

SCHEME AND SYLLABUS OF EXAMINATION FOR THE PURPOSE OF FILLING UP THE POST OF WDO/ADO/HDO IN THE SIKKIM STATE AGRICULTURE SERVICE

PAPERS	SUBJECT	FULL MARKS	TIME ALLOWED
PAPER-I	GENERAL ENGLISH & GENERAL KNOWLEDGE	100 MCQ	2.00 HOURS
PAPER-II	AGRICULTURE	300 MCQ & CONVENTIONAL	3.00 HOURS
	VIVA-VOCE/ PERSONALITY – 50 MARKS		

2. PAPER-1: GENERAL ENGLISH

The question will be designed to test the candidate's understanding and command of the English Language. The patterns of questions would be broadly as follows:-

- 1) Comprehension of given passage
- 2) Grammar
- 3) Usages and Vocabulary

General Knowledge: knowledge of current events of Local, National & International importance.

3. PAPER-II : Agriculture

1. Agronomy

Agro-climatic zones of India and Sikkim.

Organic Package of Practice of major cereals, nutri-cereals, pulses, legumes, oilseeds and fodder crops in the State.

Seed and sowing, tillage and tilth, crop density and geometry, water resources, soil-plant-water relationship, crop water requirement, water use efficiency irrigation-scheduling criteria and methods, quality of irrigation water, micro-irrigation technology, logging. Weeds-importance, classification, crop-weed competition, concepts of weed management- principles and methods, herbicides-classification, selectivity and resistance, allelopathy. Factors affecting growth and development , plant ideotypes, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

Remote sensing, GIS.

Definition and objective of crop rotation, intensity of cropping, multiple cropping, inter-cropping, rain-fed cropping, mixed cropping system, integrated intensive farming system.

Trap crop and other agronomic measures of pest management

Crop residue management

Dryland agriculture, drought management

Soil conservation practices

Methods of irrigation-surface, sub-surface, micro-irrigation, Factors affecting Water Use Efficiency

Varieties of cereals, pulses and oilseeds suitable for Sikkim

GM crops

Climate change, GHG, Greenhouse effect, hydroponics, aeroponics, aquaponics

Concept of sustainability, sustainable agriculture, difference between sustainable agriculture And modern agriculture and its management,

2. Plant Physiology

Absorption of water and its movement inside plant, factors affecting solute absorption and transpiration, evapo-transpiration, mineral nutrition, enzymes and enzymatic activity in different physiological process, carbon assimilation, respiration and photorespiration, nitrogen and fat metabolism, growth hormone and their importance in agriculture/horticulture photoperiodism and vernalisation and their importance in agriculture.

3. Genetics and Plant Breeding

Cell component, concept of cytoplasmic inheritance, mutation, evolution, elementary concept of gene, gene action, DNA and RNA, principle of inheritance, interaction of gene and modification of F2 ratios, linkage and crossing over. plant breeding as modern science, classification of crops according to breeding behavior. application of breeding method, Breeders seed, Foundation seed, Certified seed, Truthfully-Labeled seed, Principle, methods and application of plant breeding to the improvement of major crops like rice, wheat, maize, pulses and oil seeds including horticultural crops of local importance. Gene Bank and importance of gene bank in crop improvement, crop improvement methods in open-pollinated and cross-pollinated crops. GM crops. different methods of organic seed production.

4. Soil Science

Composition of soil, soil texture, soil water, soil colloids-mineral and organic, their natures and properties. concept of soil pH, acidic soil, alkaline soil.

Organic matter, humus, its formation nature and properties, C:N ratio in soil and its significance. Important biological process in soil – nitrogen cycle, ammonisation, ammonification, nitrification, denitrification and nitrogen fixation

Concept of soil productivity and fertility essential elements for plant, their forms availability and function. deficiency symptom of nutrients in plant, fixation and release of nutrient in soil, classification of nutrient, factors affecting loss of plant nutrient. Nutrient Use Efficiency. soil fertility

Nitrogen fixation, symbiotic and non-sym-biotic biofertilizers and their use, chemical fertilizers, organic manures-their composition, classification, method of application. different types of soil micro-organisms, decomposition of organic matter in soil. concept of soil profile, details study of soil profile. land capability classification, soil survey, definitions, purpose and types, concept and components of watershed management.

5. Plant Pathology

Concept of disease in plant, importance of plant disease. classification of plant disease. causes of plant disease. diagnosis of plant disease. stages of disease development i.e. inoculation penetration, infection, invasion, growth and reproduction, affect of environment including edaphic factors in plant disease. principles of disease management. concept of integrated control measures.

Koch's postulates. methods of isolation of pathogens and their identification, fungal diseases of cereals, pulses, oilseeds, fruits, vegetables and their management.

General principles of plant quarantine, sanitary and phyto-sanitary measures.

Nematodes- their pathogenicity, relationship with other microorganisms.

Diseases caused by plant parasitic nematodes - symptoms, etiology, distribution and management.

Principles and methods of nematodes management and extraction of nematodes from soil.

Post harvest diseases

Common diseases of major field crops, pulses and oilseeds, their causal organism, disease symptom and control measures.

Importance of microbiology, classification of microorganism, different types of bacteria, fungi and viruses- structure and classification, antibiotics and antibodies, microbiology of soil, water, air and food.

