

AGRICULTURE IN INDIA



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SUSTAINABLE AGRICULTURE PRACTICES AND SYSTEMS



CONSERVATION AGRICULTURE(CA)

- ❖ It is a concept of resource-saving agricultural crop production system that strives to achieve maximum acceptable profits together with high and sustained production levels while, concurrently conserving the environment.
- ❖ In CA, **modern and scientific agricultural technologies** are applied to improve crop production by **mitigating reductions in soil fertility, topsoil erosion and runoff; and improving moisture conservation** and environmental footprints.
- ❖ CA improves soil water-use efficiency, enhances water infiltration, and increases insurance against drought.
- ❖ Thus, CA is based on the integrated management of soil, water and agricultural resources in order to reach the objective of economically, ecologically and socially sustainable agricultural production.

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CONSERVATION AGRICULTURE, MAINLY, HAS THREE MAJOR PRINCIPLES:

- ❖ Minimal soil disturbance by direct planting through the soil cover without seedbed preparation;
- ❖ Maintenance of a permanent vegetative soil cover or mulch to protect the soil surface;
- ❖ Diversified crop rotation in case of annual crops or plant associations in case of perennial crops
- ❖ Recently, 'controlled traffic' is loosely presumed as the fourth principle of CA to ensure less or no compaction of soil by the broad wheels/tyres of the tractors.

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INTEGRATED FARMING SYSTEM (IFS)

- ❖ Integration of various agricultural enterprises *viz.*, cropping, animal husbandry, fishery, forestry etc. have great potentialities in the agricultural economy. These enterprises not only supplement the income of the farmers but also **help in increasing the family labour employment.**
- ❖ The integrated farming system approach introduces a change in the farming techniques for maximum production in the cropping pattern and takes care of optimal utilization of resources.
- ❖ The farm wastes are better recycled for productive purposes in the integrated system.
- ❖ A **judicious mix of agricultural enterprises** like dairy, poultry, piggery, fishery, sericulture etc. suited to the given agro-climatic conditions and socio-economic status of the farmers would bring prosperity in the farming.

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COMPONENTS OF INTEGRATED FARMING SYSTEM

- ❖ Crops, livestock, birds and trees are the major components of any IFS.
- ❖ Crop may have subsystem like monocrop, mixed/intercrop, multi-tier crops of cereals, legumes (pulses), oilseeds, forage etc.
- ❖ Livestock components may be milch cow, goat, sheep, poultry, bees.
- ❖ Tree components may include timber, fuel, fodder and fruit trees.

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AGRO-FORESTRY

- ❖ Agro-forestry is the raising of trees and agriculture crops on the same land inclusive of the waste patches.
- ❖ It is a dynamic, ecologically based, natural resource management system that, through integration of woody perennials on farms and in the agricultural landscape, diversifies and sustains production and builds social institutions.
- ❖ It combines forestry with agriculture, thus, altering the simultaneous production of food, fodder, fuel, timber and fruit.

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INTEGRATED PEST MANAGEMENT (IPM)

- ❖ The UN's Food and Agriculture Organization defines IPM as "the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment.
- ❖ IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms.
- ❖ The introduction and spread of invasive species can also be managed with IPM by reducing risks while maximizing benefits and reducing costs.



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PRECISION FARMING

- ❖ It is a farming management concept based on observing, measuring and responding to inter and intra-field variability in crops.
- ❖ The goal of precision agriculture research is to define a decision support system (DSS) for whole farm management with the goal of optimizing returns on inputs while preserving resources.
- ❖ It is an approach where inputs are utilized in precise amounts to get increased average yields.
- ❖ It is this century's most valuable innovation in farm management that is based on using Information and Communication Technologies (ICTs).



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SILVOPASTORAL SYSTEMS

- ❖ The production of woody plants combined with pasture is referred to as Silvopasture system.
- ❖ The trees and shrubs may be used primarily to produce fodder for livestock or they may be grown for timber, fuelwood, fruit or to improve the soil.
- ❖ This system is classified into three categories
 - Protein bank
 - Live fence of fodder trees and hedges
 - Trees and shrubs on pasture



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VERTICAL FARMING

- ❖ Vertical farming is the practice of growing crops in vertically stacked layers.
- ❖ It often incorporates controlled-environment agriculture, which aims to optimize plant growth, and soilless farming techniques such as hydroponics, aquaponics, and aeroponics.
- ❖ Some common choices of structures to house vertical farming systems include buildings, shipping containers, tunnels, and abandoned mine shafts



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