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BY

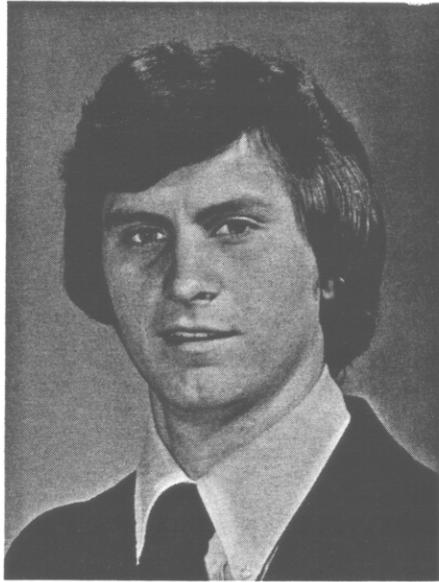
GARY E. MULLANEY AND VERNON L. ROBINSON



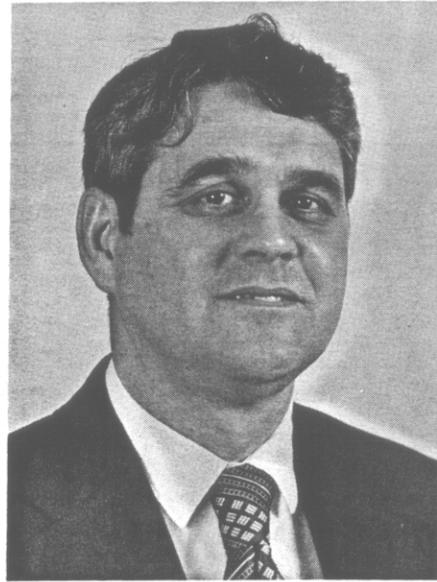
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This paper is based upon Mr. Mullaney's thesis submitted as partial fulfillment toward the Degree of Master of Forestry at Duke University.

# FOREST INVESTMENT BY NON-INDUSTRIAL, PRIVATE LANDOWNERS IN GEORGIA

BY

GARY E. MULLANEY AND VERNON L. ROBINSON

## ABSTRACT

In Georgia, nonindustrial private forest (NIPF) owners who invest in their woodlands differ significantly from those who do not. NIPF investors tend to be better educated, are more likely to be business or professional people, and are more likely to have incomes greater than \$25,000

a year. Most of them own more than 100 acres of forest land, the sample average being 1030 acres; and most have an attitude of stewardship toward this land. The repetitive use of subsidies by a large portion of the investors suggests that these individuals are responding to whatever

subsidy program is available. Their average subsidized rate of return was 13.7 percent with timber stand improvement being one of the best investments nonindustrial forest landowners can undertake.

## INTRODUCTION

In 1974 Georgia's wood-using industries processed 1.7 billion board feet of roundwood at lumber, veneer, plywood and treating plants and 6 million cords of pulpwood at pulpmills, making the State a leader in timber production (4). While these figures are impressive, projections of timber demand suggest that Georgia will be called upon to produce even greater volumes of timber in the future (12,14). Since nonindustrial private forest (NIPF) landowners control the bulk of the State's commercial forest, they are crucial in determining future timber supplies. It is generally conceded that productivity on these forest lands will have to be increased to meet the projected demand. Yet, it is well documented that

NIPF landowners do not find intensive forestry attractive (6).

McMahon (7) suggests that owners invest in forestry only when the expected rate of return for the forestry project is greater than the alternative rate of return. The majority of NIPF landowners have modest to low incomes, more pressing needs for capital such as repayment of loans or farm improvement, and short planning horizons--all factors which bring about high alternative rates of return. Forestry investments typically have low earning rates, entail some risk of capital loss, and are illiquid for long periods. This combination of high alternative rates and low earning rates is seen by McMahon as the economic cause of the predominant

ately low level of management on NIPF lands.

Nevertheless, there are many NIPF landowners who do practice intensive forestry, and very little is known about them because so few of them show up in the sample of most landowner surveys. The study described here was designed to provide information about NIPF owners who do invest in their woodlands. In this paper we: (1) describe the NIPF investors and some of their motivation; (2) report implicit rates of return on their investments based upon actual costs and price expectations; and (3) statistically test for a relationship between the alternative rate of return and certain characteristics of the investors.

## PROCEDURE

Since we were interested only in active investors, we contacted landowners who had been assisted by the Georgia Forestry Commission in the accomplishment of site preparation, reforestation, or timber stand improvement (TSI). Their names and addresses as well as information on the work accomplished were obtained by randomly sampling the files of Cooperative Forest Management (CFM) foresters in the Camilla, Milledgeville, and Washington districts for the period October 1976 to September 1977. The Milledgeville and Washington districts extend into the lower Piedmont, while Camilla represents the Coastal Plain of South Georgia. All three districts had relatively high levels of CFM activity, making it possible to contact a large number of investors in a small area.

