PUBLIC ASSISTANCE PROGRAMS

FOR NONINDUSTRIAL PRIVATE FORESTRY:

AN ANNOTATED BIBLIOGRAPHY

by

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February 1982

STAFF PAPER SERIES NUMBER 26

1 Research supported by the USDA Forest Service, State and Private Forestry, Washington, D.C., and Department of Forest Resources and Agricultural Experiment Station, University of Minnesota, St. Paul, MN. Published as paper no. 1818 of the miscellaneous journal series of the Minnesota Agricultural Experiment Station.

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Public Assistance Programs for Nonindustrial Private Forestry

An Annotated Bibliography

INTRODUCTION

Nonindustrial Private Forests: Background

Private nonindustrial landowners own 58 percent of the commercial forest land in the United States. This approximately 300 million acres of forest land is an integral part of the land base which provides a steady supply of timber to the nation's wood-based industry. The private nonindustrial forest landowners are a diverse group of landowners that exhibit a variety of reasons for landownership. These reasons often do not include the management of forests for timber production. Furthermore, the group in general does not practice intensive forest management. This lack of management has led many forestry professionals to conclude that nonindustrial private forest lands are not meeting their production potential. From a national standpoint this low productivity is viewed as unacceptable by many public and private policy makers.

A great deal of research has been conducted to determine the causes of inadequate timber management on nonindustrial private forest lands. The results of such research have highlighted insufficient investment opportunities, inadequate market forces, and the lack of investment capital. Public programs addressing these and related constraints to intensified management have been developed. They are viewed as mechanisms by which the task of private action can be overcome and socially optimal allocation of resources to private forestry can be achieved.
Three categories of public programs for the enhancement of private forestry have been identified: direct fiscal, direct nonfiscal and indirect. The direct fiscal programs are primarily tax relief efforts such as capital gain treatment of timber income and reforestation tax credit. The indirect approach is made up of programs that provide technical assistance, research and education. The direct nonfiscal programs use subsidy payments as an incentive to increased investments in forest management.

Incentive payments for forestry practices have been distributed through several different programs. Funds now obtainable are distributed through either federal programs (e.g., Forestry Incentive Program) or through several state programs. These programs have proven to be popular among nonindustrial private landowners and forestry professionals involved in private forest land management. A significant percentage of the tree planting and timber stand improvement on private nonindustrial lands is accomplished with subsidy payments. Although the accomplishments of these programs is significant, serious questions about their economic efficiency and cost effectiveness have been raised.

Bibliography: Organization and Content

A large amount of research has been conducted to answer questions concerning the efficiency and effectiveness of public programs focused on nonindustrial private forests. In the bibliography that follows many of these studies are cited. The objective of the bibliography is to provide a concise description of the important research done in this area.
It is also hoped that the bibliography will stimulate thought for new research focused on questions left unanswered by previous studies.

The major focus of the bibliography is the economic efficiency and cost effectiveness of public assistance programs for private nonindustrial forestry. Other studies concerning the issues of equity and landowner characteristics are included. This literature review is by no means exhaustive. The papers were selected on the basis of their importance as a research contribution, and on their contribution to the overall scope of the entire collection. To make the bibliography easier to follow, it has been divided into five sections, namely,

- Subsidy Programs: General Policies and Program Options
- Efficiency and Effectiveness of Forestry Assistance Programs
- Landowner Character and Behavior
- Equity of Public Subsidies
- Program Evaluation: Theory and Models

Each section includes an introduction which describes the importance and the type of information presented. The articles in each section are arranged in an order that best suits the presentation of material.

It is hoped that this collection proves useful in furthering the forestry community's understanding of an important yet somewhat perplexing area of public policy. The continuation or elimination of public subsidies for forestry will most likely be based on the research results of the next few years.
BIBLIOGRAPHY

Subsidy Programs: General Policies and Program Options

The use of subsidy programs to promote the efficient allocation of resources to forest management on nonindustrial private lands is a controversial issue with today's public policy planners. Forestry assistance programs in different forms have proven to be popular with the forestry profession and forest landowners over the past several decades. A clear understanding of subsidies in general and the forestry subsidy programs in particular is required to properly appreciate the importance of this issue. This section identifies key literature sources deemed important to gaining such an appreciation.

