

SUBJECT:- SOIL CONSERVATION AND WATER MANAGEMENT

Paper I

SOIL CONSERVATION AND WATER MANAGEMENT & SOIL SCIENCE

Max. Marks- 85 Theory + 15 CCE=100 (Each Unit 17 marks)

(A) SOIL CONSERVATION AND WATER MANAGEMENT

Unit – I

History of Soil and Water Conservation in India.

Soil and water conservation and research in India achievements and technology gaps, Water resources of India, their distribution and quality parameters.

Hydrologic Cycle and its importance on soil conservation and water management.

Unit – II

Concept of watershed management – History and development in India. Special problems land slide, slips, Minneapolis, torrents – their extant and distribution.

Rainfall measurement – standard and recording type rain gauges analysis of rainfall chart.


Rainfall intensity duration frequency relation factors affecting runoff and computation of peak rate by rational method.

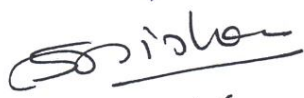
Rainfall – runoff relationship for different reasons. Ground water recharges fluctuation and Water budgeting. Sedimentation in ponds and reservoirs and methods of measurement.


Unit – III

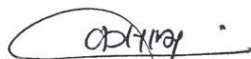
Soil erosion –Principle, processes and factor affecting. Land use patterns in difference agro ecological regions, erosion Harrods impact assessment of erosion on productivity and land aggravation.

Soil types of India their conservation of problems and productivity potential's, Soil forming processes, rocks and minerals


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B.Sc. I Year Semester- I Year 2016-2017
SUBJECT:- SOIL CONSERVATION AND WATER MANAGEMENT
Paper

SOIL CONSERVATION AND WATER MANAGEMENT & SOIL SCIENCE

(B) SOIL SCIENCE

Unit – IV

Soil Physical Properties – Texture and Structure and their important in soil effective soil depth.

Soil bulks density, water holding cations, clay minerals and their classification.

Properties of soil profiles and its developments soil classification (Soil Taxonomy).

Unit – V

Cation exchange capacity and its importance for soil management, soil reaction – Soil pH its range in humid and regions and reaction in to management of soil.

Biological characteristics – soil organism, micro flora, micro fauna – their relation for soil management, carbon cycle, nitrogen cycle, C/N ratio, Soil organic matter and its importance in soil conservation.

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B.Sc. I Year Semester- II Year 2016/2017
SUBJECT:- SOIL CONSERVATION AND WATER MANAGEMENT

Paper

SOIL AND WATER CONSERVATION ENGINEERING & CONSERVATION FORESTRY

Max. Marks- 85 Theory + 15 CCE=100 (Each Unit 17 marks)

(A) SOIL AND WATER CONSERVATION ENGINEERING

Unit - I

Role of soil and water conservation engineering in protecting natural resources.

Need types and method of engineering surveys. Method of measuring horizontal distances chaining and stadia method.

Introduction of surveying equipments chains, tapes, compass leveling staff or rod etc. leveling forms types and procedure.

Unit - II

Compass survey. Types of bearings procedure and closing error, methods of plan table surveying, their advantages and limitations,

Hydrologic - Soil cover complex number method for peak rate and volume of runoff measurement of runoff weirs, channels, flumes and pipes.

Forms and types of precipitation, rainfall and its distribution, computation of average depth of rainfall in a watershed.

(B) CONSERVATION FORESTRY

Unit - III

Importance of forestry as a natural resource and its relationship with soils and water. Major forest types of India their distribution and composition.

National forest polices - necessity, statistics and scope. Forest in relation to climate topographic edaphic (soils) biotic and historical factors.

Objectives of forest management - protective, productive and aesthetic. Introduction to working plan, rotation and yield regulation.

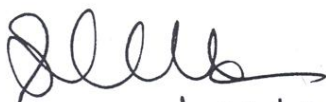
Unit - IV

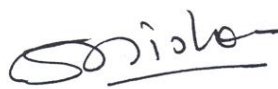
Administrative and management division of forest. Silvicultural systems and their importance for soil and water conservation.


High forest systems, clear felling system selective system and appies system, natural and artificial regeneration of forest and their scope.

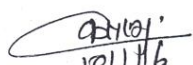
Scope and objective of forestation choice of species for various site conditions and planning for a forestation.

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B.Sc. I Year Semester- II Year 2016-2017

SUBJECT:- SOIL CONSERVATION AND WATER MANAGEMENT

Paper

SOIL AND WATER CONSERVATION ENGINEERING & CONSERVATION FORESTRY

Unit – V

Plant succession and its importance for soil and water conservation .

Seed requirements sources collection, transport storage and pretreatment for pure and mixed plantation. Establishment and Management of nurseries and different steps involved rising forest nursery.

Preparation of planning material, demonstration clearance of planning site and staling soil working techniques for different site conditions sowing and planting, tending and weeding

Plant thinning and climber cutting for regeneration, protection against fire, disease and biotic interference, wind breaks, shatter belts and wind erosion control.

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B.Sc.II Year III Semester Year 2016-17

Subject-Soil Conservation and Water Management

Paper- Soil Science & Engineering

Max. Marks- 85 Theory + 15 CCE= 100 (Each Unit 17 Marks)

Unit - I

Soil Classification-Soil order, sub order, great soil group, soil series, soil types, soil phases. Introduction to soil taxonomy, soil map, scales of soil maps and soils of India. Land capability Classification-Classes, sub classes and units. Land use planning and its importance in soil conservation. Interpretation of soil survey reports for land capability classification. Soil moisture constant-soil moisture tension. (Pf value).

Unit - II

Classification of soil moisture-physical and biological. Practical application of soil moisture constant values. Essential elements for soil fertility evaluation, deficiency symptoms and their role in plant growth. Soil testing and crop response. Effect of soil and their identification. Methods of reclamation-chemical, biological and mechanical.. Acids soil and their management.

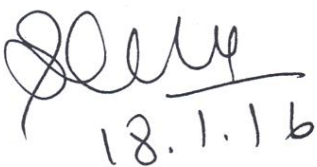
Unit - III

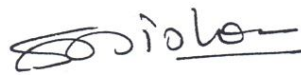
Types of engineering measures on agriculture lands. Adaptability, design and planning of contour bunds. Graded bunds-design principles, construction and maintenance. Bench terrace-types, design procedure and riser stabilization.

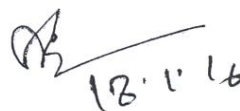
Design of water disposal structure-grassed waterways, channels and diversion. Conservation ditches-their suitability, design criteria and economics. types nomenclature, adaptability and limitations of erosion control structure on non agriculture lands. Hydrological and structural design of control structure-Drop, Drop inlet and chute spillways.

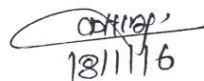
Unit - IV

Engineering measures for landslides, roadside erosion and mine spoil control. Design criteria for stream bank protection and torrent control measures. Classification of gullies. Gully control measures and design of check dams. Moisture conservation practices. Tillage, Contour cultivation, compartmental bunding, tied ridging, ridge furrows. Vertical mulching, Organic and inorganic mulching, broad bed and furrow and raised sunken bed system.


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Unit - V

Biological measures for control of landslides and rehabilitation of mixed lands. Vegetative measures for torrent training and stream bank protection. Reclamation of gullied and ravine lands through vegetative measures and their economics. Biological measures for reclamation of saline, alkaline and acid soils.

B.Sc. II Year IV Semester Year, 2016-17

Subject-Soil Conservation and Water Management

Paper- Conservation Forestry & Conservation Agronomy

Max. Marks- 85 Theory + 15 CCE= 100 (Each Unit 17 Marks)

Unit – I

Grassland types in India-their distribution and ecological status. Principles of grassland management-preliminary survey, botanical composition and growth condition. Grazing intensity, carrying capacity and grazing systems for grassland development. Development and renovation of various grassland types-closure soil and water conservation measures, reseeding with grasses and legumes.

