

## 1. Forestry Research in General

- 1.1 Principles and practices of research methods applicable to forestry
- 1.2 Types of research relevant to natural resource management
- 1.3 International organizations involved in forestry research and various methods/approaches adopted
- 1.4 Tools and techniques used for identification and prioritization of researchable problems and potential in forestry
- 1.5 Emerging issues in forestry research in Nepal and around the world

## 2. Experimental design and Statistical methods

- 2.1 Theories and principles of experimental design
- 2.2 Application of experimental design in forestry research
  - 2.2.1 Structure and function of blocking, randomization and replications
  - 2.2.2 Treatment structure, contrast and function, main effect and interactions, experimental unit, plot shape, size, and field layout
- 2.3 Design used in forestry experimentation

- Randomized block design
- Split plot design
- Latin square design
- Factorial experiments

- 2.4 Statistical methods used in forestry research
  - 2.4.1 Concept and use of statistical parameters
  - 2.4.2 Statistical tests
  - 2.4.3 Analysis of variance and covariance analysis
  - 2.4.4 Linear and multiple regression, and correlation
  - 2.4.5 Linear and non-linear models
  - 2.4.6 Estimation and analysis of proportion
  - 2.4.7 Models and distribution of frequency data
  - 2.4.8 Repeated measurements and bivariate analysis
- 2.5 Social and Environmental research methods in forestry
  - 2.5.1 Tools and Techniques of socio-economic surveys
  - 2.5.2 Environmental Impact Assessment of Forestry Programmes
- 2.6 Analysis of various designs using appropriate computer software
- 2.7 Interpretation of research results

## 3. Management of Forestry Research and Survey Programmes

- 3.1 Planning, organizing, monitoring, evaluation and control of forestry research and survey programmes
- 3.2 Social, economic and environmental impact evaluation of forestry research projects
- 3.3 Management of research resources/facilities and research sites
- 3.4 Coordination among research and development organizations
- 3.5 Linking forestry research programmes with national development objectives and priorities
- 3.6 Review and evaluation of scientific papers

#### **4 Forest Resource Survey, Inventory and Mapping**

4.1 Principles and Practices of Forest Resource Survey, Inventory and Mapping

4.2 Planning, Management, Monitoring and Evaluation of forest resources Survey and Inventory programmes

4.3 Design and techniques of Sampling

- Simple random sampling
- Systematic sampling
- Cluster sampling
- Sampling unequal size units
- Stratified random sampling
- Double sampling
- Two-stage sampling
- Size and shape of sample unit

4.4 Forest Mensuration and biometrics

Measuring trees and forest

Methods of socio-economic and marketing surveys applicable in forestry

Inventory of NTFP and on farm tree resources

Census of wildlife population

4.5 Use and efficiency evaluation of modern tools/techniques used in photogrammetry, cartography and digital mapping

#### **5 Remote Sensing, GIS and Space Technology**

5.1 Principles and Practices of Remote Sensing (RS), GIS and

Space Technology and its application in forestry sector research and development

5.2 Visual interpretation of Arial photographs and Remote Sensing imageries and their Comparisons

5.3 Land use/land cover change detection using RS and GIS technology

5.4 Integration of RS and GIS technology in forestry

#### **6. Silviculture and Forest Management**

6.1 Recent advancement in Silviculture and Management research of Natural and Plantation forests around the world

6.2 Research methods in natural forest silviculture and management

6.2.1 Forest regeneration, growth and yield modeling, silvicultural systems, thinning, pruning, shrub land improvement

6.2.2 Reduced impact logging, grading, marketing and timber utilization

6.2.3 Silviculture of high value and major forest tree species of Nepal

6.3 Research methods in plantation silviculture and management

6.3.1 Production, testing and supply of quality forest seeds

6.3.2 Plant propagation using various methods (both conventional and advanced technologies)

6.3.3 Management and operation of forest nursery and research activities

6.3.4 Planning management and evaluation of plantation establishment research (including species selection, provenance and progeny trials)

6.4 Agroforestry

6.4.1 Recent developments in agroforestry research in national and international level

- 6.4.2 Agroforestry systems and technologies for domestication and commercialization of agroforestry trees
- 6.5 Applied Forest Genetics and Tree Improvement
  - 6.5.1 Modern tools and techniques used in research of forest genetics and tree improvement
  - 6.5.2 Establishment and evaluation of forest seed stands/orchards
  - 6.5.3 Collection, evaluation and conservation of forest genetic resources
  - 6.5.4 Designing and implementation of forest genetic experiments (Including tree breeding, hybridization and advance generation)
  - 6.5.5 Assessment of genetic traits (qualitative and quantitative gains)
- 6.6 Management of forest fire, tree and forest health and application of integrated insect/pest management strategies in forestry
- 7. Non-timber forest products (NTFPs)**
  - 7.1 Research methods adopted for domestication and commercialization of high value NTFPs in different countries
  - 7.2 Linking role of traditional knowledge on NTFPs research for poverty reduction in developing countries
  - 7.3 Research on high value NTFPs of socio-economic importance in Nepal (bamboo and rattan, medicinal and aromatic plants, wild fruits, fiber, resin, taxol etc.)
  - 7.4 Planning and strategy formulation for conservation, management, enterprise development and marketing of high value NTFPs via WTO and TRIPS agreement
- 8 Biodiversity, Soil Conservation and Watershed Management**
  - 8.1 Major Biological diversity of Nepal
  - 8.2 Research methods applicable in bio-prospecting of forest biodiversity in Nepal
  - 8.3 Recent developments in research and development in the field of biodiversity management at ecosystem, species and genetic level
  - 8.4 Forest certification - approaches and procedures
  - 8.5 Principles of Soil-Plant-Water relationship; soil fertility and fertilization and tree physiology
  - 8.6 Planning, management and operation of researches related to soil and water conservation, bioengineering and plant and soil analysis laboratory facilities
  - 8.7 Various techniques and approaches adopted in Soil Conservation and Watershed Management in SAARC countries

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