The first article provides an explanation of the economics of federal subsidy programs. Then Gould's article suggests that agricultural policy be used as a guide to forest policy development. The next paper provides a review of the private forestry assistance programs in general. The following two papers present discussion of the need for private forestry programs. Mills then presents a concise stepwise procedure for the development of an efficient subsidy program. An article follows that gives an example of the conflicts that develop with inadequate planning. This section of the bibliography concludes with a forestry consultant's viewpoint of an alternative use of government funds to achieve the same goal.

A concise explanation of subsidies, their forms and their effects is presented. The general arguments for proposed subsidies are reviewed. The incidence of a subsidy, who pays the price, and the effectiveness of the subsidy in reallocating resources to achieve economic efficiency is discussed. The article concludes that subsidies should be reviewed with respect to costs and benefits. The comparison should be made with respect to the total benefits and costs and to the marginal benefits and costs.


This article presents the public policy development process in agriculture which has led to the improvement of farmers' financial position and the development of a sound agriculture industry. The author suggests that it would be wise to use the public policy experience of agriculture as a guide to improvements in the private forestry sector. The basic imperfections in markets, ownership, credit and information should be overcome if efficient allocation of resources to forestry is expected. Some specific suggestions for improving the present cost-share program are discussed.

This paper provides a brief review of the majority of the assistance programs available to nonindustrial private forest landowners. The policies and procedures of the programs offered by the federal and state governments and private industry are described. Also the accomplishments of these programs are analyzed and a description is given of their overall impact on the state of timber resources in this country. It is concluded that the present level of assistance is too small to have a significant effect on the intensity of forest management on small, private woodlands.


The small woodland situation, its importance as a continuing supplier of timber and the necessity of public intervention to encourage investment, is examined in this paper. The conclusion is reached that intervention may be justified. The adequacy and efficiency of the present timber subsidy is then examined. Several inefficiencies of the present Forestry Incentive Program such as the fixed cost-share rate and the excessively low minimum tract size are discussed. The paper concludes with suggestions for improvements in the present programs, some changes must be made since unnecessarily low rates of return should not be tolerated on public investments.

Reasons for subsidy programs that promote forestry on nonindustrial private land holdings are presented. An important one being the diversity of landowners' objectives and varying condition of their forest land. The pervasiveness of subsidy programs throughout the economy is also noted. In order to compete with other heavily subsidized land uses, a subsidy for forest management is considered necessary. Defending the need for subsidy programs, the paper concludes with a review of some accomplishments. The forestry incentives program is felt to be an effective and necessary public policy tool.


The need for a priority scheme for investments on nonindustrial private forest landholdings from public assistance programs is described. The necessary steps in program development are set up to ensure the program efficiently achieves the goals of its administrators. The problem of conflicting and obscure goals often being present in public policy development is stressed. A prerequisite to priority ranking is a concrete, operational program goal. The methodology for developing program ranking is presented. The ranking is chosen from a number of alternatives that best fit the program goals. To be efficient the priority ranking scheme must be linked directly to a program evaluation procedure. Any flaws in
the program determined by the evaluation of actual program performance should be eliminated immediately.


The existence of separate organizations with divergent goals can often lead to the inefficient development of public policy. In forest policy this can be exhibited by the confusing situation of the tax treatment of forestry incentive payments. The Internal Revenue Service requires that the incentive payment be reported as ordinary income. The cost of the treatment to which the payment was applied must be capitalized and recovered through depletion. This treatment effectively reduces the cost share percentage from the intended 75 percent level to approximately 52 percent for the average landowner. This reduction is counter productive to the Congress' intent of making forest management investments more attractive to the small woodland owner.


