OPERATIONAL FOREST MANAGEMENT PLANNING METHODS:

proceedings, meeting of Steering Systems Project Group, International Union of Forestry Research Organizations

Bucharest, Romania
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These 14 papers were submitted to a conference of Project Group P4.07 Division IV, International Union of Forestry Research Organizations. Topics discussed included the uses of simulations, analytical techniques, and mathematical programming techniques in land management planning, reforestation programs, intensive forestry, timber management and production, tree growth, wood transportation, and budgeting.

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Compiler

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PREFACE

At the XVIth World Congress held in Oslo, Norway, in 1976, the International Union of Forestry Research Organizations (IUFRO) reaffirmed its commitment to study forestry problems in the developing countries and to seek solutions. This collection of papers is the contribution to this task made by the Steering Systems Project Group, Division IV. This project was established at the Congress at the suggestion of Hans Speidel, Richard Plochman, and Robert Magin, to promote communication and collaboration among IUFRO scientists doing research in the development and application of forest management planning methods. The Project Group is conducting two major activities. First, an International Directory of Computerized Planning and Research Tools is being established under the sponsorship of the Forest Service, U.S. Department of Agriculture. Second, international meetings are held to inform members of the state of the art in forest management planning, and to promote the collaboration of all forestry researchers in addressing the challenges posed by forest management in developing nations.

The 14 papers collected here report on planning methods which have been successfully used in developed countries and which—in the judgment of the members of the Project Group—may be useful in attacking problems in less developed nations. Many of our members are deeply aware of their limited grasp of these problems. Our sincere hope is the these papers will open a dialogue which will lead to better understanding of these problems and to an effective collaboration among researchers from all nations in an attack on these problems.

The papers presented here span the spectrum of approaches used in forest management planning in recent decades. In the first paper, Bohumil Dolezal presents the classical approach to planning intensive forest management and establishes the validity of these principles for dealing with contemporary problems of developing economies.

The remaining papers deal with specific planning techniques, all of which—except two—require the use of electronic computers to conduct simulations, solve mathematical programs, or invert input-output matrices. The papers by Denie Gerold and Allen Lundgren demonstrate the usefulness, efficiency, modest cost, and versatility of electronic computers in modeling the behavior of forest stands, and in providing detailed estimates of outputs and of resources needed for the diverse conditions typically encountered in commercial forest lands.

The paper contributed by members of the Australian Forestry Council reports on six stand-growth and yield-simulation models which rely on functions derived from graphic analysis, nonlinear estimation, and generalized least squares. This paper also reports on two linear programming (LP) methods. The first of these provides an analysis of long-term cutting strategy for intensively managed *Pinus radiata* plantations. The second combines LP with the simulation of stand yields determination of thinnings and clear felling yield for an entire plantation.

Two additional papers report on methods integrating simulation and optimization methods. The model described by Joseph Buongiorno and Dennis Teeguarden uses simulation to estimate future growth, and to help managers select promising management alternatives, and linear programming to find an optimum combination of reforestation projects. William W. Phillips and Thomas D. Corcoran present an interactive model which uses simulation to explore alternative "market transport possibilities," and linear programming for identifying optimal overall strategies.

The next five papers report on methods which rely on the use of LP and a recent extension of LP, goal programming. Ivan Kolenka presents a model for planning the logging, transport, and distribution of wood assortments in the context of a planned economy. Malcolm Kirby presents a budgeting model for large private or public forest enterprises which also provides an analytical framework for evaluation of overall management programs. The two-stage LP methods discussed in separate papers by Krishna Rustagi and Stephen Smith provide a practical strategy for dealing with one of the most vexing limitations of LP, the assumption of the availability of reliable information about future events. Richard C. Fields describes a goal programming model which provides a systematic method for dealing with a limitation of LP which has proved particularly bothersome in forestry, the impossibility of specifying an objective function which reflects adequately the incommensurable outputs of forest management.

David Betters reports on a model which integrates a computerized procedure based on factor analysis with linear programming and input-output analysis. The computerized procedure is used to develop among planners, consumers, and managers a consensus of