A total of 104 names were drawn of which 27 were absentee owners and 12 others could not be found. The remaining 65 owners were located and interviewed. The interviews began with a discussion of the particular project undertaken by the investor. This approach served to focus attention on the investment and made later philosophical or personal questions easier to respond to. The interviews were conducted in June and July 1978.

Species, site index, and other technical information on the treatments were obtained from the CFM foresters' records. After excluding cases involving prescribed burning and those lacking cost data, 50 cases were evaluated. Of these, 43 were concerned with plantation establishment and seven with TSI. An implicit rate of return was calculated for each case using the costs incurred by the owner, his expectations of future prices for pulpwood and sawtimber, and his awareness of any increase in ad valorem taxes which might occur due to the investment in reforestation or TSI.

The investments were evaluated on an incremental basis. That is, only the changes in cash flow attributable to the investment were considered. The computation required predictions of yields, prices, taxes, and other costs with and without the improved treatment. The rate of return was calculated on the difference between the two cash flows. All costs and returns that were unaffected by the investment, including the cost of land, were ignored.

Yields for plantations on old fields were taken from Coile and Schumacher (5). It was assumed that if old fields were

left untreated they would seed naturally to pine in 5 years, and probable yields for these natural stands were taken from Schumacher and Coile (10). It was assumed that untreated, cutover pine lands would revert to hardwoods (3). Therefore, Schnur's (9) volume tables for even-aged upland oak forests were used to represent this condition. Effects of TSI on yields were taken from Mills and Cain (8).

The timber prices used in the rate return analysis were based on the current local prices and each landowner's expectations of price changes. The assumption here was that the owner had some price expectation in mind when he made the decision to undertake the investment. Two-thirds of the respondents indicated a general feeling about trends for pine pulpwood and sawtimber. Estimates of real annual price changes ranged from -5 to +2 percent for pine pulpwood and -3 to +3 percent for pine sawtimber. For owners who did not project changes in stumpage prices, the values used were the current local prices and no real price change for pulpwood and a 3 percent real price increase for sawtimber.

The total treatment cost was obtained from the landowner during the interview. Most, but not all, of these individuals had participated in either the Forestry Incentives Program (FIP) or the Agricultural Conservation Program (ACP). The amount of subsidy received was obtained from the CFM foresters' records and was subtracted from the total treatment costs to obtain the net investment by the landowner.

Since taxation can affect the profitability of forestry ventures, the analysis was done on an after-tax basis. The income tax on the subsidy was computed at a rate of 10 percent for landowners who had indicated that their annual income was less than \$25,000 and 20 percent for those with higher incomes. In cases where the landowner was aware that ad valorem taxes would increase along with timber growth, this increase was included as a cost in the rate of return analysis. Under the assumption that all of the landowners would take advantage of the capital gains treatment of timber, the taxes on revenues from the sale of stumpage were calculated at one-half the ordinary rates used for the income tax on the subsidy.

All 65 participants in this study received assistance from CFM foresters. Although forestry investments are made without assistance, the sample is believed to be representative of all NIPF landowners who undertake similar projects in middle and south Georgia.<sup>1</sup>

In some cases, participants in this

study can be compared with a 1972 sample of all forest landowners in the Coastal Plain of Georgia (6). Holemo and Brown used a two-stage area sampling method to describe the population of all NIPF owners in the region, of which the population studied here is a subset.

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<sup>1</sup> The characteristics described below conform with a sample of landowners who participated in the landowner assistance program in Mississippi (13).

## CHARACTERISTICS OF THE INVESTOR

The characteristics of the participants are presented in three sections, corresponding to McMahon's three important attributes of an investor: economic situation, goals, and knowledge of opportunities.

## ECONOMIC SITUATION

In this study net income, occupation, education level, and size of holdings were considered descriptors of the owner's situation. The net income of the study participants is shown in Table 1. More than half the investors reported incomes greater than \$25,000 and nearly 77 percent of them had incomes greater than \$10,000. The 1972 survey of all NIPF landowners showed only 42.8 percent of them had incomes greater than \$10,000. While these two incomes distributions are not strictly comparable due to the effects of inflation over the 5-year interval and the 1977 drought which resulted in losses for many farmers, it would appear that forest investors can be described as a class predominated by persons with relatively high incomes.

Since occupation strongly influences income, it is another indicator of an individual's economic situation. Business and professional people, who often have high incomes, make up about 51 percent of the forestry investors even though they comprise only 20 percent of all NIPF landowners, (Table 2). Farmers, on the other hand, are poorly represented among those who practice intensive forestry. A high demand for capital for their farming enterprise may be as much a rea-

son for their lack of interest as insufficient income.

