

**प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश**

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगृ एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगृ इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौं तहका पदहरूको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

यस पाठ्यक्रम योजनालाई दुई चरणमा विभाजन गरिएको छ :

प्रथम चरण :- लिखित परीक्षा (Written Examination)

पूर्णाङ्क :- २००

द्वितीय चरण:- क) सामूहिक परीक्षण (Group Test)

पूर्णाङ्क :- १०

ख) अन्तर्वार्ता (Interview)

पूर्णाङ्क :- ३०

**परीक्षा योजना (Examination Scheme)**

प्रथम चरण :- लिखित परीक्षा (Written Examination)

पूर्णाङ्क :- २००

पत्र	विषय	खण्ड	पूर्णाङ्क	उत्तिर्णाङ्क	परीक्षा प्रणाली		प्रश्नसंख्या X अङ्क	समय
प्रथम	General Subject	Part I: General Awareness & General Reasoning Test	१००	४०	वस्तुगत (Objective)	बहुबैकल्पिक प्रश्न (MCQs)	५० प्रश्न X १ अङ्क	१ घण्टा ३० मिनेट
		Part II: General Technical Subject					५० प्रश्न X १ अङ्क	
द्वितीय	Technical Subject		१००	४०	विषयगत (Subjective)	छोटो उत्तर लामो उत्तर	४ प्रश्न X ५ अङ्क ८ प्रश्न X १० अङ्क	३ घण्टा

द्वितीय चरण : सामूहिक परीक्षण (Group Test) र अन्तर्वार्ता (Interview)

पूर्णाङ्क :- ४०

पत्र/विषय	पूर्णाङ्क	परीक्षा प्रणाली	समय
सामूहिक परीक्षण (Group Test)	१०	सामूहिक छलफल (Group Discussion)	३० मिनेट
अन्तर्वार्ता (Interview)	३०	बोर्ड अन्तर्वार्ता (Board Interview)	-

**द्रष्टव्य :**

- लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुबै हुनेछ ।
- प्रथम र द्वितीय पत्रको लिखित परीक्षा छुट्टाछुट्टै हुनेछ ।
- वस्तुगत बहुबैकल्पिक (Multiple Choice) प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तर वापत २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा त्यस वापत अङ्क दिइने छैन र अङ्क कट्टा पनि गरिने छैन ।
- बहुबैकल्पिक प्रश्नहरू हुने परीक्षामा कुनै प्रकारको Memory युक्त विद्युतीय उपकरण जस्तै: मोबाइल फोन, क्याल्कुलेटर (Calculator), Smart घडी जस्ता वस्तुहरू प्रयोग गर्न पाइने छैन ।
- विषयगत प्रश्नहरूको हकमा तोकिएको अंकको एउटा लामो प्रश्न वा एउटै प्रश्नका दुई वा दुईभन्दा बढी भाग (Two or more parts of a single question) वा एउटा प्रश्न अन्तर्गत दुई वा बढी टिप्पणीहरू (Short notes) सोध्न सकिनेछ ।
- द्वितीय पत्रमा विषयगत प्रश्न हुनेका हकमा प्रत्येक खण्डका लागि छुट्टाछुट्टै उत्तरपुस्तिकाहरू हुनेछन् । परीक्षार्थीले प्रत्येक खण्डका प्रश्नहरूको उत्तर सोही खण्डको उत्तरपुस्तिकामा लेख्नुपर्नेछ ।
- यस पाठ्यक्रम योजना अन्तर्गतका पत्र/विषयका विषयवस्तुमा जेसुकै लेखिएको भए तापनि पाठ्यक्रममा परेका कानुन, ऐन, नियम तथा नीतिहरू यो पाठ्यक्रम स्वीकृत हुँदा कायम रहेकालाई यस पाठ्यक्रममा परेको सम्झनुपर्नेछ ।
- प्रथम चरणको परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको परीक्षामा सम्मिलित गराइनेछ ।
- पाठ्यक्रम स्वीकृत मिति:- २०८०/१२/२०

**प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश**

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगृ एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगृ इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौँ तहका पदहरूको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

