

12-1-1967

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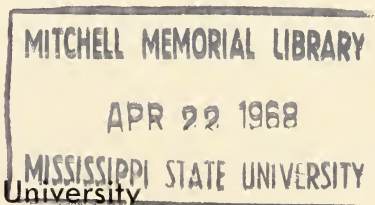
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Factors Related to Use of Recommended Forestry Practices In Five Mississippi Counties

By

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FACTORS RELATED TO USE OF RECOMMENDED FORESTRY PRACTICES IN FIVE MISSISSIPPI COUNTIES

By CARLTON R. SOLLIE

Introduction

The United States Forest Service reported in 1958 that more than 52 percent of the commercial forest land in the South was in small holdings of less than 500 acres.¹ In Mississippi about 75 percent of the forest acres are owned by farmers and other private owners. Statewide wood-using industries own about 15 percent, and the remaining 10 percent is publicly owned.

The importance of Mississippi forests to the economy of the state is to be seen in the fact that of the more than \$286 million in capital investments for new and expanded plants announced for the state in 1965, about 75 percent was by wood-using industries.² It was reported in 1962 by the Mississippi Forestry Commission that "forest products are responsible for 25 percent of the state's dollar movement, 34 percent of the state's payroll, and 40,000 industrial jobs."

The importance of forestry and the distribution of forest tract ownership are two very significant factors in the economic growth of the state. Results of a survey conducted 20 years ago pointed up the fact that even to sustain current timber production and income would require much better timber management than was being practiced.³ Forests owned and managed by wood-using industries and those in public ownership produce twice as many board feet per acre as forests in private holdings.⁴ Experiments by the U.S. Forest Service have shown that small forest tract owners can increase their income

significantly, even in a 10-year period, by following certain recommended practices in relation to their woodland. However, the prospect of additional income apparently has not been sufficient inducement to those owners, if the rate at which they have adopted certain recommended practices is an indication of their interest in forestry as an income producing enterprise.

Professional foresters, economists, and other agricultural leaders have expressed concern about the apparent lack of motivation to adopt improvement practices, and many feel that this is the most serious problems in forestry in Mississippi. In recent years the adoption of recommended forestry practices has been the focus of research in many states in attempts to understand the apparent lack of motivation and to discover ways to promote the use of recommended practices. Studies by sociologists have focused primarily on two facets of the problem, characteristics of adopters of recommended practices and the process of adoption.⁵

Problem and Method

The specific problem dealt with in this study was an attempt to identify social and cultural factors associated with the use of recommended forestry practices by a random sample of rural residents in five Mississippi counties. As pointed out by Lionberger, "whether a farmer will try a new practice quickly or at all is dependent upon many things."⁶ Many studies have shown,

¹U. S. Forest Service, **Timber Resources for America's Future**. U. S. Department of Agriculture Forest Resource Report 14, 1958.

²Mississippi Department of Agriculture and Commerce, "Mississippi Resources, 1966."

³James, Lee M., William P. Hoffman and Monty A. Payne, **Private Forest Landownership and Management in Central Mississippi**. Mississippi Agricultural Experiment Station Technical Bulletin 33, April 1951.

⁴Carlton R. Sollie, **Adoption of Recommended Forestry Practices in Three Mississippi Counties**. Mississippi Agricultural Experiment Station Bulletin 713, July 1965.

⁵For general treatments of the adoption process, see Everett M. Rogers, **Diffusion of Innovations** (New York: The Free Press, 1962), and Herbert F. Lionberger, **Adoption of New Ideas and Practices** (Ames, Iowa: The Iowa State University Press, 1960.)

⁶Herbert F. Lionberger, "Individual Adoption Behavior," **Journal of Cooperative Extension**, 1, No. 3 (Fall 1963) p. 162.

with few exceptions, that certain status factors were associated with the adoption of farm practices.⁷

On the basis of research findings, it is safe to state as a basic assumption that adoption behavior is one facet of a configuration of behavioral patterns. The purpose of this study, therefore, is to examine differential adoption of recommended forestry practices in light of selected social and cultural factors.

Data for this study were obtained by interviews in five Mississippi counties. Selection of the counties was based on certain factors which indicated that a study of forestry in the counties would provide significant information. Three counties in north Mississippi were selected because they were located in the Yazoo-Little Tallahatchie Watershed, one of the largest land reclamation projects in the South. Two counties in south Mississippi were selected because they were characterized by a high "burn rate," i.e., many forest fires.⁸

Selection of respondents was by use of a random sample technique which yielded 427 respondents in the three-county area and 259 in the two-county area for a total of 686. All respondents were interviewed by field workers using a standardized survey schedule, and this study is based on data obtained by use of the schedule.