As might be expected from the preponderance of business and professional people among forestry investors, this class of NIPF owners is highly educated (Table 3). Sixty-seven percent of them had formal training beyond the high school level.

Finally, the extent of an individual's landholdings is often an indicator of his economic situation. The size distribution of forest landholdings is shown in Table 4. Seventy-eight percent of the active investors owned more than 100 acres, even though such persons comprise only 47 percent of all NIPF landowners in the Georgia Coastal Plain. The mean size of the forest landholdings in the 1977 sample was 1,030 acres, while their total landholdings averaged 1,490 acres.

## GOALS

An individual's personal and financial goals are not easily determined. Age was included among the questions asked because of its possible effect on time preference and planning horizon. In addition, respondents were asked to state reasons for their investment activities and management objectives.

Owners over 60 comprise 39 percent of all NIPF landowners; but, only 24 percent of the investors, while those between 40-60 years of age make up 46 percent of population of owners and 61 percent of the investors, (Table 5). This increased tendency to practice forestry among the 40-60 age group may be due as much to their better economic situation, when compared to those over 60, as to any effects of planning horizon. Considering the age distribution, most of the study participants will not be alive when the revenue is realized from their investment.

By far the most often stated reason for making the forestry investment was a concern to keep the particular parcel of land productive (Table 6). This response seemed to contain two elements: (1) the owners felt that it was good for society for all land areas to be as productive as possible, and (2) they felt the need to keep all of their personal assets productive because they could not afford to maintain or pay taxes on idle land. The next most often stated reason was that the area wasn't fit for farming, implying that forestry was the next best use of the land. The desire to assure a future income for retirement or estate purposes was not often mentioned as a reason for

Table 1.--Incomes of NIPF investors in 1977 and NIPF landowners in 1972, Georgia

Income Class	1977 Survey		1972 Survey
	Number	Percent	Percent
\$ 0- 5,000	8	15.4	18.5
\$ 5,000-10,000	4	7.7	38.7
\$10,000-25,000	13	25.0	
More than \$25,000	27	51.9	42.8
Total	52	100.0	100.0

Table 2.--Occupation of NIPF investors in 1977 and NIPF landowners in 1972, Georgia

Occupation	1977 Survey		1972 Survey
	Number	Percent	Percent
Business	21	32.3	16.7
Professional	12	18.5	3.0
Farmer	11	16.9	41.7
Retired	10	15.4	19.7
Other	11	16.9	18.9
Total	65	100.0	100.0

Table 3.--Level of education of NIPF investors, Georgia, 1977

Highest Level	Number	Percent
Grade School	2	3.3
High School	18	29.5
College	32	52.4
Graduate or professional	9	14.8
Total	61	100.0

Table 4.--Size distribution of forest landholdings of NIPF investors in 1977 and NIPF landowners in 1972, Georgia

Size class forested acres	1977 Survey		1972 Survey
	Number	Percent	Percent
1 - 100	13	21.7	52.9
101 - 500	28	46.7	32.9
501 - 1,000	6	10.0	
More than 1,000	13	21.6	14.2
Total	60	100.0	100.0

Table 5.--Age of NIPF investors in 1977 and NIPF landowners in 1972, Georgia

Age class	1977 Survey		1972 Survey
	Number	Percent	Percent
Less than 40	9	14.5	14.1
41 - 50	16	25.8	22.2
51 - 60	22	35.5	24.5
61 - 70	10	16.1	20.7
More than 70	5	8.1	18.5
Total	62	100.0	100.0

having made the forestry investment. In contrast, Hølemo and Brown found that income production, financial security, or estate planning accounted for 92 percent of the primary reasons given by NIPF landowners for owning forest land!

It might be argued that "keeping the land productive" was what the owners did and not their reason for having done so. The second response may be identical to the first in that it reflects a similar desire to keep land productive. Thus, the utility of the results in Table 6 is very limited. In any event, an attitude of forest land stewardship seemed to prevail among the investors.

## KNOWLEDGE OF OPPORTUNITIES

An increased awareness of opportunities in forestry may have been a factor influencing many of the decisions to intensify management. Twenty-three percent of the respondents were occupationally related to forestry, including loggers, lumber producers, pulpwood dealers, consulting foresters and others—a factor which would increase knowledge of opportunities.

Two-thirds of the respondents had made some similar previous investment, (Table 7). This fact seems to support the allegation that current subsidy programs do not attract new investment in forestry, but only subsidize those who regularly practice intensive forestry and would have done so without assistance (11,15). However, only one-third of those who had made some previous investment had done so without previous subsidies. Perhaps the existence of the subsidy programs had attracted these respondents, as well as those who had no previous investment experience, to make the current investment. In addition, the repetitive use of subsidies by a large portion of the investors suggests that these individuals are responding to whatever subsidy program is available.

