FOREST ECONOMICS

1. Basics of Forest Economics and associated quantitative methods

Micro and macroeconomics. Relevance of economics to forestry sector. Definition of Forest Industry Economics and Forest Management Economics. How Forest Economics is different from normal economics? Economic indicators of contribution of forestry to GDP of a country. The Forestry and Logging sector in Indian Economy – its place in the National Industrial Classification 2008. GDP of the Forestry Sector and Logging sector of India.

Utility and marginal analysis, Law of diminishing marginal utility, Consumer Surplus and Indifference Curve. National Income and Related Aggregates, Money and Banking, Determination of Income and Employment. Linear Programming – Definition, formulation, Assumptions, Solutions – graphical, Simplex, Pivoting rules, Duality in LP, Applications.

Definition of Econometrics, Methods for econometric analysis, Central Tendency and Dispersion, Correlation and Regression, multiple regression analysis, Principal Component Analysis, Factor Analysis, Cluster Analysis, Discriminant analysis and Structural Equation Modelling. Concept of data – Time Series data, Longitudinal Data, Techniques for forecasting.

2. Production Forestry

Concept of Production Functions (Single and Multiple Input cases), their characteristics and forms, Production Possibility Curve, Production theory as applied to forestry, Laws of demand and supply, Indifference Curves, Elasticity of Demand, Law of diminishing marginal returns, Efficiency, cost curves, Isoquants, Concept of Substitution

Factors affecting demand and supply of forest products

3. Markets and firms

Definition of Market, Role of markets in forestry sector, Forms and types of markets - Perfect Competition, Imperfect competition - Monopoly, Duopoly, Oligopoly. Market Regulations, Marketing of forest products. Demand and Supply Functions, Demand estimation techniques, Quantitative Techniques for analysis of demand and supply. Factors of production, land, rent, Interest, Costs and revenues, Opportunity Cost, wages. Investment criteria. Definition, joint production, Definition of public goods, Factors affecting forest management – Ownership, Size, Cost of production, Demand, legal regulations, accessibility, taxation. Integration in forestry firms, Product Management. Trade in Forest Products – Absolute and Comparative Advantage, Offer Curves, Production Possibility Frontier, Social Indifference Curves, Autarky, Equilibrium with and without trade, The Heckscher-Ohlin model, International Treaties and agreements on trade and tariff, Exchange rate, Databases related to trade in forest products

4. Non-Timber Forest Products and Forest Valuation, Forest Resource Economics

Forest based ecosystem services, Direct, indirect, use and non-use values, determining forest ecosystem values and benefits. Methods of monetization and valuation of forest resources and intangible services from forests – Market Price Approach, Surrogate Market Approach,

Production Function Approach, Travel Cost method, Hedonic Pricing Method, Contingent Valuation Method, Discrete Choice Experiments and Cost-based evaluation, and their contribution to national accounts. Compounding and Discounting, Financial and Social Benefit – cost analysis, Net Present Value and Internal Rate of returns, Sensitivity Analysis and its applications. Determination of Stumpage value. Factors affecting demand of eco-system goods and services, Costs associated with supply of forest based Eco-system Goods and services. Market Failure and forest degradation, Tragedy of Common, Environmental Kuznets Curve. Externality, Natural Resource Accounting, Economics of ecosystems and biodiversity. Economics of air, water and carbon sequestration.

5. Applications of Forest Economics

Sources of revenue, Risk and Uncertainty, Treatment of time horizons, Concept of Rotation, economic rotation. Land Expectation Value (Faustman's Formula), Economics of Thinning, Short and Long Rotation Crops, Current Annual Increment, Mean Annual Increment and their relationship. Regeneration models of forests – No direct cost and Direct Cost Models.

Optimum rotation and its assumptions, Single rotation model and problems associated with it, Multiple rotation model with constant scale replication, Factors affecting rotation

Effect of site quality, mixed species stands, Insect Pests, Fire on rotation. Allowable cut effect.

Sustained yield, Sustainable forest management (SFM) and its criteria and indicators, Economics of SFM, Optimal Economic Models – Binkley's Model.

Dimensions of Land-use, Interdependence of land-uses, Issues with land use planning.

Theory of Time preference, Determination of social discount rate and associated disadvantages

Economic Analysis and impact assessment of Forestry Projects, nature, scope and design of forestry projects, Project planning – types, levels and phases. Project appraisal, interim and post evaluation. Case studies on analysis of forestry projects.

Climate Change, Mitigation policies, Carbon markets, Environmental policies and Regulations