**प्रथम पत्र (Paper I): General Subject**

**Part (I): - General Awareness & General Reasoning Test (50 Marks)**

- 1. General Awareness and Contemporary Issues** (25 ×1 Mark = 25 Marks)
  - 1.1. Physical, socio-cultural and economic geography and demography of Nepal
  - 1.2. Major natural resources of Nepal
  - 1.3. Geographical diversity, climatic conditions, and livelihood & lifestyle of people
  - 1.4. Notable events and personalities, social, cultural and economic conditions in modern history of Nepal
  - 1.5. Current periodical plan of Nepal and Lumbini Province
  - 1.6. Information on sustainable development, environment, pollution, climate change, biodiversity, science and technology
  - 1.7. Nepal's international affairs and general information on the UNO, SAARC & BIMSTEC
  - 1.8. The Constitution of Nepal (From Part 1 to 5, 20 and 26 and Schedules)
  - 1.9. Governance system and Government (Federal, Provincial and Local)
  - 1.10. Provisions of civil service act and regulation (Federal and Lumbini Provincial) relating to constitution of civil service, organizational structure, posts of service, fulfillment of vacancy and code of conduct
  - 1.11. Functional scope of public services
  - 1.12. Public Service Charter
  - 1.13. Concept, objective and importance of public policy
  - 1.14. Fundamentals of management: planning, organizing, directing, coordinating, decision making, motivation, leadership and controlling.
  - 1.15. Planning, budgeting and accounting system of Federal and Provincial Government
  - 1.16. Major events and current affairs of national and international importance
- 2. General Reasoning Test** (25 ×1 Mark = 25 Marks)
  - 2.1. Logical Reasoning (9×1 Mark = 9 Marks)

Verbal Ability, Alphanumeric Series, Reasoning Analogies, Classification, Coding-Decoding, Order & Ranking, Direction and Distance, Analytical and Logical Reasoning, Assertion and Reason, Statement and Conclusions, Input-Output, Venn-diagram
  - 2.2. Numerical Reasoning (8×1 Mark = 8 Marks)

Arithmetic Series, Analogy, Classification, Arithmetical reasoning, Fraction, Percentage, Ratio, Average, Profit & Loss, Time & Work, Date & Calendar, Data Sufficiency, Data interpretation & Data verification
  - 2.3. Spatial Reasoning (8×1 Mark = 8 Marks)

Figure Series, Figure Analogy, Figure Classification, Figure Matrix, Pattern Completion, Embedded Image Formation & Analysis, Mirror and Water images, Cubes and Dices, Paper Folding & Cutting

प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश  
प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगृ एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट  
प्रोटेक्सन, एगृ इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौं तहका पदहरूको खुला, आन्तरिक र  
अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

**प्रथम पत्र (Paper I): General Subject**

**Part (II) : - General Technical Subject (50 Marks)**

- 1. History and Current Status of Agriculture Sector in Nepal (5 marks)**
  - 1.1. History of agricultural research and development in Nepal
  - 1.2. Overview of Nepalese agriculture: Current status and scope
  - 1.3. Institutional arrangement of agricultural research, extension and education in Nepal
  - 1.4. Agriculture Perspective Plan (APP) and its impact in Nepalese agriculture
  - 1.5. Agriculture extension system in federal context and its impact in agricultural development
- 2. Agriculture Research, Extension and Education (5 marks)**
  - 2.1. Role of agriculture research in contemporary agriculture
  - 2.2. Nepal Agricultural Research Council (NARC) and its vision
  - 2.3. Agricultural education systems in Nepal
  - 2.4. Academic institutions such as AFU, PU, TU
  - 2.5. Non-academic institutions (CTEVT and its allied institutions)
  - 2.6. Major functions of agriculture research, extension and education in Nepal
  - 2.7. Linkage and coordination among research, extension and teaching in Nepal
  - 2.8. Public, private, NGOs, CBOs, agricultural co-operatives and farmer groups involvement in research, extension and education
  - 2.9. Participatory technology development, participatory planning, monitoring, evaluation and feedback
- 3. Natural Resources, Environment Conservation, Climate Change and Disaster-Risk Management (10 marks)**
  - 3.1. Importance of natural resources conservation, utilization and management with respect to food security, employment generation and livelihood improvement in Nepal
  - 3.2. Bio-diversity and agro-biodiversity: Conservation and utilization for sustainable agriculture development
  - 3.3. Use of fertilizers and pesticides in agriculture and their implications to environment
  - 3.4. Integrated pest management (IPM), integrated crop management (ICM) and integrated plant nutrient management (IPNM) systems and Good Agricultural Practices (GAP)
  - 3.5. Environmental issues and sustainability of Nepalese agriculture
  - 3.6. Organic agriculture and organic products for export promotion and food safety
  - 3.7. General climatic conditions of Nepal
  - 3.8. Weather observation and instruments use in Nepal
  - 3.9. Climate change and its impact in agriculture sector
  - 3.10. Climate change adaptation and mitigation strategies of Nepal
  - 3.11. Disaster (landslide, drought, flood, cold spell, earthquake, pest outbreak) management in agriculture
  - 3.12. Rapid urbanization and change in land use pattern and their consequences in food security, environment conservation, employment generation and youth migration
  - 3.13. Crop insurance in Nepal: Current policies and status

