

UPSC CSE Agriculture Syllabus 2024

The syllabus for the Agriculture optional subject covers topics like natural resource economics, agronomy, plant breeding, horticulture, and more. Aspirants have to study crop management, soil science, agricultural extension, and other domains. The UPSC CSE Agriculture syllabus 2024 tests conceptual knowledge relevant for civil services roles.

UPSC CSE Agriculture Syllabus 2024 Paper 1

1. Ecology and Environmental Management:

- Relevance of ecology to human life
- Sustainable management and conservation of natural resources
- Physical and social environment as factors influencing crop distribution and production
- Agroecology and cropping patterns as indicators of environmental conditions
- Environmental pollution and hazards to crops, animals, and humans
- Climate change, international conventions, and global initiatives
- Greenhouse effect, global warming, and tools for ecosystem analysis (Remote sensing, GIS)

2. Cropping Patterns and Farming Systems:

- Cropping patterns in different agro-climatic zones
- Impact of high-yielding and short-duration varieties on cropping patterns
- Concepts of cropping and farming systems
- Organic and Precision farming
- Package of practices for important crops: cereals, pulses, oilseeds, fibres, sugar, commercial, and fodder crops

3. Forestry and Agroforestry:

- Types of forestry plantations: social forestry, agroforestry, and natural forests
- Propagation of forest plants and forest products
- Agroforestry, value addition, and conservation of forest flora and fauna

4. Weed Control and Soil Management:

- Characteristics, dissemination, and control of weeds
- Soil properties: physical, chemical, and biological
- Soil formation processes and factors
- Soil fertility principles, testing, and fertilizer recommendations
- Biofertilizers, nitrogen fixation, and efficient phosphorus and potassium use
- Soil conservation, watershed management, and soil erosion control
- Dryland agriculture, technology for rainfed areas, and water-use efficiency
- Rainwater harvesting and irrigation techniques: drip, sprinkler, and drainage

5. Farm Management and Economics:

- Farm planning, resource use, and budgeting
- Economics of different farming systems
- Marketing management, strategies, and market intelligence
- Agricultural price policy and crop insurance
- Role of cooperatives in the agricultural economy

6. Agricultural Extension and Rural Development:

- Importance and role of agricultural extension
- Evaluation methods for extension programs
- Socio-economic survey of farmers and agricultural laborers
- Training programs for extension workers
- Role of Krishi Vigyan Kendra (KVK) in disseminating agricultural technologies
- NGO and self-help group approach for rural development

UPSC CSE Agriculture Syllabus 2024 Paper 2

1. Cell Biology and Genetics:

- Cell structure, function, and the cell cycle
- Synthesis, structure, and function of genetic material
- Laws of heredity, chromosome structure, and chromosomal aberrations
- Linkage, cross-over, and their significance in recombination breeding
- Polyploidy, euploids, and aneuploids
- Mutations and their role in crop improvement
- Heritability, sterility, and incompatibility
- Cytoplasmic inheritance and sex-linked characters

2. History of Plant Breeding and Crop Domestication:

- Modes of reproduction, selfing, and crossing techniques
- Origin, evolution, and domestication of crop plants
- Center of origin, law of homologous series, and crop genetic resources
- Conservation and utilization of crop genetic resources
- Application of plant breeding principles, improvement of crop plants

3. Molecular Biology and Biotechnology:

- Molecular markers and their application in plant improvement
- Pure-line selection, pedigree, mass, and recurrent selections
- Combining ability and its significance in plant breeding
- Heterosis and its exploitation
- Somatic hybridization
- Breeding for disease and pest resistance
- Role of interspecific and intergeneric hybridization
- Genetic engineering and biotechnology in crop improvement
- Genetically modified crop plants

4. Seed Production and Processing Technologies:

- Seed certification, testing, and storage
- DNA fingerprinting and seed registration
- Public and private sectors in seed production and marketing
- Intellectual Property Rights (IPR) issues and WTO impact on agriculture

5. Plant Physiology:

- Principles of plant physiology, plant nutrition, and nutrient absorption
- Soil-water-plant relationship
- Enzymes, plant pigments, and photosynthesis
- Respiration mechanisms: aerobic and anaerobic, C3, C4, and CAM
- Carbohydrates, protein, and fat metabolism
- Growth and development, photoperiodism, and vernalization
- Plant growth substances and their role in crop production
- Physiology of seed development and germination, dormancy
- Stress physiology: drought, salt, and water stress

6. Horticulture and Crop Management:

- Major fruits, plantation crops, vegetables, spices, and flower crops
- Package practices of major horticultural crops
- Protected cultivation and high-tech horticulture
- Post-harvest technology, value addition of fruits and vegetables
- Landscaping and commercial floriculture
- Medicinal and aromatic plants
- Role of fruits and vegetables in human nutrition

7. Pest and Disease Management:

- Diagnosis of pests and diseases in field crops, vegetables, orchard, and plantation crops
- Classification of pests and diseases and their management
- Integrated pest and disease management
- Storage pests and their management
- Biological control of pests and diseases
- Epidemiology and forecasting of major crop pests and diseases
- Plant quarantine measures, pesticides, and their modes of action

8. Food Production and Security:

- Food production and consumption trends in India
- Food security and growing population – vision 2020
- Reasons for grain surplus, national and international food policies
- Production, procurement, distribution constraints
- Availability of food grains, per capita expenditure on food
- Trends in poverty, Public Distribution System, and Below Poverty Line population
- Targeted Public Distribution System (PDS) and policy implementation in the context of globalization
- Processing constraints, relation of food production to National Dietary Guidelines
- Food consumption patterns, food-based dietary approaches to eliminate hunger

- Nutrient deficiency, micronutrient deficiency, protein-energy malnutrition (PEM or PCM)
- Micro-nutrient deficiency and human resource development (HRD) in the context of work capacity of women and children
- Food grain productivity and food security

