कमलामाई नगरपालिका सिन्धुली

कृषि स्नातक, अधिकृतस्तर छैठौ तहको पाठ्यक्रम

द्वितीय पत्रः- सेवा सम्बन्धी (वस्तुगत, बहुबैकल्पिक) पूर्णाङ्क-१००

Second paper : - General Technical Subject (100 Marks)

1. **History and Current Status of Agriculture Sector in Nepal**
   - 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 Devolution of agriculture extension system and its impact in agricultural development
2. **Natural Resource, Environment Conservation, Climate Change and Disaster-Risk Management**
   - 2.1 Importance of natural resources conservation, utilization and management w. r. t.food security, employment generation and livelihood improvement in Nepal
   - 2.2 Use of fertilizers and pesticides in agriculture and their implications toenvironment
   - 2.3 Environmental issues and sustainability of Nepalese agriculture
   - 2.4 Organic agriculture, and organic products for export promotion and food safety
   - 2.5 General climatic conditions of Nepal
   - 2.6 Climate change and its impact in agriculture sector
   - 2.7 Climate change adaptation and mitigation strategies of Nepal
   - 2.8 Rapid urbanization and change in land use pattern and their consequences in food security, environment conservation, employment generation and youth migration
   - 2.9 Crop insurance in Nepal: Current policies and status
3. **Agricultural Technology and Management**
   - 3.1 Importance of technology generation, verification and dissemination in cropproduction and management
   - 3.2 Seed quality assurance: Seed production, laboratory testing, processing, handling, marketing and storage
   - 3.3 Variety release and registration system in Nepal
   - 3.4 Food and nutrition security: Concepts, status and dimensions
   - 3.5 Importance of pests and pesticides management
   - 3.6 Integrated Pest Management (IPM) concepts and strategies/practices
   - 3.7 Roles of pollinators in crop production
   - 3.8 Importance of microbial agents (fungus, bacteria, nematodes and virus) in plant protection
   - 3.9 Importance of crop diversification and commercialization in Nepal.
   - 3.10 Precision and protected agriculture: Concepts and technologies
   - 3.11 Agricultural crops for agro-forestry and environmental protection
   - 3.12 Strategies for commercialization of high value low volume commodities

3.13 Concept of soil fertility and productivity
3.14 Essential plant nutrients and their sources (manures and fertilizers)
3.15 Soil reaction (pH) and soil reaction improvement
3.16 Concept of Integrated Plant Nutrient Systems (IPNS) and its significance
3.17 Contemporary agricultural extension practices in Nepal (plant clinic, mobile service, training and demonstration farm, farmer to farmer extension and pluralisticextension)
3.18 Role of information and communication technology(ICT) in agriculture development
3.19 Agricultural markets and marketing in Nepal
3.20 Agricultural Management Information System (AMIS) in Nepal
3.21 Agriculture Census, 2068
3.22 Linkage of agro-industries with agriculture production and marketing
3.23 Role of cooperatives in agriculture development in Nepal
3.24 Research methodology in agriculture (basic concepts, common designs and theirapplication)
3.25 Trade liberalization and its implication in Nepalese agricultural product
3.26 Value chain development: concepts and practices in agriculture
3.27 Postharvest management of agricultural commodities
3.28 Farming system and sustainable agriculture development
3.29 Gender Equity and Social Inclusion(GESI) and women's role in Nepaleseagriculture
3.30 Conservation agriculture: concept, principles and practices

4. Communication, Innovation, Diffusion and Technology Transfer

4.1 Role of communication in agricultural extension
4.2 Communication models and Communication channels (mass media, inter personal, indigenous)
4.3 Information and Communication technologies (ICTs) and Agricultural Extension
4.4 Designing effective communication process
4.5 Barriers of effective communication
4.6 Innovation diffusion process
4.7 Adopter's categories and factors affecting rate of adoption
4.8 Development and transfer of technology and selection of appropriate technology
4.9 Models of transfer of technology (e.g. Conventional, Feedback Model, Farming System Research and Extension, Farmers' Field School)

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

5.1 Concepts of agricultural planning, preparation of programs/projects, budgeting and project cycle
5.2 Feasibility studies of agricultural projects and use of B/C Ratio, IRR, Economic and Financial Rate of Return, Net Present Value
5.3 Risk and uncertainty
5.4 Monitoring and evaluation of agricultural programs/ projects
5.5 Logical framework in project planning and monitoring