## प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगृ एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगृ इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौँ तहका पदहरूको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

### 4. Legislations, Plan, Policies, Strategies and Global Trade in Agriculture (10 marks)

- 4.1. Agriculture sector in current constitution
- 4.2. Concept, goals, target and strategies of current Federal and Lumbini Provincial periodic plan
- 4.3. Planning, implementation, monitoring and evaluation of agricultural projects
- 4.4. Local governance and its role in agricultural development
- 4.5. National Agriculture Policy, 2061 (2004)
- 4.6. Agro-biodiversity Promotion Policy, 2063 (2007) (first amendment, 2071)
- 4.7. Agri-business Promotion Policy, 2063 (2006)
- 4.8. Agriculture Development Strategy (ADS), 2015-2035 AD: vision, mission, target, components and its salient features, implementation status of ADS, supporting projects and institutional arrangement
- 4.9. National Seed Vision, 2013-2025 and its implementation status
- 4.10. Nepal Trade Integration Strategy (NTIS), 2016 - Agricultural commodities
- 4.11. Agricultural Extension Strategy, 2061 (2003)
- 4.12. Seeds Act, 2045 (1988) and Seeds Regulation, 2069 (2013)
- 4.13. Plant Protection Act, 2064 (2007) and Plant Protection Rules, 2066 (2010)
- 4.14. Pesticides Management Act, 2076 (2019)
- 4.15. Fertilizer Control Order, 2055
- 4.16. Food Right and Food Sovereignty Act, 2075 (2018)
- 4.17. Food Safety Policy, 2076 (2019)
- 4.18. Agro Forestry Policy, 2076 (2019)
- 4.19. World Trade Organization (WTO), Agreement on South Asian Free Trade Area (SAFTA): their implication and impact in Nepalese agriculture
- 4.20. Comparative advantage, agriculture commercialization and trading of Nepalese agricultural products.
- 4.21. Implication of Sanitary and Phyto-sanitary (SPS) measures in Nepalese agricultural trade.

### 5. Agricultural Technology and Management (20 marks)

- 5.1. Importance of technology generation, verification and dissemination in crop production and management
- 5.2. Seed quality assurance: Seed production, laboratory testing, processing, handling, marketing and storage
- 5.3. Variety release and registration system in Nepal
- 5.4. Food and nutrition security: Concepts, status and dimensions
- 5.5. Importance of pests and pesticides management
- 5.6. Integrated Pest Management (IPM) concepts and strategies/practices
- 5.7. Roles of pollinators in crop production
- 5.8. Importance of microbial agents (fungus, bacteria, nematodes and virus) in plant protection
- 5.9. Importance of crop diversification and commercialization in Nepal.
- 5.10. Precision and protected agriculture: Concepts and technologies
- 5.11. Agricultural crops for agro-forestry and environmental protection
- 5.12. Strategies for commercialization of high value low volume commodities
- 5.13. Concept of soil fertility and productivity
- 5.14. Essential plant nutrients and their sources (manures and fertilizers)
- 5.15. Soil reaction (pH) and soil reaction improvement
- 5.16. Concept of Integrated Plant Nutrient Systems (IPNS) and its significance
- 5.17. Contemporary agricultural extension practices in Nepal (plant clinic, mobile service, training and demonstration farm, farmer to farmer extension and pluralistic extension)
- 5.18. Role of information and communication technology (ICT) in agriculture development
- 5.19. Agricultural markets and marketing in Nepal
- 5.20. Agricultural Management Information System (AMIS) in Nepal

### प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगृ एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगृ इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौँ तहका पदहरुको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

- 5.21. Agriculture Census, 2078
- 5.22. Linkage of agro-industries with agriculture production and marketing
- 5.23. Role of cooperatives in agriculture development in Nepal
- 5.24. Research methodology in agriculture (basic concepts, common designs and their application)
- 5.25. Trade liberalization and its implication in Nepalese agricultural product
- 5.26. Value chain development: concepts and practices in agriculture
- 5.27. Postharvest management of agricultural commodities
- 5.28. Farming system and sustainable agriculture development
- 5.29. Gender Equity and Social Inclusion (GESI) and women's role in Nepalese agriculture
- 5.30. Conservation agriculture: concept, principles and practices

\*\*\*\*\*

प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश  
प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगृ एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगृ इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौं तहका पदहरूको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

