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## Mains Practice Questions

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**Q.** What is conservation agriculture? Discuss its advantages in the wake of climate change leading to soil degradation. (150 words)

08 Feb, 2019 GS Paper 3 Economy

**Approach:**

- Elaborate the concept of Conservation Agriculture (CA) in the introduction part.
- Start with how climate change is leading to soil degradation in Body part.
- Then discuss the advantages of CA in the wake of increasing soil degradation due to climate change.

**Introduction**

- Conservation Agriculture (CA) is a set of soil management practices that minimize the disruption of the soil's structure, composition and natural biodiversity. CA has proven potential to improve crop yields, while improving the long-term environmental and financial sustainability of farming.
- CA shares three core principles. These include:
  - maintenance of permanent or semi-permanent soil cover (using either a previous crop residue or specifically growing a cover crop for this purpose);
  - minimum soil disturbance through tillage (just enough to get the seed into the ground);
  - regular crop rotations to help combat the various biotic constraints;
- CA uses or promotes where possible or needed various management practices listed below:
- Utilization of green manures/cover crops (GMCC's) to produce the residue cover;
- No burning of crop residues;
- Integrated disease and pest management;
- Controlled/limited human and mechanical traffic over agricultural soils.

**Body**

Climate change leads to reduction in the potential of the land to produce benefits from a particular land use under a specified form of land management and is considered to be one of the major problems of the world in recent times.

Conservation agriculture has several advantages in checking soil degradation:

- **Check soil erosion:** Conservation agriculture improves soil structure and protects the soil against erosion and nutrient losses by maintaining a permanent soil cover and minimizing soil disturbance.
- **Enhances organic matter in soil:** CA practices enhance soil organic matter (SOM) levels and nutrient availability by utilizing the previous crop residues or growing green manure/ cover crops (GMCC's) and keeping these residues as a surface mulch rather than burning. Thus, arable land under CA is more productive for much longer periods of time.

- **Nutrients** - Soil nutrient supplies and cycling are enhanced by the biochemical decomposition of organic crop residues at the soil surface that are also vital for feeding the soil microbes. While much of the nitrogen needs of primary food crops can be achieved by planting nitrogen-fixing legume species, other plant essential nutrients often must be supplemented by additional chemical and/or organic fertilizer inputs. In general, soil fertility is built up over time under conservation agriculture, and fewer fertilizer amendments are required to achieve optimal yields over time.
- **Protects Soil biota** - Insect pests and other disease causing organisms are held in check by an abundant and diverse community of beneficial soil organisms, including predatory wasps, spiders, nematodes, springtails, mites and beneficial bacteria and fungi, among other species.
- **Conserve water** - Conservation agriculture requires significantly less water use due to increased infiltration and enhanced water holding capacity from crop residues left on the soil surface. Mulches also protect the soil surface from extreme temperatures and greatly reduce surface evaporation, which is particularly important in tropical and sub-tropical climates. The risk of total crop failure is significantly reduced due to enhanced water use efficiency.

## **Conclusion**

Soils are crucial to food security and change in climate has threatened the food security by affecting the soil property. In such scenarios, conservation agriculture is an apt method to conserve the soil fertility and increase the sustainability of agriculture.