The management of small, private woodlands can be more efficiently accomplished by consulting foresters than by publicly funded Cooperative Forest Management (CFM) personnel. The woodland owner should have a significant, personal financial investment in his woodland to ensure his commitment to sound stewardship of his land. A proposal is presented to further the use of public monies to establish consultants in areas that
are lacking qualified forestry personnel. After a few years to allow establishment, the consultants should be self-supporting. It is concluded that the use of public funds as seed money to support consultants would be much more efficient than the present CFM program.
Efficiency and Effectiveness of Forestry Assistance Programs

Although public subsidy programs for nonindustrial private forest landowners have been popular among forestry professionals and forest landowners, the economic virtues of such programs have been challenged on a number of occasions. These challenges have led to research that has attempted to answer questions of program efficiency and effectiveness. This section reviews a selection of such research efforts.

The first presentation is the latest work by Mills and Cain which evaluated the efficiency of the Forestry Incentive Program. This part of the bibliography includes evaluations of earlier subsidy programs, including the Soil Bank Program. Except for the study by Mills and Cain, the studies are limited to regional or state reviews of programs. Included is an analysis of the effectiveness of forest subsidies in Germany. Since the proper allocation of cost-share funds is an important determinant in the cost effectiveness of a subsidy program, this section concludes with several articles describing methodologies for cost effective allocation of subsidy funds.

The details of an economic analysis of the overall performance of the 1974 FIP is presented. The presentation includes the estimated timber yield increase and financial returns expected on a national scale. The major segments of the program are reviewed so that recommendations for improvement can be made. The results of the analysis showed that the financial returns and timber yield increases were substantial. Some individual program segment performances were unacceptable. Five recommendations to improve the overall performance of the program are presented.


This paper provides a full review of the analysis and the complete data from the study presented above. This article is recommended if greater detail is required.


An examination of the efficiency of the FIP in achieving cost effective timber production is presented. Expenditure and practice composition of the 1974 program accomplishments is also detailed. This study was done on a national scale. Four indicators: tract size, per acre cost,
site class and forest type and practice applied to that type; were used in the determination of cost effectiveness. The data evaluated showed the overall performance of the program to be adequate in meeting the goal of cost effective timber production. Four recommendations to improve program performance are presented.

Dunn, B. Allen and Michael J. Beese. 1977. Structure, Characteristics of Participants and Effectiveness of the Forestry Incentive Program (FIP) in South Carolina. Department of Forestry, Forest Research Series No. 31, Clemson University, Clemson, S.C.

The efficiency of the FIP structure, the characteristics of the program participants and the effectiveness of the cost-share funds allocation in South Carolina are reviewed. The program structure was analyzed using questionnaires and interviews of the personnel involved in program administration and delivery. The results of the survey were used to determine the effectiveness of program implementation. Program participants were also surveyed. The data gathered gave an indication of the general characteristics of those using the subsidy. This information is important to determine weaknesses in the program and may result in program changes that will attract a broader sector of the population. This data may also be used to help analyze the question of program equity. Benefit-cost analysis was used to determine the effectiveness of cost-share fund allocation. The analysis provided a ranking of the most cost efficient counties. A more efficient allocation of funds will result if this data is used.

This review of the Rural Environmental Assistance Program Practice-A7 in Minnesota provides a guide for the general evaluation of the effectiveness and efficiency of subsidy programs. An in depth review of the benefits provided by public expenditures on private woodlands is presented. The analysis combines an efficiency analysis of the timber production with a survey of landowner attitudes and characteristics. This study limits itself to an analysis of planted red pine. The format may be expanded to include other treatments. This study concludes that the structure of the present subsidy programs is inadequate to accomplish the program goals. Recommendations are made for improving the efficiency of public programs for forestry.


The cost effectiveness of public and private investment in the accomplishments of the Agricultural Conservation Program and the Cooperative Forest Management Program in Pennsylvania is analyzed. The method of analysis uses current cost data and projections of price levels and market outlooks to determine financial returns from different investments by region. The return on investment can be determined for either the public investment, the private investment or for the combined investment.
The study stresses the need to emphasize investments which provide the highest rate of return. Programs which are oriented to investments with high rate of return will provide the maximum cost effectiveness.


This study examined the effects of the Soil Bank Program on timber management and the economy of South Carolina. It was found that the program had been effective in improving the timber base of the state and has increased landowner awareness of the benefits of sound forest management. Also timber stand improvement activities were shown to have been conducted by 75 percent of the landowners, showing that landowners continued to show an active interest in forest management. Over 75 percent of the planted land is still in timber. This land has the potential of providing almost $6 billion in manufactured goods and 94 thousand man-years of employment over a 40 year period to the economy of South Carolina. The success of this program should be compared to other similar programs to promote forestry on small woodlands. The strengths of the program may be formulated into the new program.