**द्वितीय पत्र (Paper II) : Technical Subject**

**Section (A) - 25 Marks**

**1. Agricultural Extension**

- 1.1. Extension Education, Training and Leadership Development
  - 1.1.1 Concepts, definition, principles, philosophy and objectives of extension education
  - 1.1.2 Role and scope of extension education in Nepalese agricultural development
  - 1.1.3 History of agricultural extension in Nepal
  - 1.1.4 New direction of agricultural extension (subject matter specialist, privatization, pluralistic, collaborative, gender mainstreaming in agriculture, pocket package strategy, public private partnership)
  - 1.1.5 Extension teaching methods and factors to be considered for selection of methods
  - 1.1.6 Training need assessment, designing training module and training management
  - 1.1.7 Leadership development and role of local leaders in Agricultural Extension
- 1.2. Communication, Innovation, Diffusion and Technology Transfer
  - 1.2.1. Role of communication in agricultural extension
  - 1.2.2. Communication models and Communication channels (mass media, inter personal, indigenous)
  - 1.2.3. Information and Communication technologies (ICTs) and Agricultural Extension
  - 1.2.4. Designing effective communication process
  - 1.2.5. Barriers of effective communication
  - 1.2.6. Innovation diffusion process
  - 1.2.7. Adopter's categories and factors affecting rate of adoption
  - 1.2.8. Development and transfer of technology and selection of appropriate technology
  - 1.2.9. Models of transfer of technology (e.g., Conventional, Feedback Model, Farming System Research and Extension, Farmers' Field School, group/co-operative approach)
- 1.3. Agricultural Extension System & Extension Program Planning
  - 1.3.1. Agriculture extension Systems of Nepal in changing context
  - 1.3.2. Role, responsibility and coordination among stakeholders involved in agricultural extension in Nepal
  - 1.3.3. Effective extension program planning: Principles, importance and process in Nepalese context
  - 1.3.4. Factors to be considered in executing extension program

**2. Agricultural Economics**

- 2.1. Principles of Economics
  - 2.1.1. Basic concepts on demand and supply
  - 2.1.2. Price and income elasticity of demand, cross elasticity of demand
  - 2.1.3. Consumer's preference and indifference curve
  - 2.1.4. Market classification and price determination under different market condition
  - 2.1.5. Principles of production (production function, the law of diminishing return, isoquant, product curves, production possibility curves)
  - 2.1.6. Cost of production (explicit and implicit costs, total, average, marginal, variable and fixed costs, economies and diseconomies of size and scale)

प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगृ एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगृ इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौं तहका पदहरूको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

2.1.7. Comparative and competitive advantage

2.2. Agricultural Economics

2.2.1. Farm Management

- 2.2.1.1. Scope and importance of farm management
- 2.2.1.2. Farm budgets (total and partial budgeting)
- 2.2.1.3. Cost and return analysis (Major food grains, cash crops and horticultural crops)
- 2.2.1.4. Farm plan (Resources, constraints and optimization)
- 2.2.1.5. Efficiency measure: farm inventory management and valuation
- 2.2.1.6. Time value of money, compounding and discounting techniques
- 2.2.1.7. Income and net-worth statement

2.2.2. Agricultural Marketing and Agri-business

- 2.2.2.1. Concept, scope and role
- 2.2.2.2. Characteristics of agricultural market and problems of marketing in Nepal
- 2.2.2.3. Grading, standardization, quality control and related problems of agricultural commodities
- 2.2.2.4. Value chain development in agriculture
- 2.2.2.5. Business plan preparation
- 2.2.2.6. Marketing of agricultural inputs (fertilizer, seeds, saplings, chemicals) and outputs (cereals, cash crops, fruits and vegetables)
- 2.2.2.7. Global and regional context of agricultural marketing and trade (WTO, SAFTA, Indo-Nepal trade)
- 2.2.2.8. Commodity markets in agriculture

2.3. Agricultural Program Planning, Monitoring, Evaluation and Data Management

- 2.3.1. Concepts of agricultural planning, preparation of programs/projects, budgeting and project cycle
- 2.3.2. Feasibility studies of agricultural projects and use of B/C Ratio, IRR, Economic and Financial Rate of Return, Net Present Value
- 2.3.3. Risk and uncertainty
- 2.3.4. Monitoring and evaluation of agricultural programs/ projects
- 2.3.5. Logical framework in project planning and monitoring
- 2.3.6. Statistics and Survey Techniques
  - 2.3.6.1. Frequency distribution and measures of central tendency, bar and pie charts
  - 2.3.6.2. Computation of mean and standard deviation from grouped and ungrouped sets of data
  - 2.3.6.3. Hypothesis testing and confidence interval
  - 2.3.6.4. Regression and correlation analysis
  - 2.3.6.5. Estimate of errors, control of error
  - 2.3.6.6. Agriculture Census: Sample survey, census survey and advantage/ disadvantage of sample survey over census survey
  - 2.3.6.7. Source of sampling and non-sampling error and measures to minimize such errors. Sample design for collecting current agricultural statistics in Nepal
  - 2.3.6.8. Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) and crop cutting surveys

