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# Factors Affecting Mississippi's NIPF Landowners' Reforestation Decisions - *Kathryn G. Arano, John E. Gunter, Stephen H. Bullard, Larry Doolittle, Ian A. Munn*

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## Introduction

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Non-industrial private forest (NIPF) landowners have played an increasingly important role in the nation's timber economy. Nearly 70% of the forestland in the South is owned by NIPF landowners (Powell et al., 1994). In Mississippi alone, these landowners control approximately 66% of the state's forestland base (Hartsell and London, 1995). Therefore, NIPF landowners are expected to provide a large portion of the state's supply of timber. However, whether they do so depends largely on how their timberlands are managed. Forest management decisions of NIPF landowners can impact future timber supply due to the magnitude of their collective ownership.

In the South, most forestry investment opportunities involve regenerating harvested timberlands with pine. Consequently, pine regeneration on private timberlands is an important factor affecting future timber supplies. While industrial owners have been active in regenerating their timberlands with pines, NIPF landowners have not always done so (Adams and Haynes, 1991). Softwood growth in most of the large softwood producing states in the South has been less than softwood removals (Powell et al., 1994). This is an indication that landowners have not always provided for pine regeneration after harvest. This shortfall in regeneration efforts is occurring despite the presence of a variety of government programs designed to assist NIPF landowners. A major concern, therefore, among the forestry community and policy makers is why some landowners regenerate after harvest while others don't. Identifying the specific reasons for regenerating and not regenerating is important in developing policies and programs that address the most important reforestation issues faced by NIPF landowners.

A number of studies have looked into the reforestation behavior of NIPF landowners (see Doolittle and Straka, 1987; Royer, 1987; Royer and Kaiser, 1983; Hyberg and Holthausen, 1989), but very few have examined the specific reasons why some landowners regenerate and others don't. This study explores the different reasons for landowners' reforestation decisions as well as the degree of importance of these reasons. Moreover, this study also looks into the different factors affecting

landowners' reforestation decisions (e.g. socio-demographic characteristics) and identifies which types or groups of landowners are more likely to regenerate.

## Methods and Procedures

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A telephone survey of NIPF landowners in Mississippi was conducted from March 15 to May 30, 2000, to determine landowner characteristics and the reasons behind their reforestation decisions. Dilman's (1978) total design method for survey procedures was followed. The sampling frame consisted of all Mississippi landowners not living in "Delta counties" who owned at least 8 ha of uncultivated land, and who harvested timber between January 1, 1994 and December 31, 1998. The 8 ha threshold eliminates many non-forestry uses (e.g. home sites). Furthermore, NIPF landowners who own less than 8 ha account for only 8.5 percent of the state's uncultivated acreage (Doolittle, 1996).

From 62 counties with landowner records, a simple random sample of about 22 percent was drawn. Names and addresses were matched with telephone records to get telephone numbers. This resulted in about a 50 percent match or just fewer than 11,000 telephone numbers. From these telephone numbers, 7,392 respondents were contacted. Of the respondents contacted, 340 refused to be interviewed, 6,223 were screened but did not qualify for the interview, and 829 completed the interview (427 of these had reforested and 402 had not). This final sample size achieved the targeted five percent sampling error at the 95 percent confidence level. An interview schedule was constructed and used in collecting necessary information from the landowners during the telephone interview.

Survey results were summarized and analyzed using the Statistical Package for the Social Sciences (SPSS, Inc., 1999) and the Statistical Analysis System (SAS Institute, 1996). Specifically, relative frequencies were calculated to summarize the survey results. Moreover, chi-square tests were done to evaluate relationships between landowner characteristics and the decision to regenerate following harvest.

## Results

### Ownership Size

Size of ownership has long been considered an important factor in the forest management decisions of private landowners. Landowners in our study owned tracts of land ranging from 8 ha to more than 2,024 ha. Statistical analysis showed that ownership size was significantly related to landowners' reforestation decisions. Results indicate that landowners who own larger tracts of land were more likely to regenerate while those in the smaller ownership categories were more likely to be non-regenerators (Figure 1). Specifically, about 66.7% of the landowners who owned 8-20 ha did not regenerate nor did the 59.3% of the landowners who owned 21-40 ha. For larger ownerships, the majority of the landowners regenerated their timberlands with pine. For landowners who owned 41-100 ha, 101-202 ha, 203-404 ha, 405-2,023 ha and more than 2,024 ha, the percentage who regenerated was 57.6%, 66.0%, 68.6%, 76.7% and 80.8%, respectively. Thus, as ownership acreage increases, the percentage of regenerators also increases. (See all figures at end of paper.)

### Demographic Characteristics

Information about landowners' demographic characteristics was also obtained to determine which of these characteristics are significantly related to landowners' reforestation decisions, as well as to identify landowner groups that are more likely to regenerate. The demographic characteristics examined in the study included: race, age, gender, and place of residence, education, occupation and income. Except for age, all of these variables have a statistically significant relationship with the decision to regenerate.

A slightly larger percentage (54.2%) of the whites were regenerators (Figure 2). On the other hand, a great majority (87.0%) of the blacks did not regenerate. Males were more likely to regenerate as compared to females (Figure 3). About 53.6% of the males were regenerators. In contrast, a larger percentage (55.2%) of the female gender were non-regenerators. Landowners who live in larger cities or towns were also more likely to regenerate than those who live in rural areas (Figure 4). For instance, most of the landowners who lived in farm/rural areas were non-regenerators (52.3%); while for those who lived in cities with population greater than 10,000, most were regenerators (64.6%).