A detailed insight into the costs and accomplishments of the forestry section of the ACP in Southeastern Ohio over a seven year period is presented. The accomplishments represent only 3.4 percent of the reforestation and 1.6 percent of the timber stand improvement needed in this area of the country. Although the ACP was not expected to resolve the problem of inadequate forest management on small woodlands, it is obvious that programs that can deliver a greater impact are necessary.


Forestry practices completed under the ACP up to 1958 are reviewed in terms of cost-share payments, acres affected and the magnitude of the effort that needs to be given to meet long range goals. The importance of the timber stand improvement and the tree planting work done under this program as percentages of the total U.S. accomplishments is noted. The limited percentage of the total ACP budget distributed to these activities makes the totals more impressive.

An objective approach for determining the forestry effects of major public assistance programs is presented. Levels of participation, satisfaction, and forestry accomplishments were measured using personal interviews of landowners and contacts with program administrators. The study was limited to 31 counties in Northern Michigan, but should be applicable to other regions. Programs designed to aid forestry have met with limited success. This lack of success is attributed to the limited effort by program administrative personnel and to landowner's lack of awareness of available programs. Review of program effectiveness is essential to the efficient administration of public programs. Especially important is the effectiveness of the program in reaching the intended group. A greater objective basis should be given to the allocation of time and funds when considering public assistance programs.


A detailed account of the methodology and sampling procedure used to gather data discussed in the above article is presented in this bulletin.

The effectiveness of two different public subsidies for increasing the profitability of managing upland oak woodlands is analyzed. The study used internal rate of return and present net worth calculations to analyze the various combination of investments with and without subsidies. Subsidies will have little effect on the profitability of oak management except in the case of sawtimber rotations of 50-70 years. However, subsidies can prove to be a positive force in bringing together the public desires and improving landowner attitudes toward forest management.


The importance of subsidies paid to forest cooperatives as a means of promoting efficient forest management on small, private woodlands in Germany is discussed. Subsidies are shown to be an important aspect of efficient private forest management but are available in insufficient amounts to provide the necessary incentive to overcome the long term time element present in timber production. Problems with the benefit-cost analysis of macro-economic effects of subsidies are also discussed. Since the level of subsidization is very low the effects on timber price development may not be computed without a significant amount of inaccuracy.
Although the effects can not be accurately measured the need for incentives still exist. It remains obvious that the forestry market mechanism does not guarantee optimal allocation of resources to timber production. Therefore policy instruments using a combined system of area based and product based subsidies can be recommended.


The apportionment procedure used to distribute the funds in the initial year of the Forestry Incentive Program is described. The procedure followed guidelines as set out by Congress. The distribution of funds is dependent upon the relative amount of cost effective timber investments within each state. The qualifying acreage within a state was estimated, then weighted by the expected financial return and proportion of area suitable for treatment. The apportionment resulted in the majority of the funds going to the South. Each state received some funding as a recognition that every state has financially acceptable investments. Sensitivity analysis showed the results to be relatively insensitive to reasonable fluctuations in the key variables. The apportionment procedure uses a simple financial return procedure. The procedure uses available data and the results are quite stable. Much regional variation was ignored and current data on financial analysis of timber management activities is scarce. This procedure estimates the relative scale of investment opportunities but is not reliable for estimating the amount of total investment justified.

A procedure is demonstrated that identifies and ranks geographic areas which offer the best potential for investment in forestry. This procedure, which uses parametric linear programming, would enable administrators of cost share programs to rank areas on the basis of economic potential while taking into account factors such as treatment costs and manpower limitations. This procedure is applicable to all types of forestry investments. Its use could result in an increased efficiency of the allocation of cost-share funds.