प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश  
प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगू एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगू इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौं तहका पदहरूको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

**Section (B) - 25 Marks**

**3. Soil Science**

**3.1. General Introduction**

3.1.1. Definition of soil

3.1.2. Soil forming process

3.1.3. Physical properties of soils (texture, structure, density, porosity, consistency, elasticity)

3.1.4. Chemical properties of soils (soil reaction, electric conductivity, cation exchange capacity, percentage base saturation, fertilizers and reclamation of problematic soil: Acidic & alkaline)

3.1.5. Biological properties of soils (algae, fungi, actinomycetes, soil bacteria, mycorrhizal association)

3.1.6. Role of soil microorganisms in ammonification, nitrification, denitrification, biological nitrogen fixation (symbiotic and non-symbiotic)

3.1.7. Soil organic matter and carbon nitrogen ratio (C: N ratio)

**3.2. Soil Fertility and Plant Nutrition**

**3.2.1. Plant Nutrition**

3.2.1.1. Essential plant nutrients and their functions

3.2.1.2. Visual symptoms of nutrient deficiencies and nutrient disorders

3.2.1.3. Nutrient cycle (C, N, P and S) and its component

3.2.1.4. Nutrient requirements, uptake mechanism

3.2.1.5. General soil fertility status of Nepal and major causes of declining soil fertility

3.2.1.6. Soil testing, plant analysis and diagnostic techniques for improved soil fertility management

3.2.1.7. Integrated Plant Nutrient Systems and its significance in sustainable soil management in the Nepalese context

**3.2.2. Manures and Fertilizers**

3.2.2.1. Different types of chemical fertilizers and their application

3.2.2.2. Sources and types of organic manures

3.2.2.3. Bio-fertilizers, inoculants and their use in Nepalese agriculture

3.2.2.4. Fertilizers available in Nepalese market and their use

3.2.2.5. Fertilizer regulation, marketing and quality control mechanism in Nepal

**3.3. Soil survey and Water conservation**

**3.3.1. Soil Survey**

3.3.1.1. Importance of soil survey and its types

3.3.1.2. General soil classification

3.3.1.3. Major soils of Nepal and their characteristics (suborder/great group levels of USDA taxonomy).

3.3.1.4. Soil fertility mapping and tools used

**3.3.2. Soil, Water and Plant Relationship**

3.3.2.1. Hydrological cycle

3.3.2.2. Water infiltration and percolation

3.3.2.3. Soil permeability and Hydraulic conductivity

3.3.2.4. Saturation percentage, permanent wilting point, field capacity and plant available soil water

3.3.2.5. Soil moisture retention curve



## प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगृ एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगृ इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौं तहका पदहरूको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

3.3.2.6. Crop water requirements, evapo-transpiration and irrigation requirements, water balance

3.3.2.7. Soil water management, water stress (drought, water logging)

3.3.2.8. Soil Erosion, Slopping Agriculture Land Technology (SALT) and terracing

## 4. Agronomy

### 4.1. Basics of crop production

#### 4.1.1. Farming system

4.1.1.1. Introduction, system approach in agriculture, component /Determinants of farming system

4.1.1.2. Farming System Research Methodology (FSR)

4.1.1.3. Framework of FSR methodology

#### 4.1.2. Resource conservation technologies (RCT) in crop production

#### 4.1.3. Tillage

4.1.3.1. Objective, significance and importance of tillage in crop production

4.1.3.2. Zero tillage, minimum tillage and optimum tillage

4.1.3.3. Condition of soil suitable for cultivation

#### 4.1.4. Seed Technology

4.1.4.1. Seed formation, development and physiology of seed

4.1.4.2. Seed quality and seed classes

4.1.4.3. Principles and practices of seed production

4.1.4.4. Seed processing, handling and storage

4.1.4.5. Seed testing principles

4.1.4.6. Seed certification procedures and seed standards of major crops in Nepal

4.1.4.7. Importance of Varietal Replacement and Seed Replacement Rate

4.1.4.8. Seed self-sufficiency and seed production programs in Nepal

### 4.2. Crop production technology

4.2.1. Production practices of rice, maize, wheat, buck wheat, finger millet, lentil, soybean, chickpea, blackgram, horsegram, vicebean, mung bean, rapeseed, sunflower, groundnut, linseed, sugarcane with respect to:

