

# **RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER**

## **SYLLABUS FOR COMPETITIVE EXAMINATION FOR THE POST OF ASSISTANT PROFESSOR IN AGRICULTURE AGRONOMY FOR COLLEGE EDUCATION DEPARTMENT**

### **PAPER – I**

#### **Unit 1: Crop Ecology and Agrometeorology –**

Principles of crop ecology; Ecosystem concept and determinants of productivity of ecosystem; Physiological limits of crop yield and variability in relation to ecological optima; Crop adaptation; Climate shift and its ecological implication; Agro-ecological and agro-climatic regions of India and Rajasthan; Geographical distribution of cereals, legumes, oilseeds, vegetables, fodders and forages, commercial crops, seed spices, medicinal and aromatic plants; Adverse climatic factors and crop productivity; Photosynthesis, respiration, net assimilation, solar energy conversion efficiency and relative water content, light intensity, water and CO<sub>2</sub> in relation to photosynthetic rates and efficiency; Physiological stress in crops; Remote sensing: Spectral indices and their application in agriculture, Atmospheric weather variables; Atmospheric pressure, Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze; solar radiation, short wave, long wave and thermal radiation, net radiation, albedo; Atmospheric temperature, Atmospheric humidity, process of condensation, Precipitation, process and types of precipitation ; Artificial rain. Monsoon-importance in Indian agriculture, Weather hazards -Agriculture and weather relations; Weather forecasting- types and their uses. Climate change, global warming. Greenhouse effect.

#### **Unit 2: Weed Management -**

Scope and principles of weed management; Weeds classification, biology, ecology and allelopathy; Crop weed competition, weed threshold; Herbicides classification, formulations, mode of action, selectivity and resistance; Persistence of herbicides in soils and plants; fate of herbicides, adjuvants, herbicidal resistance, Application methods and equipment; Biological weed control, bio- herbicides: Integrated weed management; Special weeds, parasitic and aquatic weeds and their management in cropped and non-cropped lands; weed control schedules in field crops, vegetables and plantation crops; Role of GM crops in weed management.

### **Unit 3: Soil Fertility and Nutrient Management -**

Soil fertility and productivity - factors affecting, history of soil fertility and fertilizer use; Concept of essentiality of plant nutrients, their critical concentrations in plants, nutrient interactions, diagnostic techniques with special emphasis on emerging deficiencies of secondary and micro-nutrients; Fertilizer materials including liquid fertilizers, their composition, mineralization, availability and reaction products in soils; Water solubility of phosphate fertilizers; Slow release fertilizers, nitrification inhibitors and their use for crop production; Principles and methods of fertilizer application; Integrated nutrient management and bio-fertilizers; Agronomic and physiological efficiency and recovery of applied plant nutrients; Criteria for determining fertilizer schedules for cropping systems direct, residual and cumulative effects; Fertilizer related environmental problems including ground water pollution; Site-specific nutrient management.

### **Unit 4: Dryland Farming and Watershed Management -**

Concept of dryland farming; dryland farming vs rainfed farming; History, development, significance and constraints of dryland agriculture in India; Climatic classification and delineation of dryland tracts; Characterization of agro-climatic environments of drylands; Rainfall analysis and length of growing season; Types of drought, drought syndrome, effect on plant growth, drought resistance, drought avoidance, drought management; Mulches, antitranspirants, Crop Planning including contingency, crop diversification, varieties, cropping systems, conservation cropping and mid-season corrections for aberrant weather conditions; Techniques of moisture conservation in-situ to reduce evapotranspiration, runoff and to increase infiltration; Rain water harvesting and recycling concept, techniques and practices; Timelines and precision key factors for timely sowing, precision in seeding, weed control; Fertilizer placement, top dressing and foliar application, aqua-fertigation; Concept and importance of watershed management in dryland areas.

### **Unit 5: Sustainable Land Use Systems -**

Concept of sustainability; Sustainability parameters and indicators; Conservation agriculture; Alternate land use systems; Types, extent and causes of wasteland; Shifting cultivation; Agro forestry systems; Agricultural and agro-industrial residues and its recycling, safe disposal; Allelopathy and biomass production, Farming System-scope, importance, and concept, Types and systems of farming

system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping system, crop diversification, Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages.

### **Unit 6: Agricultural Statistics -**

Frequency distribution, standard error and deviation, correlation and regression analyses, co-efficient of variation; Tests of significance-t, F and chi-square ( $\chi^2$ ); Data transformation; Design of experiments and their basic principles, completely randomized, randomized block, split plot, strip-plot, factorial and simple confounding designs; Efficiency of designs; Methods of statistical analysis for cropping systems including intercropping; Pooled analysis.

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#### **Note: - Pattern of Question Paper**

1. Objective type paper
2. Maximum Marks: 75
3. Number of Questions: 150
4. Duration of Paper: Three Hours
5. All Questions carry equal marks.
6. Medium of Competitive Exam: Bilingual in English & Hindi
7. There will be Negative Marking.