A full account of the parametric linear programming technique for ranking forestry investments is presented. The technique will work with multiple restraints and combines the advantages of simple ranking and linear programming as capital budgeting tools. The presentation of the model is complex, an understanding of advanced math is necessary.
Landowner Character and Behavior

The importance of forest landowner character and behavior cannot be underestimated in the evaluation of the effectiveness of public policy focused on nonindustrial private forests. The effectiveness of public policy in achieving its goals is dependent upon the landowner's positive response to the incentive provided by the program. Information concerning landowner behavior and characteristics can be of assistance in the development of public policies. A better understanding of landowner motivations allow public policy planners to design programs that appeal to the landowner's needs. Programs designed using landowners' objectives as a guide should have an increased chance of success.

Studies that have examined landowner characteristics and behavior and landowners' response to forestry assistance programs are presented in this section. The studies display a variety of techniques that can be used to measure landowner response to public policy programs. Studies that are strictly theoretical and those that have empirical evidence of landowner behavior are presented.

Research concerning forest owners' behavior can be essential in the analysis of forest policy. Some basic concepts and methodological problems of forest owner studies are discussed. The selection of the proper explanatory model for analyzing forest owners' behavior is reviewed. The explanatory model used is decisively dependent on the objectives of the study. If such studies are to be of service to forest policy planners they must aim at causal explanations, and should analyze the general determinants and manipulable factors of forest owners' behavior.


The diversity of programs available to stimulate a greater intensity of forest management on nonindustrial private lands is examined. The significance of the complexity of this group of landowners is noted. Potential alternatives that will increase forest management within different sectors of this diverse group are available. The conclusion is reached that the chances for failure of a public policy far outweigh the chance of success. The ability to learn from past mistakes is essential to ensure the increased efficiency of new forest policy.

An analytical approach is devised that may be used to determine landowner response to different assistance programs. The analysis of these responses can then be used to design programs that will more effectively stimulate landowner interest. The analytical approach uses a psychological testing technique (Q-sort) to classify owners into categories based on their motivations and ownership objectives. Interest in timber production and on the ground management were found to be correlated.


A microeconomic model incorporating both timber and nontimber objectives in predicting harvest behavior of nonindustrial private forest landowners is presented. The landowner's decision making process that is involved in timber harvests is analyzed. These decisions are of critical importance to ensuring the timber supply from this landowner class. The harvesting of timber was found to be profoundly affected by timber prices and tract size. Income is negatively related to the probability of harvest. Nontimber amenities should be considered as fully as timber supply in future policy decisions concerning this landowner class.

A study was conducted to provide information about nonindustrial private landowners who invest in their forest land. Investors tend to be professional people with better education and higher incomes than the average for the population. An investor usually owns more than 100 acres of land and has a strong attitude of stewardship. Many of the investors were repeat users of subsidies. Subsidy programs will be ineffective as an incentive for most landowners unless they pay the entire cost of treatment. In the absence of a 100 percent subsidy, technical assistance stressing low cost management should be provided for the majority of private forest owners.


An approach to examine and predict landowner response to proposed public incentive programs is developed. The methodology presented is suitable to analyze forest landowner behavior and relates their behavior to the expected response to incentive programs. Multiple factor centroid analysis was used with regression analysis to evaluate landowner response. The methodological procedures are described in much detail. This approach may be modified for conducting a study on a larger scale. The information collected can be useful in designing a more effective incentive program.

A study was conducted in East Texas to determine the interest of nonindustrial private landowners in different forestry assistance programs. The correlation of this interest to ownership characteristics was determined. The most popular programs were proposals for requiring performance bonds from loggers and for management assistance for multiple use. Well educated professionals with above average incomes, living in urban areas, were found to show the most interest in forestry programs. More imaginative design and appropriate distribution of assistance programs should increase the effects of these programs on the productivity of small woodlands. The targeting of the design to a particular group may be a more effective means of program delivery.


A multiple variate screening process, AID, to explain the decision making process of a particular group is discussed. This technique is used to explain the selling behavior of private woodland owners. This technique may be used to gather data that will result in the improvement of policy related inferences and in the promotion of better strategies for public policy program orientation.