4.2.1.1. Importance, distribution, origin and classification

4.2.1.2. Morphology and growth stages

4.2.1.3. Recommended varieties

4.2.1.4. Climate and soil

4.2.1.5. Cultural practices and post-harvest technology

#### 4.2.2. Underutilized crops and their importance in food and nutritional security

### 4.3. Plant breeding and research design

4.3.1. Definition, importance, history and achievement of plant breeding

4.3.2. Methods of crop improvement and breeding methods in field crops

4.3.3. Classification of crops according to mode of pollination

4.3.4. Germplasm collection, characterization, evaluation and utilization

4.3.5. Variety development procedure in Nepal

4.3.6. Maintenance breeding of varieties/germplasms.

4.3.7. Hybrid variety development and hybrid seed production.

4.3.8. Use of biotechnology in plant breeding

4.3.9. Research design and application

प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगु एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगु इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौं तहका पदहरुको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

**Section (C) - 25 Marks**

**5. Horticulture**

- 5.1. Cultivation practices of major horticultural crops
  - 5.1.1. Fruits: Citrus (*Citrus spp.*), Mango (*Mangifera indica*), Litchi (*Litchi chinensis*), Banana (*Musa acuminata*), Apple (*Malus pumila*), Pear (*Pyrus communis*) and Kiwi (*Actinida deliciosa*), Walnut (*Juglans regia*)
  - 5.1.2. Vegetables: Potato (*Solanum tuberosum*), tomato (*Solanum lycopersicum*), chili (*Capsicum frutescens*), cucumber (*Cucumis sativus*), cauliflower (*Brassica oleracea var botrytis*), radish (*Raphanus sativus*), beans (*Phaseolus vulgaris*), onion (*Allium cepa*), Pea (*Pisum sativum*) broad leaf mustard (*Brassica juncea var rugosa*), Brinjal (*Solanum melongena*), Bottle gourd (*Lagenaria siceraria*), Sponge gourd (*Luffa cylindrica*), Bitter melon (*Momordica charantia*), Pumpkin (*Cucurbita moschata*), okra (*Abelmoschus esculentus*), and Asparagus (*Asparagus officinalis*)
  - 5.1.3. Spice crops: Ginger (*Zingiber officinale*), Turmeric (*Curcuma longa*), Cardamom (*Amomum subulatum*), Garlic (*Allium sativum*) and Coriander (*Coriandrum sativum*)
  - 5.1.4. Flower: Rose (*Rosa spp.*), carnation (*Dianthus caryophyllus*), gladiolus (*Gladiolus spp.*), Gerbera (*Gerbera jamesonii*) and Marigold (*Tagetes spp.*)
  - 5.1.5. Plantation crops: Tea (*Camellia sinensis*) and Arabica coffee (*Coffea arabica*)
- 5.2. Vegetable Seed production technology
  - 5.2.1. Vegetable seed production zones of Nepal
  - 5.2.2. Classification and types of seeds (breeder, foundation, certified and improved; Open pollinated, hybrids, True Potato Seed and Pre-basic Seed)
  - 5.2.3. Hybrid seed production of tomato in Nepal and seed production of open pollinated crops (cauliflower, radish, cucumber and onion)
- 5.3. Postharvest management of horticultural crops
  - 5.3.1. Post harvest physiology: transpiration, respiration and ripening and senescence of fruit and vegetables
  - 5.3.2. Causes of postharvest loss and their management
  - 5.3.3. Storage of vegetables and fruits (potato, onion and apple): principles, importance and different storage structures
  - 5.3.4. Preservation of fruits and vegetables
- 5.4. Nursery management in fruits and vegetables
  - 5.4.1. Sexual and asexual propagation techniques of horticultural crops
  - 5.4.2. Nursery types and its use in horticultural crop production including hi-tech nurseries
  - 5.4.3. Use of rootstocks in horticulture
  - 5.4.4. Care and management of plants in nursery
- 5.5. Modern technologies in horticulture
  - 5.5.1. Organic farming, soilless farming, tissue culture technology for tuber and sapling production, high density planting, modern irrigation technologies, use of machineries in horticulture
  - 5.5.2. Precision and protected horticultural technology
  - 5.5.3. Urban farming technologies (roof top, vertical farming and home garden)
  - 5.5.4. Use of plant growth regulators and hormones in horticulture
- 5.6. Plant growth and development
  - 5.6.1. Seed germination: mechanism and controlling factors

प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगू एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगू इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौं तहका पदहरुको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

