

# Farming System and Sustainable Agriculture

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## **PREFACE**

Agriculture is the largest enterprise in India which is at present and will continue to be the lifeline of the Indian economy in the foreseeable future. However, due to urbanization, agricultural land is shrinking and human population is increasing day by day and so there is a need for vertical increase in agricultural produce to feed the increasing population. Due to changing climatic conditions, there is a need for reorientation of the presently practised agricultural technologies. At the same time there is a need to save/conserves the natural resources. Crop yield can be improved with the adoption of improved production and protection technologies for raising field crops. For better crop profitability, judicious use of inputs like viable seeds of improved varieties, timely sowing, optimum plant stand, required amount of fertilizers, irrigation water and pesticides (insecticides, fungicides and herbicides) should be done.

This book contains detailed and comprehensive information regarding components of farming system, historical background of farming system, allied enterprises of Integrated Farming System (IFS), models of IFS in different climatic zones, role of IFS in livelihood security, resource cycling and flow of energy, role of crop residues in different farming systems and farming system of drylands agriculture. It also discusses in detail the latest concept of agronomy like conservation agriculture, sustainable agriculture, scope of hydroponics in agriculture, scope of organic farming in agriculture, role of agroforestry in farming system. etc.

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The Indian economy is predominantly rural and agriculture oriented. In agriculture, 85% of the holdings are less than two hectares and the declining trend in the average size of the farmer holdings, poses a serious problem. Majority of them are dry lands, which depend on erratic monsoon rains. The rest of the area is cultivated with supplemental irrigation. The farmers concentrate mainly on crop production, which is invariably subjected to a high degree of uncertainty income and employment.

In India the cultivable land is 143.8 million hectares and there is very little possibility of extending it further. Therefore, to meet the requirement of food grains for increasing population, the only option open is effective utilization of time and space in agriculture. The time concept relates to increasing the intensity of cropping under assured irrigated conditions, whereas space utilization pertains to building up of vertical dimension through multi-tier cropping and farming system approach. Thus by making use of these time and space concept either in irrigated or in rained areas, the productivity per unit area per unit time can be substantially enhanced. Therefore the only way to increase agricultural production in the small/marginal units of farming is to increase the productivity per unit time and area. This may be achieved by selecting early maturing varieties with equal yields or by improving agronomic techniques like judicious use of fertilizers, pesticides and other inputs.

### **System approach**

Management practices are developed for individual crops and recommendation are made for individual crops. The residual effect of individual crops is not considered in crop based recommendation. In this resources are not utilized efficiently. To a farmer management practices for all crops are considered that are to be grown on a piece of land. Therefore system approach is applied to agriculture for efficient utilization of all resources, maintains sustainability in production and obtaining higher net returns.

Farming is a dynamic biological and open system with human or social involvement. Being primarily biological with a high degree of dependence on weather variables and changing socio-political environments. Farming is inherently more risky than any other system. Farming system can also mean different things to different people. Farming is the process of harnessing solar energy in the form of economic plant and animal products and system implies a set of inter related practices/processes organized into a functional entity.

A system consists of several components which depend on each other. A system is defined as a set of elements or components that are inter-related and interacting among themselves. System could be defined as an organized unitary whole composed of two or more inter dependent and interacting parts, components or subsystems delineated by identifiable boundary or its environmental super system.

## Farm and farming system

- **Farm:** It is an organized economic unit in which crop and animal production is carried out with purpose of producing economic net returns.
- **Farming system:** It is a part of farm system which crop production, animal production and combination of both *i.e* mixed farming.
- **Farm area:** Productive cropped area/ fields pastures, plantations, fishponds, forest etc. + indirectly productive land- farm building, ditches, roads etc. + fallow land + unproductive land.

“Farming system” therefore designates a set of agricultural activities organized while preserving land productivity, environmental quality and maintaining desirable level of biological diversity and ecological stability. The emphasis is more on a system rather than on gross output.

Farming system specially refers to a group combination of enterprises in which the products and or the byproducts of one enterprise serve as the inputs for production of other enterprise.

Farming system takes into account the combined needs of the family, the economic factors like relative profitability of the technically feasible enterprises, availability of off farm resources, infrastructure and institutions such as irrigation, marketing facilities including storage and transportation and credit besides the agro biological consideration namely interdependence, if any among various technically feasible enterprises and the performance of individual farmers.

Farming is defined as the way in which the farm resources are allocated to the needs and priorities of the farmers in his local circumstances which include-

- I. Agro climatic condition such as the quantity, distribution and reliability of rainfall, soil type, topography, temperature etc.
- II. Economic and institutional circumstances like market opportunities, prices, institutional and infrastructure facilities and technology.

## CLASSIFICATION OF FARMING SYSTEMS

### 1. According to the size of the farm:

- (a) Collective farming
- (b) Cultivation farming
  - (i) Small-scale farming
  - (ii) Large-scale farming.