



ICAR JRF Agronomy Syllabus



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Code 05: AGRONOMY

UNIT-I: General

Importance of Agriculture in national economy; basic principles of crop production; cultivation of rice, wheat, chickpea, pigeon-pea, sugarcane, groundnut, rapeseed and mustard, potato. Major soils of India, role of NPK and their deficiency symptoms. Structure and function of cell organelles; mitosis and meiosis; Mendelian genetics: elementary knowledge of photosynthesis; respiration, photorespiration and transpiration; structure and functions of carbohydrates, proteins, nucleic acids, enzymes and vitamins. Major pests and diseases of rice, wheat, cotton, chickpea, sugarcane and their management. Important rural development programmes in India; organisational set up of agricultural research, education and extension in India; Elements of statistics.

UNIT-II: Principles of Agronomy

Crop ecology and geography and Agricultural Meteorology: Agronomy –meaning and scope, National & International agricultural research institutes in India, Agro climatic zones of India, Tillage, crop stand establishment and planting geometry and their effect on crop, Physiological limits of crop yield and variability in relation to ecological optima, organic farming, Precision farming, Integrated farming systems, Principles of field experimentation. Principles of crop ecology and crop adaptation, climate shift and its ecological implications, Agro- ecological regions in India, Geographical distribution of crop plants, Greenhouse effect, Climatic factors and their effect on plant processes and crop productivity, Role of GIS and GPS in agriculture. Weather & climate, Earth's atmosphere, Solar radiation, Atmospheric temperature and global warming. Crops and atmospheric humidity, Weather forecasting.

UNIT-III: Field crops

Origin, distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield of cereals (rice, wheat, maize, sorghum, pearl millet, minor millets, barley), pulses (chickpea, lentil, peas, Pigeon pea, mungbean, urdbean), oilseeds (groundnut, sesame, soybean, rapeseed & mustard, sunflower, safflower, linseed), fiber crops (cotton, jute, sun hemp), sugar crops(sugarcane), fodder & forage crops (sorghum, maize, napier, berseem, Lucerne, oats), medicinal & aromatic plants (menthe, lemon grass and isabgol) and commercial crops(potato, tobacco).

UNIT-IV: Weed management

Principles of weed management, Classification, biology and ecology of weeds, crop weed competition and allelopathy, concepts and methods of weed control, Integrated

weed management, Classification, formulations, selectivity and resistance of herbicides, Herbicide persistence in soil and plants, Application methods and equipments, Weed flora shifts in cropping systems, Special and problematic weeds and their management in cropped and non-cropped situations, Weed management in field crops.

UNIT-V: Water management

Principles of irrigation, Water resources and irrigation development in India, Water and irrigation requirements, Concepts and approaches of irrigation scheduling, Methods of irrigation, Measurement of irrigation water, application, distribution and use efficiencies, Conjunctive use of water, Irrigation water quality and its management, water management in major field, crops (rice, wheat, maize, groundnut, sugarcane) Agricultural drainage.

UNIT-VI : Soil fertility and fertilizer use

Essential plant nutrients and their deficiency symptoms, concept of essentiality of plant nutrients, Indicators of soil fertility and productivity, Fertilizer materials and their availability to plants, slow release fertilizers, Nitrification inhibitors, Principles and methods of fertilizer application, Integrated nutrient management, site specific nutrient management.

UNIT-VII : Dryland Agronomy

Characteristics of Dryland farming and delineation of Dryland tracts, constraints of Dryland farming in India, Types of drought and their management, contingency crop planning and mid- season corrections for aberrant weather and its recycling. Watershed management.

UNIT-VIII: Problem soils

Problem soils and their distribution in India, Characteristics and reclamation of these soils, Crop production techniques in problem soils.

UNIT-IX: Sustainable land use systems

Sustainable agriculture: parameters and indicators, Conservation agriculture, safe disposal of agri-industrial waste for crop production, Agro-forestry systems, shifting cultivation, Alternate land use systems, Wastelands and their remediation for crop production.