CONSERVATION AGRICULTURE
Basic principles, techniques, advantages and challenges

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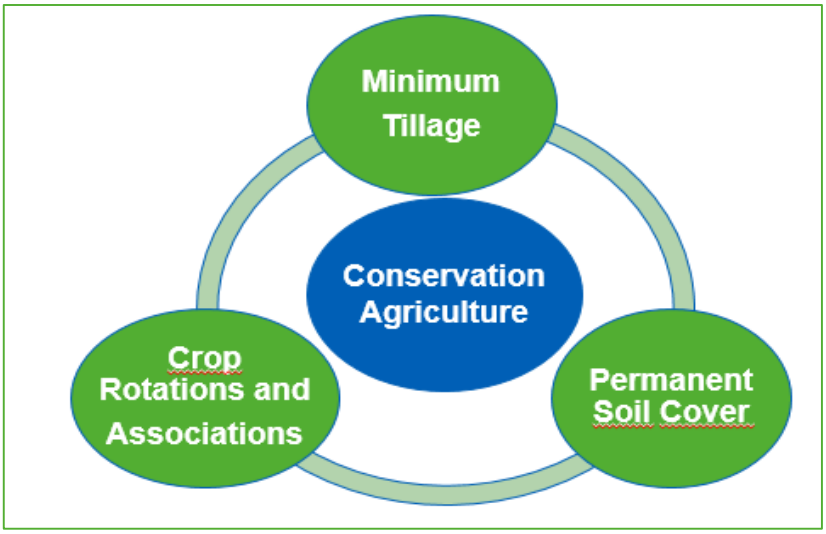
WHY CONSERVATION AGRICULTURE?

One of the side effects of conventional agriculture is its impact on natural resources, and particularly on soil degradation. Conservation agriculture is a set of agricultural practices that aim at protecting the soil against erosion and all forms of soil degradation. It contributes to soil fertility enhancement by enriching it with organic matter, by enhancing soil structure and enabling biological activity in the soil. It also allows an optimized management of water resources, enhancing soil water-retention capacity, thus reducing evaporation.

Photo of field with Maize and leguminous Association – ACF Ethiopia © Bader M.D.

THREE BASIC PRINCIPLES OF CONSERVATION AGRICULTURE

Conservation agriculture bases its foundation on three basic principles: minimum tillage (including sometime zero tillage), crop rotations and associations, and permanent soil cover (living cover crops or mulch). These principles include a number of agricultural practices that interact each with another; the main objective being to improve productivity on a sustainable way, to increase farmer profits and improve food security, while preserving natural resources and environment, thus fulfilling the three dimensions (economic, social and environmental) of sustainable development and agroecology.



ADVANTAGES OF CONSERVATION AGRICULTURE

Conservation agriculture provides a number of advantages, some of which being very evident as soon as the agroecosystem reaches it equilibrium.

Minimum tillage (including zero tillage)	▪ Reduction of workload due to tillage ▪ Preserving and enhancing soil fertility ▪ Enhancing soil water retention capacity ▪ Reducing evaporation ▪ Adaptation to and mitigation of climate change
Crop Associations & Rotations	▪ Enhancing soil organic matter ▪ Improving soil fertility ▪ Enabling biodiversity conservation ▪ Diversification of production ▪ Improving diet and nutrition ▪ Reducing pests and disease ▪ Reducing evaporation
Permanent soil cover	▪ Recuding soil erosion and degradation ▪ Reducing evaporation ▪ Adaptation to and mitigation of climate change ▪ Weed management

PROVEN ADVANTAGES, BUT IMPLEMENTATION CHALLENGES

The following challenges were identified in the implementation and adoption of the practices of conservation agriculture in different contexts:

- **Need for a transition phase (5-7 years) before the agrosystem finds its equilibrium** (yield reduction can be observed during the first years and farmers are not reluctant to take this risk)
- **Difficulty of having permanent soil cover,** particularly in semi-arid zones, where cattle graze the mulch (usually crop residue). In addition, the produced biomass is usually not enough to cover the required soil surface.
- **Limited adoption of crop rotation and association** by farmers who prefer to grow continuously and widely staple crops on the fields as these crops are the basis of their main diet
- **Workload** required for soil preparation, weeding and adoption of different farming practices (due to the different crops included in the crop rotation)
- **Knowledge and time intensive practice** for farmers as they need to learn these practices and adopt the techniques and this requires time and technical support at least on the medium term.

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