The dependent variable, the focus of the study, was the vote of adoption of recommended forestry practices. This variable was defined operationally as the number of practices adopted from a list of nine specific forestry practices identified by professional foresters as being relevant to the two areas. A typology consisting of three classes was

used for purposes of analysis; the classes were non-adopters (no practices adopted), low adopters (1 or 2 practices adopted), and high adopters (3 or more practices adopted). Low and High Adopter classes were established by use of the arithmetic mean, i.e., the average number of practices adopted which was 2.3 for the sample.⁹

The rate of adoption of recommended forestry practices was examined in light of 11 independent variables, four of which were attitudinal or opinion items. Operational definitions of these 11 variables are provided in the following analysis section. Tests of significance between the dependent and independent variables were conducted by use of the chi-square statistic, and the .05 level of confidence was selected as the basis for accepting or rejecting hypotheses.

Analysis

The first hypothesis tested was that there is a significant relationship between race and the rate of adoption of recommended forestry practices. It was reasoned that race was a significant differentiating feature of the sample, and that whites would have a higher rate of adoption than non-whites.

The sample contained 577 white and 109 non-white respondents, and Table 1 shows the relationship between race and rate of adoption. The test of association showed that no significant difference existed between whites and non-whites in terms of their use of recommended forestry practices.

Although the whites showed a slightly higher tendency to use the recommended practices, the difference could not be attributed to the factor of race.

⁷See, for example, Lee Coleman, "Differential Contact with Extension Work in a New York Rural Community," *Rural Sociology*, XVI, (September 1951); Neal Gross, "The Differential Characteristics of Accepters and Non-Accepters of an Approved Technological Practice," *Rural Sociology*, XIV (June 1949); C. R. Hoffer, *Acceptance of Approved Farming Practices Among Farmers of Dutch Descent*, Michigan Agricultural Experiment Station Bulletin 316, 1942.

⁸Field work for the three-county area was conducted during the summer of 1963 and for the two-county area in the summer of 1965. Agencies responsible for collection, tabulation and analysis of data were the Division of Sociology and Rural Life and the Social Science Research Center at Mississippi State University, the Federal Forest Service and the State Forest Service.

⁹The nine practices were: Planted trees to grow timber, made a road through timber, following a plan and schedule for growing timber, removed cull trees, had timber measured before making a sale, sold timber on a written contract, selected or marked trees to be cut, received bids on timber before selling, and constructed fire lanes.

For both whites and non-whites, as shown in Table 1, more than 50 percent had adopted or used at least one of the practices, and less than 20 percent had adopted or used three or more practices.

Age was considered to be relevant to the study in light of findings of other studies. Bailey and Bryant, for example, found that high levels of fertilizer use were associated with younger age among farmers.¹⁰ Rogers reports that "general evidence seems to indicate that innovators (early adopters) are younger than" those who adopt a practice relatively late.¹¹

For this study, respondents were grouped into four age categories as shown in Table 2.

Examination of this table shows that distribution of adopter types within each age group is very similar to the total sample. For example, the percentage of High Adopters in each age group varies less than two percentage points from the percentage of High Adopters in the total sample.

The null hypothesis of no relationship between age and rate of adoption was therefore accepted, and the conclusion was drawn that age had no effect on the adoption or use of recommended forestry practices.¹²

The third independent variable considered was education. As with age, other studies have shown that education is associated with adoption behavior; as education increases, the tendency to adopt and/or use new practices also increases.

For purposes of analysis, respondents in this study were grouped into three logical categories of education as shown in Table 3.

A statistical test of the relationship between the two variables showed that education did affect the use of recommended forestry practices. Inspection of Table 3 reveals the nature of the relationship, that the use of such practices increases as education increases. It will be noted that 30 percent of the respondents in the upper educational level were High Adopters and that only 16 percent of those in the lower educational level were High Adopters. Non-Adopters showed a tendency to decrease as education increased, increasing the validity of the conclusion that education affects the use of recommended forestry practices.