## RATES OF RETURN

The rates of return calculated for each investment ranged from zero percent to 30 percent, with an average of 13.7 percent, (Table 8). These rates are based upon only the owner's share of the cost. In 1977, the cost share basis was set at 75 percent of the statewide average costs

Table 6.--Reasons for forestry investments by NIPF investors, Georgia, 1977

Reason	Number	Percent
To keep area productive	35	48.6
Land not suited for farming	11	15.3
Unable to continue farming	6	8.3
To provide income to pay taxes	5	6.9
Subsidy was available	4	5.6
Future income	3	4.2
Other reasons	8	11.1
Total	72 <sup>1/</sup>	100.0

<sup>1/</sup> Eight respondents gave two reasons and one gave no reason.

Table 7.--Previous forest investment by NIPF investors, Georgia, 1977

Type of investment	Number	Percent
Some previous investment	44	68.7
With subsidy only	15	23.4
Without subsidy only	14	21.9
With & without subsidy	15	23.4
No previous investment	20	31.3
Total	64	100.0

for the various forestry practices. Thus, on the average, the owner's share of the cost represents only 25 percent of the total project cost. This clearly suggests that many of the forestry investments analyzed were marginal in light of their total cost and probably explains the repetitive use of subsidies in accomplishing forestry projects.

With this caution in mind, timber stand improvement appears to be one of the best investments NIPF landowners can undertake, (Table 8). This result is supported by other research which shows that precommercial thinning and control of small hardwoods can triple pine production above levels with no treatment and increase financial returns four to six times (1,2). The establishment of plantations on old fields offers the next best investment alternative with an average rate

of return of 14.7 percent, while reforestation on cutover land is only slightly less attractive.

## RATE OF RETURN VERSUS OWNER CHARACTERISTICS

Each year some of the landowners who apply for participation in an assistance program, after becoming fully aware of the costs to them, never complete the project. This suggests that these landowners decided that their time and money would be better spent in some activity other than the proposed forestry project. On the other hand, economic theory suggests that landowners who voluntarily undertake forestry projects must

Table 8.--Type of forestry investment and rate of return in 1977, Georgia

Investment type	Number	Rate of return	
		Range	Average
Plantations	43	0 to 25	12.7
Old fields	18	5 to 24	14.7
Cutover lands	20	5 to 22	11.6
Low sites	5	0 to 25	10.0
Timber stand improvement	7	6 to 30	19.8
Total	50	0 to 30	13.7

expect the rate earned on their investment to exceed the rate available to them in some other alternative, taking into account differences in risk and other subjective factors. Since all the participants in this study voluntarily undertook such investments, their subsidized rate of return from the investment presumably met or exceeded their alternative rate of return (ARR) at that time. In light of this, it is possible to assign the calculated rate of return as the investor's ARR.

The final objective of this study was to determine whether a predictable relationship exists between the ARR and any of the NIPF investor characteristics. To do this, a simple linear regression model was computed and an f-test was used to determine if a significant relationship exists between income, age, occupation, education, or acres owned with ARR. Only income was significantly related to ARR. It is the excess of income over expenditures from year to year, with the resulting accumulation of liquid capital assets, which makes a person a likely participant in programs of forest management intensi-

fication, not the size of the holdings. Income and ARR are negatively correlated; that is, the higher an individual's income, the lower the alternative rate. This result, which is consistent with economic theory, demonstrates that while higher income persons will undertake forestry investments that are likely to earn reasonably good returns, individuals with low incomes will only intensify forest management if the returns are substantially higher.

## CONCLUSIONS

Income appears to be the key factor in determining an individual's alternative rate of return and thus the likelihood of investing in forestry. Because of the nature of their alternative uses for capital, business and professional persons are more likely to be willing and able to invest in forestry than other NIPF landowners. On the assumption that many forest landowners lack knowledge of forestry investment opportunities, an educa-

tional program directed particularly at these higher income business and professional people might stimulate investment. Such a program should probably stress timber stand improvement as it meets the NIPF owner's demands for low-cost, short-term, and high return investments (1).

Lower income landowners and farmers, who comprise 81 percent of the NIPF owners and hold 71 percent of the forest land, require higher rates of return to attract their limited capital into forest management. Subsidy programs are not likely to bring a response from most of this group unless they are essentially free to the landowner. Experience with the Soil Bank program bears this out. In the absence of a "free" program, good arguments can be made for providing technical assistance at the time of harvest to insure natural regeneration rather than to make available the money necessary for expensive artificial reforestation practices. Timber stand improvement will probably be needed in these naturally regenerated stands after establishment.

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