

DETAILED SYLLABUS FOR AGRICULTURAL ASSISTANT IN AGRICULTURE

DEVELOPMENT AND FARMERS WELFARE DEPARTMENT

(Category No. 112/2020)

PART I -CROP PRODUCTION

Module 1 : AGRONOMY (15 marks)

Crops - Classification- Major crops of Kerala - Major farming systems- Rained and irrigated agriculture- Agricultural seasons in Kerala- Basic elements of crop production and animal husbandry- Agronomy: definition and scope – agronomy classification of crops and their importance, fertilizer scheduling , Seeds and sowing – seed definition – methods of sowing – seed drills and other implements – transplanting. Weeds – definition – classification. Crop– weed association and competition– critical stages of crop weed competition-Weed management – chemical and organic methods -Methods of irrigation-Surface, subsurface, overhead and micro irrigations. Irrigation efficiency- Water productivity and water use efficiency Cropping pattern – terms and definition – multiple cropping and inter cropping – sequential cropping – crop rotation – catch cropping - cover cropping – strip cropping – trap cropping. Cropping systems in Kerala – multitier cropping system – Rice based cropping systems. Farming system –concepts and types - Integrated farming systems in Kerala.

MODULE 2 : SOIL SCIENCE & AGRICULTURAL CHEMISTRY (15 Marks)

Soil-definition - components of soil. Rocks and minerals- Formation and classification-Weathering of rocks and minerals- Soil formation and profile development. Properties of soil-physical properties, chemical properties and biological properties. Soil air -soil water-soil colloids-soil reaction - Concept of pH -Soil acidity-Soil salinity-Soil alkalinity- management techniques- liming –Lime requirement- liming materials- methods of application. Plant nutrients- Major, secondary and micro nutrients. Soils of Kerala- Soil testing in Kerala -Problem soils of Kerala and management. - Soil organic matter – importance in soil fertility management -composition – decomposability – humus - fractionation of organic matter. Carbon cycle - C: N ratio. Organic farming and food security- Tools and practices of organic farming- Organic manures-Bulky and concentrated-Organic recycling-Composting-Vermicomposting-Enrichment of manures-Liquid organic manures-Bio fertilizers-Classification and use-Biodynamic agriculture-Zero budget natural farming. Organic farming movement –National and regional organic farming- Organic certification

PART II- CROP PROTECTION

Module 3 : AGRICULTURAL ENTOMOLOGY (15 marks)

Economic classification of insects- External Morphology,Anatomy and general Physiology, structure and function of various systems of Insects-Pest of major crops of Kerala- Pests of rice, plantation crops

(coconut-arecanut -cashew), vegetables (chilli, brinjal, tomato, bhindi, cowpea, amaranthus, cool season vegetables), fruits (mango,banana, citrus), spices (cardamom, pepper, turmeric and ginger) Pests of tuber crops (tapioca, sweet potato, yams etc) and their management(Chemical and organic).Pest of stored products and their management(Chemical and organic). Non-insect pests in crops (mites, rats, rodents, Nematode) and their management (Chemical and organic). Integrated Pest Management: Principles of IPM, concept of economic threshold (ETL) and economic injury levels (EIL), Tools of IPM- Bio pesticides- Predators, parasites, pathogens. Insect pheromones-types and application. Classification of inorganic and Organic pesticides- mode of action- Common botanical insecticides -Pesticide act & rule.

Module 4 : PLANT PATHOLOGY (15 marks)

Plant pathology- Importance of plant diseases- Definition- Objectives- Terminologies in plant pathology- Important plant pathogenic organisms- Fungi, bacteria- virus, phytoplasma, spiroplasma, viroids, algae, protozoa, nematodes, phanerogamic parasites. Diseases due to abiotic /biotic causes: Causes/ factors affecting disease development. Principles and methods of plant disease management (Chemical and Organic)- symptoms, disease cycle and management of diseases of rice, sugarcane, pulses, vegetables, tubers, citrus, mango, banana, grapevine, pineapple, papaya, guava, sapota, cashew, , coconut, arecanut, cocoa, black pepper, ginger, cardamom, tree spices, oil palm, betelvine, coffee, tea, rubber and ornamentals. IDM- Integrated Disease management – concepts and components

Part III: CROP IMPROVEMENT

Module 5 : PLANT BREEDING AND GENETICS (10 Marks)

Introduction to breeding -Major breeding objectives for crop improvement and procedures including conventional and modern innovative approaches for development of hybrids and varieties. Plant breeding techniques for raising crops- different breeding objectives, selection criteria, selection strategy- assessment of socio-economic and legal conditions. Participatory plant breeding techniques - Seed production technology in self pollinated, cross pollinated and vegetatively propagated crops. Hybrid seed production technologies-methods and problems . Micropropagation -organogenesis and embryogenesis- different stages of micropropagation - commercial micropropagation, quality assurance of tissue culture plants Plant tissue culture for crop improvement- popular varieties of major crops of Kerala .

MODULE 6 : SEED AND SEED TECHNOLOGY (5 Marks)

Seed certification, field inspection- and methods- Seed Act and Seed Act enforcement- Central Seed Committee, Central Seed Certification Board, State Seed Certification Agency, Central and State Seed Testing Laboratories. Seed certification -Seeds Control Order 1983 and Seed Bill 2004, IPR- Intellectual Property Rights

Module 7 :HORTICULTURE (10 Marks)

Definition and importance of horticulture - area, production, productivity of horticultural crops in India and Kerala – branches of horticulture –Criteria for selection of site for crops - climate, soil, socio-economic factors; Techniques of training and pruning ,Plant growth regulators in horticulture -Plant propagation techniques - definition and basic concepts, type-structures - commercial propagation of horticultural crops; Seed propagation – seed bed preparation – pre sowing treatments –Asexual propagation – apomictic embryos– plant modifications for vegetative propagation. Cuttings and layering different methods – advantages and disadvantages. Budding and grafting – different methods – advantages and disadvantages. Micropropagation – steps involved - methods – advantages and disadvantages. Post harvest management of major horticultural crops.

MODULE 8 : AGRICULTURAL ECONOMICS (10 Marks)

Agricultural economics- Basic concepts: Goods and services, desire, want, demand, utility, cost and price. Agricultural Marketing: Concepts and definitions of market, marketing, classification and characteristics of agricultural markets- demand, supply and producer's surplus of agri-commodities: factors affecting demand and supply of farm products, producer's surplus, Laws of marketing . Marketing of Organic produces -global review-opportunities and constraints marketing channels and agencies - new opportunities in growing market- domestic and export market- certification of organic products –organic food certification in India- Certification Agencies-economic viability in organic farming- computation of cost benefit ratio- Govt. schemes and other financial resources for promoting marketing of Organic produces

Module 9 : Agricultural Extension (5 Marks)

Rural development programmes in Kerala- New trends in agricultural extension- Extension Teaching – methods- Sociology and Rural sociology- Classification: Group contact method-Mass contact method. Audio visual aids and classification.Community development-Rural Leadership: concept and definition, types of leaders in rural context; extension administration.

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper