

**SYLLABUS FOR SOIL CONSERVATION ASSISTANT**

- Agriculture Extension: Meaning and definition of agriculture extension, Scope of agriculture extension -its need and importance, Basic concept of extension, Distinguishing features of extensions, Objectives of extension service, Extension program planning. Formal and informal education, Meaning of teaching and learning, Factors affecting learning, Creation of learning situation, Criteria for learning.
- Communication: Meaning of communication and innovation, Objectives of communication, Key elements of communication, communication-qualities, Channels of communication, Treatment of message, an audience audience response.
- Extension teaching: Methods of teaching, Functions of extension teaching methods, Purpose of teaching methods, Individual contact methods-farm and home visits- principles and procedures- advantages & limitations. Office calls, telephone calls, personal letters-objective-principles-advantages & limitations, Result demonstration- objective-procedures- advantages & limitations, General meetings, discussion meeting, lecture meeting -follow ups- advantages & limitations, Workshop, seminar, conference, forum and field trips-objectives, advantages, Mass contact methods- literature-audio visual aids-advantages & disadvantages.
- Agriculture Economics: Definition of agriculture economics-nature and scope; Division of agriculture economics: Economics of production and marketing- Economics of consumption and distribution- Economics of planning and policy making. Importance of agriculture in national economy, Problems of low yield-consequence and causes.
- Farm management: Definition-scope, Farm management as an art, science, business, Classification-types-systems-forms, Importance of farm management in agriculture production and productivity. Farm Planning and budgeting, farm size selection, input output calculation, cost variable in Farm, advantages and disadvantages
- Agricultural labour: Causes and growth in number of agricultural labour, Causes of poor economic condition of agriculture labour, Improvement steps of economic condition of agriculture labour.
- Agricultural marketing: Definition of marketing-functions-importance-objectives, Market and market structure, marketing functions, agencies, institutions and channels, concept of demand and supply, market survey and intelligence.
- Animal Husbandry: Importance and scope of animal husbandry in Nagaland. Breed of livestock: Breeds of cattle, pig, goat and poultry (any other exotic birds);Reproduction mechanisms: Male and female reproductive organs, Different hormones-pregnancy period of different livestock, Lactating period of different livestock's, Artificial insemination-advantages and disadvantages, Common terminology in animal reproduction; Animal nutrition: Composition & classification of feed stuffs, Roughages and concentrates, Mineral supplements-vitamin supplements- food additives, Green forage and their conservation.
- Animal farm management: Functions and tools of farm management, Care of pregnant animals, Care at the time of parturition, Care of young ones after parturition, Housing of animals, Castration, dehorning, identification mark, deworming. Maintenance of livestock registers. Animal by-products: Manures and uses, Milk and milk products.

- **Personality Development:** Meaning and definition of personality, Traits of personality, Development of personality, Kinds of personality, Assessment of personality.
- **Soil Science:** Definition-Difference between land & soil, components of soil, functions of soil, origin of soil; Soil forming rocks and minerals: Definition- rocks, minerals . Classification-Types of rocks (igneous, sedimentary, metamorphic); Weathering of rocks: Definition- Types of weathering- physical, chemical and biological processes, factors affecting weathering on rocks & minerals. Soil formation: Factors of soil formation (Passive and active soil forming factors); Erosion: Water and wind erosion- Definition.
- **Properties of soil:** Soil texture- definition and classification of soil particles. Particle density and bulk density- definition. Porosity of soil- macro and micro pores. Soil structure- definition and its Classification, Macro and micro nutrients of soil, Soil profile.
- **Organic matter of soil:** sources, composition, functions of organic matter. Difference between organic matter and humus. Functions of soil microorganisms. Soil yield: Definition- Soil fertility, soil productivity, Integrated nutrient management (INM); Soil water loss: Definition- Percolation, infiltration, leaching, evaporation; Problem soils: Acid soils, saline soils, Alkali soils- Definition, characteristics, Reclamation measures or management. soil pH, Importance of lime application in acidic soil.
- **Soil survey:** Purpose and objectives of soil survey, types, Land capability classification (LCC), GIS and remote sensing, GPS and its applications.
- **Definition-different branches of horticulture-** role of horticulture in soil and water conservation, Scope of horticulture in Nagaland, Importance of fruits and vegetables in human diet. Classification of horticultural crops, soil, climate and other factors affecting fruit production, planning, layout and planting system of an orchard. Aspects of propagation-Propagation structures – medium - water quality – sanitation - container and handling, sexual and asexual method of propagation- advantage and disadvantage. Techniques of grafting, budding, layering, cutting-methods - tools and accessories - time and season - selection of rootstock and scions. Nursery management, Growth regulators, application of manures and fertilizers, irrigation and different cultural operations, training and pruning.
- **Definition-scope of fruit cultivation,** cultivation of important fruit and plantation crops in Nagaland with respect to their origin, nutritive value, climate, soil type, varieties, propagation methods, insect pests and diseases of major fruit crops, various cultural operations, harvesting and yield.
- **Olericulture:** Definition- importance-scope. Different types of vegetable gardens- layout- location and size. Classification of vegetable crops, cultivation of important vegetables, spices and condiments in Nagaland with respect to their origin, nutritive value, economic parts used, climate, soil type, varieties, propagation methods, insect pests and disease of major vegetable crops, various cultural operations, harvesting and yield.
- **Floriculture:** Definition- importance and scope of floriculture and landscape gardening.

- Garden operations: Soil sterilization- seed sowing-planting and transplanting-shading pinching- de-shooting-de-budding- defoliation- staking-topiary. Different types of Garden- features of garden, cultivation of important flowers in Nagaland with respect to their origin, uses, climate, soil type, varieties, propagation methods, insect pests and disease, various cultural operations, harvesting and yield.
- Post harvest management: Importance and scope of post harvest management. General principles of fruits and vegetables preservation, methods of preservation and processing with value addition.
- Agronomy: Definition – Basic Concept and Fundamental – Relationship to Soil & Water Conservation. Plant Nutrients: Roles, Mineral Elements, Essential Elements, Functions, Sources of Plant Nutrient, Nutrient losses in Soil, Nutrient Deficiency, Manure & Fertilizers. Bulky Organic Manures, F.Y.M, Compost, Vermi Compost, etc
- Definition of Botany – Branches of Botany: Economic Botany & Classification – Agronomy, Horticulture, Plant Pathology, Pharmacognosy, Forestry, Plant Breeding. Parts of an Angiospermic Plant: Aerial modification of stem, Modification of Root, Stem, Leaf – Classification of Roots, Compound Leaf and Simple Leaf. Functions of different parts of Plants body, Flower, Pollination, Fertilization.
- Water Management of crops- Soil Water Balance- Soil moisture constants, Physical Classification of Soil water- Water requirement of crops- Role of water with the plants- Soil water relation to crops, Irrigation Definition- Importance of Irrigation- Irrigation at critical growth stage- Depth of Irrigation- Sources of irrigation to crops.
- Tillage and Tilt: Objective, Types Of tillage, Interculture or Inter cultivation, Eroded Soil Management, Causes of eroded soil.
- Biofertilizers – Rhizobium, Blue Green Algae, Azolla, Azotobacter, Nitrogen fixation by legumes.
- Seeds – Definition – characteristics of a good seed, seed viability, dormancy of seeds, seed Certification, seed treatment, Calculation of seed requirement for different crops,
- Agricultural Meteorology: Weather and Climate – Factors of influencing the weather and climate – Climatic requirement of crops. Effect of climate and weather on agriculture – climate change/global warming. Definition of Meteorology – Common Meteorological Instruments, functions and uses. Design, installation and data recording at Agro-meteorology observatory-definition of Agro-meteorology. Observatory- Site for observatory- layout of instruments.
- Agronomic Crop Classification: Garden Crops, Plantation Crop, Field Crops. Sub-Classification - Place of Origin Botanical Classification Commercial Classification- Economical Classification, Classification according to their physical and Life cycle. Major Crops Common Name Families and their Scientific names.
- Cropping Planning and Cropping System- Monoculture and Mixed Cropping-Multi cropping and Cropping Intensity- Crop Rotation- Green Manuring crop- Green Leaf Manuring Crop. Contour Farming, Strip Cropping, Contour Strip Cropping, Cover Crops-

Buffer Strip Cropping. Dryland Farming-Rainfed Farming, Dry Framing System- Drought and its Classification.

- Package and Practices of Crops: Pulses- Oil Seeds- Sugar Crops- Spices and Condiment-Fibers- Fodders.
- Survey: Definition, Objectives, Uses, Classification of surveying, General principle of survey, Method of linear measurement, Accessories of Linear Measurement, Ranging, Leader and follower, Method of chaining on level ground & sloping ground, obstacle in chaining, chain surveying, Compass surveying, levelling, computation of perimeters, area & volume.
- Soil & Water Conservation: Soil erosion principle, Soil erosion and processes, factors affecting soil erosion, types of soil erosion, mechanics of water erosion, factor affecting water erosion, types of water erosion, other form of soil erosion, soil loss, sediment yield, soil depletion & degradation, classes of erosion.
  - a) Gully erosion: Causes of gully formation, factor affecting gully formation, triggers for gully development, gully development, process of gully, classification of gully, intensity of gully, preventive measures of gully, gully control, gully control measures.
  - b) Stream bank erosion: Causes of stream bank erosion, control of stream bank erosion, stream bank stabilization-loose boulder, gabion structures & spur,
  - c) Agronomical Measures to Control Erosion/Soil loss -Contouring, strip cropping and tillage practices, conservation agriculture, conservation tillage, tillage practices, mulching, soil management practices, cover crops, crop rotation and soil erosion.
  - d) Bunding: Definitions, Types of bunds, classification of bunds. Contour trenching.
  - e) Terracing: Terrace classification, bench terraces, design of bench terrace, construction of bench terrace, earth work per hectare.
  - f) Farm pond: Uses of pond, types of farm pond, component and selection of farm pond, design of farm pond, seepage, construction of farm pond and dugout farm pond.
  - g) Sedimentation: Sediment, sources of sediment, factor affecting sediment yield, types of sediment load, sediment transportation and mechanics.
- Hydrology: Hydrological cycle, precipitation, forms of precipitation, measurement of precipitation, rain gauge network, preparation and presentation of rainfall data, evaporation, evaporimeters, transpiration, interception, depression storage, infiltration.
- Forest, Forestry – introduction, its types, scope and importance. Role of forestry in soil and water conservation. Forest types and its distribution in Nagaland. Forest species of Nagaland.
- Forest and Environment: forests in relation to various locality factors- climatic factors, edaphic factors, physiographic factor, biotic factor and forest succession.
- Forest management: objectives and importance of forest management, working plan, yield regulation, rotation. Silvicultural systems and their Importance for soil and water conservation.
- Forest protection: definition and objectives, Preventive and remedial measures for biological – man, animal and fire. Joint forest management. Indian forest act, national forest policy, Forest rights act, Nagaland jhum land act, Nagaland Forest act.



- Seed and germination: sources of seed, harvesting processing, handling , quality of seed, seed germination, seed certification, dormancy ,regulation of germination, factors affecting seed germination.
- Nursery: techniques and practices, type of nursery, site selection, development, protection, soil working, bed preparation and dimension, soil treatment, poly bag filling, seed treatment, scarification, stratification, mechanical and chemical, method of sowing, mulching, weeding, thinning, cleaning and after care.
- Plantation: general guidelines for planting, choice of species-indigenous and exotics, post planting operation.
- Regeneration of forest: Natural regeneration – definition and methods of regeneration, Artificial regeneration- definition and objects, propagation, management practices, Afforestation, Reforestation.
- Silviculture: definition, Scope and objects, important forest crops in Nagaland with respect to Taxonomy, climate, regeneration.
- Agroforestry: introduction to agroforestry systems and practices for different ecological regions. Agroforestry systems for production, protection and reclamation in relation to climate change. Yield importance, measurement of DBH, girth estimation of cubic feet or cubic meter.
- Forest utilization: classification of forest products, NTFP for cottage industries and livelihood security.
- Wildlife management: importance, objectives, principles, factor affecting wildlife management, National parks & sanctuaries, community conserved areas, wildlife protection act .
- Conservation forestry: introduction and importance- objectives of farm forestry, Social forestry, Agroforestry, Conservation forestry systems- agri-silvi system, Silvi-mixed system, Grassland development-selection of site & species. Afforestation on catchment area – suitable species & soil types & conditions, Rehabilitation of landslide prone area- suitable species & biotic protection, protection of stream bank erosion, gullies and ravines, torrent- damage cause-control measures by vegetation-suitable species, hill road side cut stabilization-planting system, reclamation of problem soil and afforestation for problem soil; wind erosion & its control.