A study of four public programs, which in some part were designed to stimulate forest management on privately owned forest land is discussed. The effectiveness of these programs in generating increased levels of forest management, in number of areas and participants, is determined. The goals of conservation and increased timber production could be furthered by redirecting the available funds through different programs. Affluent owners are more likely to become involved in public programs which encourage investment in forest management. As a means of income redistribution the programs reviewed were found to be inadequate. This goal could be better achieved by a direct payment method. Solving the problem of rural poverty would probably lead to higher levels of investment in forestry on small woodlands.


Predicting landowner response would allow policy makers to design programs that would efficiently achieve their goals. A survey was conducted on landowners in several New York counties to test the significance of differences which exist between participants in public forestry programs and nonparticipants. Only two characteristics, "acreage of forest land owned" and "assessed value of the owner's property," were found to be positively correlated to the response to public forestry programs.
If timber production at minimum cost is the objective of a public forestry program then the program should be aimed at assisting affluent landowners with large land holdings.


A theoretical model of the nonindustrial forest landowner’s economic situation and the effect of this on the intensity of forest management on these landholdings is presented. The analysis of the small woodland owner’s investment position shows that high alternative rates of return and short planning horizons limit the viability of investments in forestry. Depending on this particular group of landowners to close the projected gap between timber supply and demand is unrealistic. To efficiently achieve greater levels of timber production, national policy should be directed toward influencing investment on national forests and industry timberlands.

A study conducted in eastern Oklahoma that examined the potential for grouping nonindustrial private forest landowners by tract size is discussed. The individuals are divided into groups according to the similarity of timber management objectives. This type of classification was found to be an effective means for dividing landowners into separate management groups. Three groups were made divided as follows: 10 to 50 acres—little commercial timber management, 51-700 acres—significant commercial management with some size related problems, and over 700 acres—extensive commercial management. This classification scheme could have significant impact on forest policy. The groups most likely to respond to a particular assistance program could be singled out leading to more efficient program use. This classification method could be easily expanded to other areas of the country.
Equity of Public Subsidies

The question of equity is an important consideration in the discussion of public policy. Public policy planners should be able to delineate and support the redistribution consequences that will result from the enactment of a public subsidy program. The equity issue has not been given sufficient consideration with regard to private forestry subsidy programs. More research is needed to determine the actual distribution of benefits from these programs.

Papers discussing the equity issue are presented in this section. The first paper discusses the distribution of benefits from farm subsidies to the program participants. The next two papers describe the secondary benefits and costs from a proposed private forestry subsidy program and the model used to predict these results. The last paper discusses the magnitude of subsidies and the narrowness of benefit distribution using reclamation project subsidies as an example.

The distribution of benefits from farm subsidy programs by size of farm and income group is analyzed. The influence of subsidies on the net return to farmlands is also investigated. Included are discussions of transfer costs and national income costs of farm subsidy programs. A methodology for distributing benefits by economic class is described. It was found that federal subsidies are an inadequate method of redistributing income to a large number of low income farmers.


A theoretical model to measure the secondary benefits and costs of a forestry subsidy program is presented. Although these secondary impacts may be over emphasized they must be considered in the full appraisal of a public policy program. A quantitative assessment of secondary impacts of a proposed forestry subsidy program was made. This program was taken from the report, Outlook for Timber in the United States. The model uses a downward shifted supply curve to display the effects of an increase in timber output caused by a new program. The major secondary impacts are caused by changes in the forest products markets. The benefits of an increased supply are shown to be substantial. An 11 percent increase in softwood output would cause a 9 percent savings for consumers. Losses will also occur, these losses will accrue for the most part to producers
of wood substitutes. An increase in supply should lead to a slowdown in the rate of increase for stumpage prices causing stumpage producers to receive slightly lower returns. Other important public policy impacts are not measured such as changes in tax revenues or regional incomes. A complete analysis should include these changes.


A complete explanation of the model used in the above paper is given. The model estimates changes in timber product prices, consumption levels, consumer expenditures and national income that are the result of an intensified timber management program. Included is a discussion of the possible impacts on profits, employment and payrolls.