Fertilizer application, burning control and economics of pasture development and management. Farm/Social forestry: Definition, objectives scope, limitation and roll in soil and water conservation programmes. Agro-forestry systems: Definition and objectives. Land use systems related to agro-forestry. Taungya system, multiple cropping system and plantation forestry.

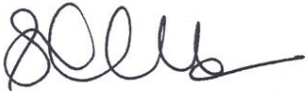
Unit – II

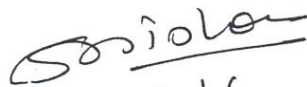
Establishment of farm forest- site selection, choice of species, methods, source of stock seed and nursery. Criteria for selection of species for agro-forestry systems in India. Agri-horti system in India- Aims and objectives. Soil working, moisture conservation, species selection and nursery management of fruit trees.


Management and working of fruit trees in different agro-climatic zones. Shifting cultivation: Definition, problems and distribution in India. Afforestation of damaged areas and improved conservation measures on agricultural lands. Concept, scope and need for conservation of wild life in nature and its role in soil and water conservation.


Unit – III

Botanical classification of crops and its importance. Classification of crop in relation to soil erosion and tolerance to different soil condition. Role of agronomy in watershed management. Crop production as affected by erosion, water logging, salinity, alkalinity and acidity.


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Unit – IV

Role of acidity, tilth, organic matter and fertility status in crop land management. Tillage and its relationship with soil structure. Concept of minimum tillage and common tillage practices for water and wind erosion control.


Basic principles of cropping systems and common types in India. Monoculture, mixed cropping, cropping sequences and rotation- Definition, advantages and limitations. Advantage and limitation of green manuring and crop suitable for green manuring.

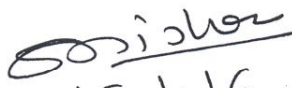
Unit – V


Cropping systems in different regions of India. Economics of different cropping systems. Manures and fertilizers- their importance and availability.

Fertilizer needs of different crops and recommended doses based upon crop and soil testing. Fertilizer application techniques and assessment of residual impact. Organic manures- methods of handling, storage and application.

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B.Sc. III Year Semester- V

SUBJECT:- SOIL CONSERVATION AND WATER MANAGEMENT
Paper – Rain Water Harvesting, Watershed Management & Conservation
agronomy

Max. Marks- 85 Theory + 15CCE=100 (Each Unit 17 marks)


Max.Marks- 85

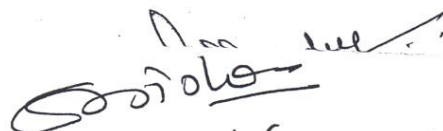
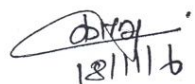
Unit – I


1. Water harvesting systems: an overview.
2. Pre- design Survey and site investigations for water harvesting structures.
3. Design criteria for dugout type ponds and their suitability.
4. Embankment type ponds for Water Resource Development site selection and design principles.
5. Water harvesting practices in different regions in India.
6. Design procedure for percolation tanks/ponds.
7. Method to contain seepage and evaporation losses.

Unit – II

1. Layout, construction and maintenance of water harvesting structures.
2. Land leveling for command area development.
3. Methods of irrigation: Surface, Sprinkler and Drip.
4. Management of irrigated lands.
5. Irrigation efficiencies and water requirement of crops and factor affecting.
6. Drainage: Need, Benefits and Methods.
7. Structure for Water Control diversification in irrigation system.
7. Watershed Management concept as a unit of planning.
8. Watershed characteristic and their importance in Soil Conservation.
9. Watershed survey for present land used and land capability classification.
10. Engineering Survey and planning for mechanical conservation measures in the watershed.