- 5.6.2. Flowering, pollination, fruit set, fruit drop and fruit maturity
- 5.6.3. Fruit ripening and senescence: mechanism and controlling factors
- 5.6.4. Tuber and bulb formation: mechanism and controlling factors

**Section (D) - 25 Marks**

6. Plant Protection

6.1. General Plant Protection

- 6.1.1. Importance of crop pests & disease
- 6.1.2. Climate change and implication on crop pest & disease
- 6.1.3. Plant protection principle and approaches
- 6.1.4. Importance, issues, challenges and role of plant quarantine in Nepalese agriculture.
- 6.1.5. Importance of pest survey and surveillance in disease/pest forecasting and early warning
- 6.1.6. Types of sprayers, duster and seed treatment Equipment
- 6.1.7. Use of equipment, calibration, dose calculation
- 6.1.8. Biological control of pests and diseases
- 6.1.9. Tools used for pest monitoring
- 6.1.10. Insect predators, pathogens and parasitoids
- 6.1.11. Biopesticides & Bio fungicides in pest & disease control
- 6.1.12. Type of Pesticide formulation
- 6.1.13. WHO classification of pesticide by hazard
- 6.1.14. Banned pesticides in Nepal
- 6.1.15. Safe use of pesticides
- 6.1.16. Status of pesticide use in Nepal
- 6.1.17. Symptoms and treatment of pesticide poisoning
- 6.1.18. Different methods of pesticide residue monitoring
- 6.1.19. Weed management
- 6.1.20. Rodents and their management

6.2. Entomology

6.2.1. Industrial Entomology

- 6.2.1.1. Importance of industrial entomology
- 6.2.1.2. Biology of silkworm and honey bee

6.2.2. **Agricultural Insect Pests of National Importance and their Management**

- 6.2.2.1. Cereals: Stem borers (*Chilo partellus*; *Chilo suppressalis*; *Sesamia inferens*; *Scirpophaga incertulas*); Green leaf hopper (*Nephotettix nigropictus*); Brown plant hopper (*Nilaparvata lugens*); Gundhi bug (*Leptocoris chinensis*); White grubs (*Melolontha spp.*; *Phyllophaga spp.*; *Holotrichia spp.*); white fly in rice, Fall Armyworm (*Spodoptera frugiperda*), Earth worm (*Eisenia fetida*)
- 6.2.2.2. Vegetables: Cutworm (*Agrotis ipsilon*; *A. segetum*); Pumpkin fruit fly (*Bactrocera cucurbitae*); Aphids (*Myzus persicae*; *Aphis fabae*; *A. gossypii*; *A. craccivora*; *Brevicoryne brassicae*); Red ants (*Dorylus orientalis*); Shoot and fruit borer (*Leucinodes orbonalis*); Large white butterfly (*Pieris brassicae nepalensis*); Fruit borer (*Helicoverpa armigera*); Tobacco caterpillar (*Spodoptera litura*); Potato tuber moth (*Phthorimaea operculella*); Diamond back moth (*Plutella xylostella*); White fly (*Bemisia tabaci*); South american leaf miner (*Tuta absoluta*)

## प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगु एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगु इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौँ तहका पदहरुको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

### 6.2.2.3. Cash Crops

6.2.2.3.1. White stem borer of coffee (*Xylotrechus quadripes*)

6.2.2.3.2. Sugarcane plassey borer (*Chilo tumidicostalis*)

6.2.2.3.3. Pink bollworms (*Pectinophora gossypiella*)

### 6.2.2.4. Fruits

6.2.2.4.1. Sub- tropical fruits: Citrus fruit fly (*Bactrocera spp.*); Scale insects (*Aspidiotus destructor*, *Aonidiella aurantii*); Citrus green stinkbug (*Rhynchocoris poseidon*), Citrus psylla (*Diaphorina citri*), Citrus Mealy Bug (*Planococcus citri*)

6.2.2.4.2. Tropical fruits: Mangooppers (*Idioscopus clypealis*, *I. nitidulus* and *Amritiodus atkinson*); Banana stem weevil (*Odoiporus longicollis*); Banana rhizome weevil (*Cosmopolites sordidus*); Litchi leaf curl mite (*Aceria litchii*), Red banded Caterpillar (*Deanolis sublimbalis*)

