

## OPTIONAL SUBJECTS AGRICULTURE PAPER -I

Ecology and its relevance to man, natural resources, their management and conservation. Physical and social environment as factors of crop distribution or production. Climatic elements as factors of crop growth impact of changing environment on cropping pattern as indicators of environments. Environmental pollution and associated hazards to crops, animal and humans.

Cropping patterns in different agro-climatic zones of the country-Impact of high yielding patterns. Concepts of multiple cropping, multistory, relay and inter-cropping and their importance in relation to food production. Package of practices for product of important cereals, pulses, oilseed, fibre, sugar and commercial crops grown during kharif and rabi seasons in different regions of the country.

Important features, scope and propagation of various types of forestry plantations, such as extension/social forestry, agro-forestry and natural forests.

Weeds, their characteristics, dissemination and association with various crops, their multiplications. Cultural, biological and chemical control of weeds.

Processes and factors of soil information formation, classification of Indian soils including modern concepts, Mineral and organic constituents of soil and their role in maintaining soil productivity problem soil extent and distribution in India and their reclamation Essential plant nutrients and other beneficial elements in soils and plants, their occurrence, factors affecting their distributions, functions and cycling in soils. Symbiotic and non-symbiotic nitrogen fixation, Principles of soil fertility and its evaluation for judicious fertiliser use.

Soil conservation planning on water shed basis, erosion and run-off management in hilly foot hills and Valley lands, processes factors affecting them. Dry land agriculture and its problems. Technology for establishing agriculture production in rainfed agriculture area.

Water use efficiency in relation to crop production criteria for scheduling irrigations, ways and means of reducing run losses off irrigation water . Drainage of water logged soils.

Farm Management, scope importance and characteristics, farm planning and budgeting. Economics of different types of farming systems.

Marketing and pricing of agricultural inputs and outputs, price fluctuation and their cost, role of co-operatives in agricultural economy, types and system of farming and factors affecting them.

Agricultural extension, its importance and role, methods evaluation of extension programmes, socioeconomic survey and status of big, small and marginal farmers and landless agricultural labourers the farm mechanization and its role in agricultural production and rural employment. Training programmers for extension workers, lab to land programmes.

## PAPER -II

Heredity and variation, Mendel's law of inheritance, Chromosomal theory of inheritance , Cytoplasmic inheritance, sex linked, sex influenced and sex limited Characters. Spontaneous and induced mutations. Quantitative characters.

Origin and domestication of field crop. Morphology patterns of variations in varieties and related species of important field crops. Causes and utilization of variations in crop improvement.

Application of the principles of plant breeding to the improvement of major field crops, methods of breeding of self and cross-pollinated crops. Introduction, selection, hybridization, heterosis and its exploitation, Male sterility and self-incompatibility utilization of mutation and polyploidy in breeding.

Seed technology and importance, production processing and testing of seeds of crop plants, Role of National and State Seed Organisations in Production, Processing and marketing of improved seeds.

Physiology and its significance in agriculture, nature, physical properties and chemical constitution of protoplasm, imbibition, surface tension, diffusion and osmosis, absorption and translocation of water, transpiration and water economy.

Enzymes and plant pigments, photosynthesis modern concepts and factors affecting the process, aerobic and anaerobic respiration.

Growth and development, photoperiodism and vernalization Auxin, Hormones and other plant regulators and their mechanism of action and importance in agriculture.

Climate requirements and cultivation of major fruits, plants and vegetable crops, the package of practices and the scientific basis for the same. Handling and marketing problems of fruits and vegetables, principle methods of preservations, important fruits and vegetables products, processing techniques and equipment. Role of fruits and vegetable in human nutrition landscape and floriculture including raising ornamental plants and design and layout of lawns and gardens.

Diseases pest of field, vegetable, orchard and plantation crops of India and measures to Control these causes and classification of plant diseases, principles of plant diseases control including exclusion eradication, immunization and protection. Biological control of pests and diseases, integrated management of pests and diseases. Pesticides and their formulations, plant protection equipment their care and maintenance.

Storage pests of cereals and pulses, hygiene of storage godowns preservation and remedial measures.

Food production and consumption trends in India National and International food policies, Procurement, distribution, Processing and production constraints, Relation of food production to national dietary pattern, major deficiencies of calorie and protein.