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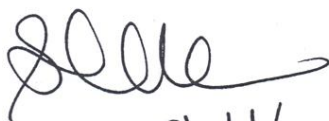

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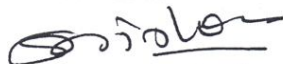
Unit - III


1. Proposed land use and planning for agronomical measures.
2. Survey and planning for vegetative measures in the Watershed.
3. Preparation for social forestry, Agri-Horti and pasture land development plan in the Watershed.
4. Site Selection, Design, and Planning of Water Resource Development Structure in Watershed.
5. Participatory Planning, Participatory Rural Appraisal (PRA) concept of Agro-Eco analysis and their use in development of Watershed.
6. Estimating and Costing of Conservation measures in Watershed.
7. Benefit-Cost Analysis of Soil and Water Conservation measures on watershed basis.
8. Phasing of project work and project evaluation.

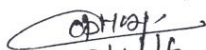
Unit - IV

1. Contour farming, cover crops and legumes for erosion control and sustained Production.
1. Strip Cropping: Definition, Types, Advantages and Applicability.
2. Objectives, advantages and limitations of mulch farming practices for crop production.
3. In-Situ Water Harvesting techniques and rain Water Management.
4. Farming in terraced fields for erosion control.
5. Introduction to rain fed and dry land agriculture in India.
6. Rainfall and Temperature distributions in India and areas of scarcity / drought.
7. Recommended dry farming practices for moisture conservation and productivity.


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Unit - V

1. Climatic variation and Crop planning in rain fed areas.
2. Soil Management for moisture conservation.
3. Nutrients supply to crops in dry land farming.
4. Agronomic practices for drought management and Sustained Production.
5. Contingent crop plans for drought Management.
6. Recycling of harvested water for initial stages of crops growth.
7. Use of improved varieties and Soil amendments for maximum production.


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B.Sc. III Year Semester- VI

SUBJECT:- SOIL CONSERVATION AND WATER MANAGEMENT

Max. Marks- 85 Theory + 15CCE=100 (Each Unit 17 marks)

Paper - Transfer of Technology and Economic Evaluation

Max.Marks- 85

Unit – I


1. Extension in soil conservation: Concept, Scope and objectives.
2. Conventional Systems for transfer of technology: Village Level Extension Workers, Input support Systems, Subsidies and Credit Support Institutions.
3. Role of NGO's in Transfer Technology.
4. Technology transfer through National demonstration lab to land programmes of ICAR : Objectives and achievements.


Unit – II


1. Community Participation in Natural Resource Development.
2. Krishi Vigyan Kendra (KVK's) : A system of technology transfer.
3. Operational Research Projects : History and achievements with special reference to Soil and Water Conservation Programmes.
4. Institutions – Village linkage programmes of ICAR for technology transfer, assessment, and refinement and on farm research.

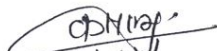
Unit – III

1. Role of Women in technology transfer and agriculture.
2. Top down and bottom up approach for soil and water conservation programmes.
3. Extension activities in Watershed Management.
4. Leadership, team building and group action for Watershed Management Programmes.


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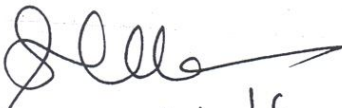

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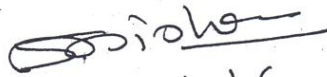
Unit – IV


1. Concept of contact farmers, Mitra Kisan, Mahila Mitra Kisan and Social Institutions.
2. Training and Visit Systems for Human Resource Development.
3. Participatory approaches and people's participation in Soil and Water Conservation Programmes
4. Multimedia training in Participatory Watershed Management.
5. Role of Media – TV, Radio, Kishan Melas, Exhibitions and Cultural methods in technology dissemination.


Unit – V

1. Economic Evaluation of Soil and Water Conservation projects – Scope and need.
2. Identification and quantification of costs and benefits.
3. Economic Evaluation Methods – Advantages and limitations.
4. Exercise on Economics Evaluation of Soil and Water Conservation Projects – A case study.
5. Role of financial institutions in Natural Resources Management: Indian experiences.


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