6.2.2.4.3. Temperate fruits: Apple wooly aphid (*Eriosoma lanigerum*); San Jose scale (*Quadraspidiotus perniciosus*)

6.2.2.4.4. Ornamental and Flowers: Red Spider Mite (*Tetranychus spp.*)

## 6.3. Plant Pathology:

6.3.1. Introduction and importance of plant diseases

6.3.2. Mechanism of infection by plant pathogen, Host Plant Resistance

6.3.3. Defense mechanisms of host plants

6.3.4. Genetics and disease resistance in plants

6.3.5. Plant disease epidemiology and forecasting

6.3.6. Agricultural Crop Diseases of National Importance and Their Management

6.3.6.1. Cereals: Rice blast (*Pyricularia oryzae*); Bacterial blight (*Xanthomonas campestris pv oryzae*); Stalk rot (*Erwinia carotovora*); Leaf blight (*Helminthosporium turcicum*); Rusts (*Puccinia graminis tritici*, *P. recondita*, *P. striiformis*); Loose smut (*Ustilago tritici*), False smut (*Ustilaginoidea virens*)

6.3.6.2. Vegetables and spices: Late blight (*Phytophthora infestans*); Bacterial wilt (*Ralstonia solanacearum*); Alternaria leaf spots (*Alternaria brassicicola*, *A. brassicae*); Damping off of seedlings (*Pythium spp.*, *Fusarium spp.*); Club root (*Plasmodiophora brassicae*); Root knot (*Meloidogyne spp.*); Anthracnose (*Colletotrichum spp.*); Tomato yellow leaf curl virus; Rhizomes rot of ginger and cardamom (*Pythium spp.*, *Fusarium spp.*)

6.3.6.3. Fruits and others: Foot and root rot (*Phytophthora citrophthora*, *P. nicotianae*); Citrus decline, Citrus greening (*Huanglongbing*) (*Liberibacter asiaticum*); Pink disease (*Pellicularia samonickii*); Scab (*Venturia inaequalis*); Powdery mildew (*Leveillula taurica*); Panama wilt of banana (*Fusarium oxysporum*); Coffee rust (*Hemelia vastatrix*); Septoria blight of marigold (*Septoria apicola*)

## 6.4. Mushroom cultivation

6.4.1. Cultivated species of mushroom in Nepal

6.4.2. Cultivation techniques of *Pluotus spp.* and *Agaricus spp.*, *Ganoderma* (*Ganoderma lucidum*), *Sitake* (*Lentinula edodes*)

## 6.5. Laboratory Techniques & production

6.5.1. Isolation

6.5.2. Culture and preservation

6.5.3. Mounting & culturing

### प्रदेश लोक सेवा आयोग, लुम्बिनी प्रदेश

प्रदेश निजामती सेवा तथा स्थानीय सरकारी सेवा अन्तर्गत कृषि सेवा एगृ एक्सटेन्सन, हर्टिकल्चर, एग्रोनोमी, प्लान्ट प्रोटेक्सन, एगृ इको एण्ड मार्केटिङ्ग र स्वाइल साइन्स समूहका अधिकृत सातौं तहका पदहरूको खुला, आन्तरिक र अन्तरतह प्रतियोगितात्मक परीक्षाको पाठ्यक्रम

6.5.4. Sterilization

6.5.5. Different media used

6.5.6. Production technique of *Metarhizium anisopliae*, *Beauveria bassiana* & *Trichoderma harzianum* T. *viridae*

\*\*\*\*\*

प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र लिइने सामूहिक परीक्षण (F qnt o S drs) को लागि सामूहिक छलफल (Group Discussion)

यस प्रयोजनको लागि गरिने परीक्षण १० पूर्णाङ्क र ३० मिनेट अवधिको हुनेछ जुन नेता विहीन सामूहिक छलफल (Leaderless Group Discussion) को रूपमा अवलम्बन गरिनेछ । दिइएको प्रश्न वा Topics का विषयमा पालैपालोसँग निर्दिष्ट समय भित्र समूह बीच छलफल गर्दै प्रत्येक उम्मेदवारहले व्यक्तिगत प्रस्तुति (Individual Presentation) गर्नु पर्नेछ । यस परीक्षणमा मूल्याङ्कनको लागि देहाय अनुसारको समिति रहनेछ ।

आयोगका अध्यक्ष वा सदस्य -अध्यक्ष

आयोगका सदस्य -सदस्य

दक्ष/विज्ञ (१ जना) -सदस्य

#### सामूहिक छलफलमा दिइने नमूना प्रश्न वा Topic

उदाहरणको लागि -उर्जा संकट, गरिबी निवारण, कृषि जमिनको बढ्दो खण्डिकरण, कृषि भूमिको अतिक्रमण, स्वास्थ्य बीमा, खाद्य सुरक्षा, प्रतिभा पलायन जस्ता Topic मध्ये कुनै एक Topic मात्र दिइनेछ ।