6. Entomology

Different types of harmful and beneficial insects - order, genera and species. Identification, nature and extent of damage caused by economic insects, life history, seasonal occurrence and management practices of major pests of field crops, pulses and oilseeds. Productive insect with special reference to sericulture, apiculture and lac culture. Stored grain pest and their management, rodent and their control measures. Different method of pest control with special reference to IPM practices, classification of pesticides and their physical, chemical and biological properties, types of formulation, insecticide and precautionary measures. bio-pesticides, different types of plant protection equipments and their maintenance and use in field.

Management of important pests such as maize fall armyworm, citrus fruit fly, rice leaf folder, cabbage aphid, melon fruit fly, stem borer in rice, chilli thrips, citrus trunk borer etc.

Entomopathogenic bacteria, fungi, viruses and nematodes.

Biological control – scope and importance, history of biological control; bio-control agents – predators, parasitoids and parasites.

7. Extension Education

Definition, meaning, objective of extension. Extension organization in India, importance of extension education in Agriculture and Rural Development, Teaching learning process. Classification and characteristics of extension teaching methods, factors of influencing selection combination and use of extension teaching method. Role of AV aids in extension-process and planning and evaluation. Basic concept of Extension Reform — ATMA, KVK. Participatory approaches in Agriculture Extension.

8. Agriculture economics and farm management

Basic concepts like wants, goods, wealth, welfare, value price, consumption, exchange factors of production, law of diminishing return. farm as business organization. national income, per capita income.

Basic concept of economics and agril. economics,

Farming system and types; diversified farming and mixed farming. Cropping intensity

Importance of farm management, its relationship with other sciences. Principles of farm records and accounts.

System of book keeping. Types of Farm record and physical and financial records. Principles involved in Farm Management decision. Management of Farm labour and wage record. Planning labour, use for higher efficiency estimation of different kind of labour required in farm. Cost of

production and return to Farm. Cost of fencing, irrigation, Farm layout. Agriculture marketing, cooperation. Problems of acquisition and organization of Farm.

9. Agriculture Engineering

Scope of farm mechanization-benefits and limitation, sources of farm power, IC engines elementary, knowledge about tractors, types and system, soil tillage implements, inter-culture, implements/ equipments harvesting and threshing equipments. Soil-plant water relationship. Drainage engineering, surveying and leveling. Introduction of post harvest and technology, grain storage, processing. Field structures and practices to control erosion by water. Different system of soil and water conservation.

10. Organic Farming

Organic farming in Sikkim. Agro-ecology and agro-ecological regions of Sikkim, basic concept on principles of organic farming. vermicomposting, green manuring, nutrient management in organic system, nutrient re-cycling of organic residues, bio-fertilizers, plant growth regulators, microbial consortium; soil conditioners and amendments, use of bio-control agents, pest management under organic regime, weed management under organic farming; Internal Control System, organic certification, IFOAM, different organic standards such as NPOP, NOP, EU, JAS, Demeter etc. organic certification bodies, Difference between Third Party certification and Participatory Guarantee System, traceability, quality considerations, labeling and accreditation process, marketing, export, Agriculture Export Policy. Schemes of GoI for promotion of organic farming such as PKVY and MOVCD. Concept of Natural Farming, Difference between organic farming and natural farming, Good Agricultural Practices, IFFCO

11. Horticulture

Organic production technology and organic package of practices of major fruit crops *viz.*, orange, kiwi, pear, plum, pomegranate, strawberry, mango, litchi, guava, papaya, banana, dragon fruit etc. and varieties grown in the State.

High density planting, canopy management, training and pruning methods in fruit crops, rootstock development and plant propagation techniques, orange rejuvenation

Organic production technology of major vegetable crops *viz.* cole crops, leafy vegetables, root vegetables, tomato, potato, beans, etc. and popular varieties grown in Sikkim

Organic production technology of major flower crops grown in the State *viz.*, cymbidium orchids, dendrobium orchids, cattleya, phalopsis, gerbera, Aastromeria, liliium, cala lily, gladiolus, carnation, chrysanthemum, marigold,

Organic production technologies of major spices *viz.*, large cardamom, ginger, turmeric, cherry pepper, saffron

akun cultivation

Water management in horticultural crops, critical stages for irrigation

Organic nutrient management and management of pests and diseases in fruits and vegetables and other horticultural crops including flowers.

Role of bees in orchards.

Marketing of horticultural crops, of post harvest management, aggregation of produce, processing, t, Supply Chain Management, cold chain, pre-cooling, pack house etc.

Apiculture, mushroom cultivation, sericulture

12. Organic farming and certification system

History and definition of Organic farming,

Principles, concept and types of Organic Farming

Advantages and disadvantages of organic and conventional farming system.

On-farm organic inputs and production technology. (Rural compost, vermi compost, madhyam compost, biodynamic compost, herbal compost, herbal tea, jivamrit, panchagvya, amritpani, brahmashatru, biodynamic compost, etc.

Role of microorganism and beneficial insects in organic farming system.

Techniques of soil health management in organic farming .

Technique of insects pest and disease management in organic farming system. Organic standards and certification systems (NPOP, NOP, EU, JAS, IFOAM, DEMETER, Third party certification, Participatory Guarantee System, Good Agricultural Practices and other quality parameters).

National Programme for Organic Production (Structure, National standard for organic production, Accreditation of Inspection and certification agencies, certification of grower groups and organic certification mark).

Accredited certification agencies and inspection and certification procedures and trading formalities of certificate organic commodity.

Concept of Natural Farming. Difference between Natural Farming and Organic Farming. Organic worldwide movements and development.

(Dedicated organizations, organic development, organic trade, promotional activities, present status etc).