6. Soil Science

6.1 5.1 General Introduction
6.2 Definition of soil

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6.3 Soil forming process
6.4 Physical properties of soils (texture, structure, density, porosity, consistency)
6.5 Chemical properties of soils (soil reaction, electric conductivity, cation exchange capacity, percentage base saturation, fertilizers and reclamation of problematic soil: Acidic & alkaline)
6.6 Biological properties of soils (algae, fungi, actinomycetes, soil bacteria)
6.7 Role of soil microorganisms in ammonification, nitrification, denitrification, biological nitrogen fixation (symbiotic and non-symbiotic)
6.8 Soil organic matter and carbon nitrogen ratio
6.9 5.2 Soil Fertility and Plant Nutrition

7. Plant Nutrition

7.1 Essential plant nutrients and their functions
7.2 Visual symptoms of nutrient deficiencies and nutrient disorders
7.3 Nutrient cycle (C, N, P, and S) and its component
7.4 Nutrient requirements, uptake mechanism
7.5 General soil fertility status of Nepal and major causes of declining soil fertility
7.6 Soil testing, plant analysis and diagnostic techniques for improved soil fertility management
7.7 Integrated Plant Nutrient Systems and its significance in sustainable soil management in the Nepalese context

8. Soil survey and Water conservation

8.1 Soil Survey
- Importance of soil survey and types
- General soil classification
- Major soils of Nepal and their characteristics (suborder/greatgroup levels of USDA taxonomy).
- Soil fertility mapping and tools used

8.2 Soil , Water and Plant Relationship
- Hydrological cycle
- Water infiltration and percolation
- Soil permeability and Hydraulic conductivity
- Saturation percentage, permanent wilting point, field capacityand plant available soil water
- Soil moisture retention curve
- Crop water requirements, evapo-transpiration and irrigationrequirements, water balance
- Soil water management, water stress (drought, water logging)
- Soil Erosion, Slopping Agriculture Land Technology (SALT) and terracing

9. Agronomy

9.1 6.1 Basics of crop production
- **Farming system**
  - Introduction, system approach in agriculture, component /determinants of farming system
  - Farming System Research Methodology (FSR)
  - Framework of FSR methodology
- **Seed Technology**
  - Seed formation, development and physiology of seed
  - Seed quality and seed classes
  - Principles and practices of seed production
  - Seed processing, handling and storage

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- Seed testing principles
- Seed certification procedures and seed standards of major cropsin Nepal
- Importance of Varietal Replacement and Seed Replacement Rate
- Seed self-sufficiency and seed production programs in Nepal

9.2 6.1 Crop production technology

- Production practices of rice, maize, wheat, finger millet, lentil, soybean,chickpea, mungbean, rapeseed, sunflower, groundnut, sugarcane with respect to:
- Importance , distribution, origin and classification
- Morphology and growth stages
- Recommended varieties
- Climate and soil
- Cultural practices and post-harvest technology
- Underutilized crops and their importance in food and nutritional security

10. Horticulture

10.1 Cultivation practices of major horticultural crops

- Fruits: Citrus (*Citrus spp.*), Mango (*Mangifera indica*), Litchi (*Litchi chinensis*), Banana (*Musa acuminate*), Apple (*Malus pumila*), Pear (*Pyrus communis*) and Kiwi (*Actinida deliciosa*)
- 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*) and broad leaf mustard (*Brassica juncea var rugosa*)
- Spice crops: Ginger (*Zingiber officinale*), Turmeric (*Curcuma longa*) andCardamom (*Ammomum subulatum*)
- Flower: Rose (*Rosa spp.*), carnation (*Dianthus caryophyllus*), gladiolus(*Gladiolus spp.*) and Gerbera (*Gerbera jamesonii*)
- Plantation crops: Tea (*Camellia sinensis*) and Arabica coffee (*Coffeaarabica*)

10.2 Modern technologies in horticulture

- Organic farming, soilless farming, tissue culture technology for tuber and sapling production, high density planting, modern irrigation technologies, use of machineries in horticulture
- Precision and protected horticultural technology
- Urban farming technologies (roof top, vertical farming and home garden)
- Use of plant growth regulators and hormones in horticulture

10.3 Plant growth and development

- Seed germination: mechanism and controlling factors
- Flowering, pollination, fruit set, fruit drop and fruit maturity
- Fruit ripening and senescence: mechanism and controlling factors
- Tuber and bulb formation: mechanism and controlling