Advanced sowing date
- A practical strategy to mitigate greenhouse gas emissions
- Avoiding crop residue burning reduces loss of nutrients, and environmental pollution, which reduces a serious health hazard
- Improvement of resources use efficiency
- Use surface residues as mulch
- Providing opportunities for crop diversification and intensification for example in sugarcane based systems, mustard, chickpea, pigeon pea etc.

**References**

**Nyagumbo,I. (1998).** Experiences with conservation tillage practices in southern and eastern Africa: A regional perspective

**Mtambanengwe, F. (2005)** Organic matter management as an underlying cause for soil fertility gradients. *Current Science*. **88**(1): 36-44