It was felt that occupation would affect the use of recommended practices, and in order to test the hypothesized relationship respondents were classified

Table 1. Rate of Adoption of Recommended Forestry Practices by Race.

| Rate of Adoption | Race | | | | | |
|--------------------|-------|------|-----------|------|--------|-------|
| | White | | Non-White | | Totals | |
| | No. | % | No. | % | No. | % |
| Non-Adopter | 253 | 43.8 | 53 | 48.6 | 306 | 44.6 |
| Low Adopter | 212 | 36.7 | 42 | 38.5 | 254 | 37.0 |
| High Adopter | 112 | 19.4 | 14 | 12.8 | 126 | 18.4 |
| Totals | 577 | 99.9 | 109 | 99.9 | 686 | 100.0 |

Table 2. Rate of Adoption of Recommended Forestry Practices by Age of Respondents.

| Rate of Adoption | Age | | | | | | | | | |
|---------------------|----------|-------|---------|-------|---------|-------|-----------|-------|--------|-------|
| | Under 39 | | 40 - 49 | | 50 - 54 | | 55 and Up | | Totals | |
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Non Adopters | 68 | 47.6 | 56 | 39.2 | 68 | 45.9 | 114 | 45.2 | 306 | 44.6 |
| Low Adopters | 48 | 33.5 | 58 | 40.6 | 52 | 35.1 | 96 | 38.1 | 254 | 37.0 |
| High Adopters | 27 | 18.9 | 29 | 20.2 | 28 | 19.0 | 42 | 16.7 | 126 | 18.4 |
| Totals | 143 | 100.0 | 143 | 100.0 | 148 | 100.0 | 252 | 100.0 | 686 | 100.0 |

¹⁰Wilfred C. Bailey and Ellen M. Bryant, "The Use of Fertilizer by Farmers in Alcorn County, Mississippi," Progress Report in Sociology and Rural Life No. 26. Mississippi Agricultural Experiment Station, August 1962.

¹¹Rogers, *op. cit.*, p. 174.

¹²Since this finding was contrary to the pattern established by other studies, an additional test was conducted with a more refined breakdown of the independent variable. Again, however, the test indicated that no relationship existed.

occupationally as Farm Only, Farm and Non-Farm, and Non-Farm Only. It was found that respondents who were classified occupationally as Non-Farm Only represented approximately one-third of those who had adopted or used any of the specified practices.

Table 4 shows the distribution of cases according to occupational classification and rate of adoption. The statistical test indicated that a significant relationship did exist, and the conclusion was that occupation did affect the use of recommended forestry practices.

Examination of Table 4 shows that respondents classified occupationally as Farm and Non-Farm were the highest adopters; that is, 81 percent of this group had adopted at least one practice whereas 64.5 percent of the Farm Only respondents and 48.1 percent of the Non-Farm Only respondents had adopted at least one practice.

The nature of the practices being studied suggested the need to examine

the possible influence of tenure status on the rate of adoption. Since returns on investments in forestry are long-range in comparison with other agricultural practices, it was reasoned that owners would be more interested in practices related to forestry than non-owners. The reasoning was that non-owners have a higher mobility probability than owners and that they would be less future oriented than owners. A test of the hypothesized relationship, however, indicated that tenure status did not affect the use of recommended forestry practices. See Table 5.

Examination of Table 5 shows that there were just as many High Adopters in the Non-Owner group as in the Owner group. On the other hand, slightly more than 56 percent of the owners had adopted at least one practice whereas slightly less than half of the non-owners had adopted at least one practice. This difference, however, was not statistically significant.

Theory underlying adoption behavior

Table 3. Rate of Adoption of Recommended Forestry Practices by Education of Respondents.

| Rate of Adoption | Education | | | | | | Totals | |
|---------------------|------------|-------|-------------|-------|------------|-------|--------|-------|
| | 1-8 Grades | | 9-12 Grades | | 13 or More | | | |
| | No. | % | No. | % | No. | % | No. | % |
| Non-Adopters | 160 | 45.3 | 126 | 53.2 | 14 | 26.4 | 300 | 44.6 |
| Low Adopters | 137 | 38.8 | 89 | 33.3 | 23 | 43.4 | 249 | 37.0 |
| High Adopters | 56 | 15.9 | 52 | 19.5 | 16 | 30.2 | 124 | 18.4 |
| Totals | 353 | 100.0 | 267 | 100.0 | 53 | 100.0 | 673* | 100.0 |

*13 cases of no information excluded.

