

**Conservation Agriculture: Soil and Water Saving?****Digvijay Dhama<sup>1</sup>, Gourkhede P. H.<sup>2</sup> and Zade S. P.<sup>2</sup>**<sup>1</sup>PhD Scholar, <sup>2</sup>Assistant Professor, Department of Soil Science and Agriculture Chemistry, VNMKV, Parbhani, Maharashtra.**SUMMARY**

Furthermore food production while facing climate change showed need of farming that should be in harmony with nature and should not contribute in raising greenhouse gases in environment. To attain the food security of growing population crop production requires overall good soil health and in this time conservation agriculture can play a key role by preserving and enhancing natural resources and biological diversity. So adopting Conservation agriculture can be seen as climate smart agriculture which gives optimum yield with least labour while helping in reduction of global warming effects.

**INTRODUCTION**

Increased population led to grow more food almost everywhere in the world, for that purpose we intensified crop production by putting a load on natural resources without sustainable farming at many places to the extent that soils are getting degraded. Declining quality of soil certainly raise concern over further future production to feed billion people. Adopting conservation agriculture practices provides a way of intensified cropping without harming natural resources. Conservation agriculture is the system which supports no or minimum mechanical disturbance to soil, permanent surface cover and diversified crop rotation (FAO). The concept of minimum disturbance to soil was first introduced during Dust Bowl in USA in 1930s and from 2008-2009 to 2015-2016 adoption and practice of conservation agriculture had increased by 69% by farmers at global level. Out of total cropland in the world 12.5% area was under this technique in 2015-2016. In the time of climate change and water scarcity conservation agriculture provides a way of using crop residues as a soil cover instead of burning the residues, thus it lowers the greenhouse gases emission and also strengthens the soil quality and saves irrigation water.

**Conservation Agriculture Practices for Soil Quality**

Soil health depends on physical, chemical and biological aspects which are basic requirement for good farm production and the practices that followed in conservation agriculture maintains the soil quality in various ways. Practices of conservation agriculture depends on its principles that are permanent soil cover, minimum disturbance of soil and diversified crop rotation.

**Covering of soil –**

Soil in CA is covered by main crops, cover crops and by mulching of crop residue at different time. Proper choice of cover crops ensure the increase in fertility by uplifting nitrogen fixation and organic matter content in soil and farmers should also get some benefit from these cover crop. After harvesting of main crop remaining residues are used to cover the soil as mulch. By covering of soil, soil biodiversity also get increased by continuous availability of food to the soil organisms.

**Reducing mechanical disturbance to minimum in soil –**

In CA farmers should adopt zero tillage or minimum tillage and seeds are sown over the soil cover by direct seeding according to the condition of field. Some specific machinery particularly used for conservation agriculture can be used by farmers that does not disturb the soil.

**Maintenance of fertility –**

Soil fertility mainly depends upon concentration of organic matter present in soil. Root decomposition of crops results in more amount of soil organic matter. If chosen properly main crop and cover crop maintains fertility by increasing nutrients and organic matter. Application of fertilizers should be done with proper tools.

**Some good soil management practices for CA (FAO) -**

- First know thoroughly your soil, its properties and its proper use.
- Do not allow soil to get compact beyond its elasticity.

- Keep soil away from mechanical disturbance till it's possible.
- Use crop residues or cover crops to reduce erosion loss by water and wind.
- Keep organic matter and nutrients in soil at optimum level in first few years of conservation agriculture.

### Effect of CA on soil quality and water use –

Conservation agriculture needs to have some potential benefits to get acceptance at larger scale and it is proving its benefits sufficient enough to attract the farmers.

In view of soil quality CA leads to increase in organic matter, better physical properties, better soil structure and more soil water conservation. Practicing CA as a long term strategy adds more organic carbon from 23.6%-35.3% in sandy loam soil with maize crop rotations with improvement in other soil properties like bulk density, penetration resistance, water stable aggregates and saturated hydraulic conductivity (C.M. Parihar et al., 2016).

Soil biological health had been increased significantly by adopting CA practices with permanent raised bed (C.M. Parihar et al., 2016). B.N. Ghosh et al. (2015) noted that water loss due to runoff and soil loss were decreased using palmarosa grass with mulching of weed in their experiments under CA because vegetative strips hold water temporarily and increase infiltration. Thus, CA system when used as a long term strategy it reduces soil loss while saving water and produces more yield (B.N. Ghosh et al., 2015). Retention of crop residue on surface showed better infiltration and higher moisture level in Zimbabwe and Zambia in trials by C. Their fielder, P.C. Wall (2009). Adoption of conservation agriculture over conventional agriculture maintains overall soil health for longer time, reduces use of irrigation water and gives optimum yield while facing results of climate change. With use of less water, conservation agriculture practices with permanent beds showed more mean water productivity and more net income than conventional agriculture. With these benefits CA also reduces the soil erosion by means of residues over surface which also reduces water runoff. Conservation agriculture system in contrast with tillage agriculture works as a sink for carbon dioxide thus it can play a crucial role in decreasing global warming effects if adopted globally (FAO).

### CONCLUSION

Sustained production with less labour conservation agriculture can be a major throwback in future to feed large population without degrading our soil and environment. This technology has many benefits if practiced properly for long time. It is water saving, labour saving and cost saving and it reduces emission of GHGs because it eliminates the chances of burning crop residues. It is also helpful to maintain and protect soil health and biodiversity thus it can be used to improve water quality. For small scale farmers it saves up to 40% labour and gives better or equal yield after few years of adoption in sustained way.

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