The magnitude and distribution of the water subsidy in Reclamation Irrigation Projects under the current administration and with proposed changes is described. It was found that the distribution of benefits under this program is very narrow. Most of the benefits are capitalized into the land value. A major consideration of program effectiveness is the equity of benefit distribution.
Program Evaluation: Theory and Models

The analysis of the effectiveness and efficiency of subsidy programs is essential to ensure the proper development of public policy. Program evaluation often leads to the institution of changes that increase program efficiency and effectiveness. Also programs that are shown to be ineffective can be eliminated.

Public policy programs usually have diverse effects on different sectors of the economy. The papers in this section concentrate on the development of models used for policy analysis. The models presented may not be entirely applicable to a particular research problem but are meant to act as a guide to research development.

Papers in this section range from broad discussions of policy analysis to a discussion of the maximization of subsidy benefits across communities. Included are a paper which reviews the regional impacts of subsidies and one which presents a simple formula for the derivation of forestry incentives.

An important issue in policy analysis is the choice of discount rate that will provide a fair representation. An article is included that discusses the proper discount rate to be used in evaluations of public policy.
The need for analysis of public policies, a framework for policy analysis and an econometric approach to empirical policy analysis are discussed. Schematic models are used to describe a stepwise approach to policy analysis. These models serve as a methodological framework for future examinations of the effects of public policies. The basic model displays a framework of policy analysis which establishes a goal-means-effect scheme. The concept of effectiveness must be properly understood in policy analysis. Policy outcomes must be proven to be dependent on the policy decision. It is necessary to evaluate policy goals and their effects at the same operational level. From the general model an empirical model is developed to use in the analysis of policy effectiveness. A discussion of forest policy models and their uses is included.

The applicability of some methodological approaches to empirical policy analysis in evaluating the effectiveness of public forest policy is explored. The analysis concentrates on the effects of forest policy measures directed to silvicultural investments in private forestry. Two separate methodologies are used. The first uses aggregated time series data to measure the macroeconomic effects. The second measures impacts at the woodlot level utilizing a behavioral science approach. This
approach attempts to provide a causal interpretation of the impacts. The methods described are used only for the analysis of structural relationships. The models are not used for prediction or policy simulation experiments.


The economic efficiency of timber management in the public and private sectors is discussed. The emphasis is placed on examining the effective allocation of resources on public lands. An economic efficiency model that projects timber supply is presented. The model should be applicable to any analysis of resource policy. The model exhibits the effects of timber management strategies on different economic variables such as employment levels. It can also be used to determine regional effects of a shifting timber supply. Proper analysis must be employed to minimize the effects of the model's limitations.


A practical method for deriving fair timber management incentive payments is presented. A demonstration of the use of this technique in an upland forest stand is discussed. The use of this technique requires a realistic estimate of costs and returns. Each case is analyzed
individually. The incentive payment is based on the difference between discounted costs and returns of intensive forest management and the "harvest and let grow" option.


An examination of the grants economy and its impact on America concentrating on the rural sector. A general model of the grants economy is presented. The income effects of grants: subsidies, taxes, etc., and the program objectives that often lead to the misallocation of benefits are discussed.


A model is developed that determines the impacts of different subsidy schemes on industries within separate regions. This model can be used for conducting research on new programs to assist economic development. The evaluation of particular subsidy programs to determine the success they have in meeting their goals is presented.

A model is described that attempts to determine the set of cost sharing properties which will maximize the difference between aggregate levels of costs and benefits across communities. The cost sharing proportions are allowed to vary among communities. However, the inflexibility of cost sharing in the presence of a federal funding constraint causes the federal costs of small changes in production to be high. Resources cannot be easily arranged at the margin through cost sharing.


In the evaluation of public forestry investments the analyst must recognize the entire continuum between the long term social/economic welfare and the more immediate realities and needs of society. The discount rate chosen is of critical importance in evaluating public forestry investments. The adoption of a multiple rate concept of discount rates for evaluating policies is proposed. The discount rate chosen should be influenced by the duration of the investment. The arguments presented to defend this theory are based on historic price data of farmland. This data is used to develop an equation which predicts the proper discount rate depending on the time period of investment. A continuum of discount rates over time result from solving the equation. A specific rate to be used in evaluations is not given. It is suggested that rates above 8 percent are good for 10-20 year investments and rates above 5 percent are reasonable up to 50 years.