लोक सेवा आयोग

नेपाल कृषि सेवा, स्वायल साइन्स समूह, राजपत्रांकित द्वितीय श्रेणी (खुल्ला र आन्तरिक प्रतियोगिता)
को लिखित परीक्षाको पाठ्यक्रम

द्वितीय पत्र :-सेवा सम्वन्धी प्राविधिक विषय पूर्णांकः १००

1. Introduction Soil Sciences

1.1 Definition, concept and use of soil
1.2 Soil as a medium for plant growth
1.3 Concept of soil fertility and productivity
1.4 Soil component and soil water-plant relationship
1.5 Soil as a natural body

2. Soil Physics

2.1 Particles density, bulk density, porosity, particles size and
2.2 Textural classification of soils and their determination
2.3 Structures and their agricultural significance
2.4 The dynamic properties of soils-consistency and plasticity
2.5 Soil color and aeration
2.6 Thermal properties of soil
2.7 Soil water retention, movement, infiltration, percolation and permeability
2.8 Hydrological cycle
2.9 Hydraulic conductivity
2.10 Saturation percentage, permanent wilting point and plant available soil water
2.11 Field capacity of soil, soil moisture measurement
2.12 Crop water requirement, evapo-transpiration an irrigation requirements, water balance

3. Soil Chemistry

3.1 Kind of exchangeable ions and cation exchange capacity
3.2 Nitrogen cycle
3.3 Phosphorus cycle and transformation, managing soil phosphorus
3.4 Potassium cycle, soil potassium, different forms of potassium
3.5 Role of sulfur, calcium, magnesium, sources and requirement in crop production
3.6 Sulfur cycle, soil sulfur, some characteristic of soil sulfur and amendments
3.7 General concept of micronutrients (Boron, Copper, Iron, Manganese, Molybdenum, Zinc, Chloride) role, sources, availability, functions, deficiency symptoms and application.
3.8 Micronutrients availability in Nepalese soils.
3.9 Soil pH-definition, role of soil pH on nutrients availability

4. Soil Acidity and Liming

4.1 Determination of soil pH and lime requirement
4.2 Buffering of soils and their amendments
4.3 Desirable pH ranges for major crops grown in Nepal
4.4 Amount, time, methods and factors affecting frequency of lime application
4.5 Liming materials and selecting a suitable liming material
4.6 Crop response to lime application
4.7 Economic and ecological relevance of lime application to raise the productivity of soil of Nepal
4.8 Soil acidity and its effects on productivity

5. Soil Microbiology/Biology

5.1 General classification of soil organisms, role of bacteria, fungi, algae, actinomycetes, protozoa and virus
5.2 Optimum condition for essential microbial activity in soil, encouraging beneficial microorganisms, composting and crop residue management
5.3 C.N. ration and its important significance
5.4 Role of biogas in rural development, soil productivity and global warming

6. Soil Fertility and Plant Nutrition

6.1 Essential plant nutrients and their classification
6.2 Functions of essential plant nutrients in plants
6.3 Nutrient requirements, uptake and balance
6.4 General fertility status of major Nepalese soils
6.5 Use of isotop in nutrient uptake

7. Manures and Fertilizers

7.1 Sources and types of organic manures
7.2 Farmyard manure (FYM), compost and their preparation, storage and applications
7.3 Bio-fertilizers, inoculants and their use in Nepalese agriculture
7.4 Green manures, their desirable characteristics, benefits and constraints
7.5 Mineral fertilizers and their history in Nepal
7.6 Types of commercial fertilizers (straight, compound complexes, micronutrient) and their nutrient contents and behavior in soils

8. Soil Classification and Mapping

8.1 Importance of soil survey and mapping
8.2 Soil survey types
8.3 Major soils of Nepal and their characteristics in suborder/great group levels of USDA taxonomy
8.4 Use of geographic information system (GIS) and remote sensing (RS) in soil resource mapping.
8.5 Identification of soil horizons and description of soil profiles
8.6 Base maps in soil survey
8.7 Types of soil maps and their importance

9. Soil Conservation and Watershed management

9.1 Watershed hydrology
9.2 Rainfall-runoff relationships
9.3 Mechanics of soil erosion by water and wind
9.4 Soil-loss estimation and erosion process and estimation of soil loss
9.5 Biological and agronomic measures for soil conservation
9.6 Landscape management
9.7 Agroforestry
9.8 Watershed related problems and opportunities
9.9 Concept of land husbandry
9.10 Indigenous technologies
9.11 Mechanical or physical protection measures
9.12 Diversion and drainage structures

9.13 Gully stabilization, stream bank stabilization
9.14 Design of conservation structure, terracing etc.
9.15 Concept of watershed
9.16 Characterization of watershed
9.17 Upland watershed
9.18 Watershed as ecosystem
9.19 Highland-lowland linkages
9.20 Changing approaches to watershed management
9.21 Society and natural resources
9.22 Property rights and resource conservation
9.23 Common property resources (CPRs) management
9.24 Gender role in the use and management of watershed resources
9.25 Public participation in watershed development and management
9.26 Local institutions for watershed development and management
9.27 Decentralized planning
9.28 User's groups
9.29 Farmer's empowerment

10. Problems Associated with Green revolution

10.1 Groundwater depletion and pollution
10.2 Fertilizer pollution
10.3 NO_3 accumulation in drinking water
10.4 Green house effect
10.5 Eutrophication
10.6 Organic matter depletion
10.7 Soil productivity decline
10.8 Land degradation and soil acidification
10.9 Bio-diversity depletion
10.10 Pesticide pollution
10.11 Soil and environmental degradation
10.12 Adverse effect on human and animal health
10.13 Global warming and its consequences
10.14 Problems of heavy metals
10.15 Recent concerns for the mitigation of the above problems

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