Landowners who attained higher education were more likely to regenerate than landowners with lower educational attainment (Figure 5). Most of the landowners with only elementary/middle (66.7%) or

high school (62.4%) education were non-regenerators. On the other hand, a larger percentage (60.4%) of the landowners with college or advanced degrees were regenerators. Most of the landowners who were professionals/businesspeople (57.1%), government workers (67.9%), self-employed (53.8%) and retired (52.4%) were regenerators (Figure 6). More affluent landowners were also more likely to regenerate (Figure 7). About 59.5% of the landowners who earned more than \$50,000 annually regenerated their harvested timberlands with pine. In direct contrast, 56.2% of those who earned less than \$50,000 did not regenerate.

### Government Incentive and Educational Programs

Government incentive programs are important policy instruments used to encourage landowners to participate in forest management activities. Landowners in Mississippi were asked whether they were aware of the existence of different incentive programs designed to encourage reforestation. Landowners' awareness of the Conservation Reserve Program, Forestry Incentive Program and the Mississippi Forest Resource Development Program was significantly related to their reforestation decisions. In general, landowners who were aware of the programs were more likely to regenerate (Figures 8-9). About 59.6% of the landowners who were aware of the Conservation Reserve Program were regenerators, while for those who were not aware; a larger percentage did not regenerate (56.4%). Similarly, a larger percentage of the landowners who were aware of the Forestry Incentive Program were regenerators (68.1%), while for those who were not aware of the program, a larger proportion were non-regenerators (58.5%). The majority of the landowners who were aware of the Mississippi Forest Resource Development Program were also regenerators (71.4%). In contrast, most of the landowners who were not aware of the program were non-regenerators (Figure 10).

Landowners were also asked whether they had attended any educational programs designed specifically for NIPF landowners. Attendance in educational programs had a statistically significant relationship with landowners' reforestation decisions. The majority (76.1%) of the landowners who had attended these educational programs were regenerators; whereas for those who had not attended any of these educational programs, the majority (56.4%) were non-regenerators (Figure 11).

### Reasons for Landowners' Reforestation Decisions

Landowners who regenerated were presented with a list of possible reasons for regenerating and were asked to rank these reasons by level of importance

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(Table 1). In general, regenerators considered most of the different reasons presented to them as highly important for their regeneration decision. This includes both ecological and economic benefits of timber production. For instance, the three reasons that ranked the highest in terms of level of importance were: (1) the desire to keep the land in timber production; (2) the desire to be good stewards of the natural environment; and (3) an economic decision in anticipation of future profits from forest production. On the other hand, the availability of cost-sharing funds from public agencies did not have a large bearing on the decision of landowners to regenerate. Most of the regenerators considered the availability of cost shares to be of low importance or no importance relative to the other reasons.

Non-regenerators were also presented with a list of possible reasons for not regenerating and were also asked about the importance of each reason (Table 2). The majority of the non-regenerators considered each reason presented to them to be of low importance or no importance. Only a small percentage of the landowners considered these reasons to be of high or moderate importance in their decision not to regenerate. However, the belief that the land would reforest itself to pine naturally, the high cost of reforestation, and the lack of information on reforestation options were considered to be more important relative to the other reasons. On the other hand, the preference for growing hardwood on the tract and the belief that reforestation investment is too risky ranked the least in terms of level of importance.

## **Implications/Conclusions**

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Reforestation activities of NIPF landowners in the South continue to be a major concern of the forestry community and policy makers, especially with evidence of declining softwood inventories. It is particularly worrisome whether the South can continue to provide for softwood harvests to meet future softwood demands. Studying landowner characteristics and behavior is important in understanding which factors are most useful in predicting forest management activity or the lack thereof. This research study examined landowner characteristics and how they were related to landowner reforestation decisions. It provided information about the types or groups of landowners that are more likely to conduct reforestation activities.

Results indicate that demographic characteristics of landowners can be useful in predicting their management activities. Landowners who are more likely to regenerate are those who have larger

ownerships, higher income levels and higher educational attainment. These landowners also tend to live in larger cities. Moreover, white males landowners are also more likely to regenerate. Policy instruments should focus on landowners who do not belong in these demographic categories, since they are the ones who are more likely to be inactive in pine regeneration.

There is also evidence that landowners who are aware of existing government incentive programs are more likely to participate in pine regeneration. Moreover, landowners who participate in educational programs are also more likely to be active in planting harvested timberlands. These findings highlight the role of incentive and educational programs in encouraging landowners to be active in forest management. Therefore, landowners should be made aware of the existence of incentive/assistance programs available. They should also be encouraged to attend educational programs so that they will be well informed about the different reforestation options available to them. Landowners in Mississippi consider both economic and ecological considerations highly important in their decision to regenerate pine following harvest. The desire to keep the land in timber production, the desire to be good stewards of the natural environment, and an economic decision in anticipation of future profits from forest production were considered to be the three most important reasons for regenerating. Although the majority of the landowners considered all of the reasons for not regenerating to be of low or no importance, the belief that the land would reforest itself to pine naturally, the high cost of reforestation, and the lack of information on reforestation options ranked the highest in importance. These findings are similar to the findings of previous studies (see Royer and Kaiser, 1983 and Palmer et al., 1985) on NIPF landowners in the South. This implies that landowners still face the same problems they did more than a decade ago. While efforts have been made to address these problems, our findings indicate that there is a need to re-evaluate existing policies to determine if new, expanded, or re-directed programs are needed to encourage landowners to regenerate following harvest.