Table 4. Rate of Adoption of Recommended Forestry Practices by Occupational Classification of Respondents.

| Rate of Adoption | Occupational Classification | | | | | | Totals | |
|---------------------|-----------------------------|-------|-------------------|-------|---------------|-------|--------|-------|
| | Farm Only | | Farm and Non-Farm | | Non-Farm Only | | | |
| | No. | % | No. | % | No. | % | No. | % |
| Non-Adopters | 91 | 35.5 | 38 | 40.0 | 123 | 51.9 | 252 | 42.8 |
| Low Adopters | 105 | 41.0 | 32 | 33.7 | 82 | 34.6 | 219 | 37.3 |
| High Adopters | 60 | 23.5 | 25 | 26.3 | 32 | 13.5 | 117 | 19.9 |
| Totals | 256 | 100.0 | 95 | 100.0 | 237 | 100.0 | 588* | 100.0 |

*Does not include 98 cases of retired, disabled or unemployed respondents.

Table 5. Rate of Adoption of Recommended Forestry Practices by Tenure Status of Respondents.

| Rate of Adoption | Tenure Status | | | | | | Totals | |
|---------------------|---------------|-------|-----------|-------|------|-------|--------|---|
| | Owner | | Non-Owner | | | | | |
| | No. | % | No. | % | No. | % | No. | % |
| Non-Adopters | 254 | 43.6 | 51 | 51.0 | 305 | 44.7 | | |
| Low Adopters | 221 | 38.0 | 30 | 30.0 | 251 | 36.8 | | |
| High Adopters | 107 | 18.4 | 19 | 19.0 | 126 | 18.5 | | |
| Totals | 582 | 100.0 | 100 | 100.0 | 682* | 100.0 | | |

*No information on 4 cases.

pointed up the need to compare the adoption of forestry practices with the adoption of other practices. Respondents were questioned concerning their use of certain agricultural practices, and in the process of analysis they were classified according to the number of such practices they had adopted using the arithmetic mean as a dividing point. Three classes were identified—those who adopted no agricultural practices, those who had adopted one or two practices, and those who had adopted three or more.

A test of the relationship between adoption of the two types of practices showed that a relationship did exist. See Table 6. Examination of this table shows that slightly more than 70 percent of the High Adopters of forestry practices had adopted three or more of the agricultural practices, and that only about one-third of the Non-Adopters had adopted three or more of the agricultural practices.

The significance of this relationship is the support it lends to the theory that adoption behavior is a complex variable, that such behavior is not a discrete phenomenon but instead is part of a configuration of many factors.

Human behavior must be studied in light of both objective and subjective factors. The six factors discussed above have been treated as objective factors,

that is, factors which are external to the individual. Subjective factors are defined as attitudes and opinions, considered to be internal. Since behavior may be seen as an extension of attitudes, it is reasonable to assume that adoption behavior will reflect certain attitudes toward forestry. In order to test this assumption, respondents were asked a series of questions pertaining to forestry. The questions were structured so the respondents could state whether they agreed, disagreed, or had no opinion. These questions are treated individually here.

The first attitudinal item considered was the statement: You don't have to worry about the woods because Mother Nature will always take care of trees. Responses to this item were about equally divided between those who agreed and those who disagreed with the statement. See Table 7.

Examination of this table shows that almost 75 percent of the High Adopters disagreed with the statement, and that slightly more than half of the Non-Adopters agreed with it. The statistical test showed that a significant relationship existed between rate of adoption and attitude toward the care of trees and the distribution of cases in the contingency table showed that the direction of the relationship was as expected. Among those who agreed

Table 6. Rate of Adoption of Recommended Forestry Practices by Rate of Adoption of Recommended Agricultural Practices.

| Rate of Adoption | Agricultural Practices Adopted | | | | | | Totals | |
|---------------------|--------------------------------|-------|--------|-------|-----------|-------|--------|-------|
| | None | | 1 or 2 | | 3 or More | | No. | % |
| | No. | % | No. | % | No. | % | | |
| Non-Adopters | 2 | 13.3 | 136 | 54.2 | 80 | 32.7 | 218 | 42.7 |
| Low Adopters | 11 | 73.3 | 89 | 35.4 | 95 | 38.8 | 195 | 38.2 |
| High Adopters | 2 | 13.3 | 26 | 10.4 | 70 | 28.6 | 98 | 19.1 |
| Totals | 15 | 100.0 | 251 | 100.0 | 245 | 100.0 | 511* | 100.0 |

*175 cases not applicable.

Table 7. Rate of Adoption of Recommended Forestry Practices by Attitude Toward the Care of Forests.

| Rate of Adoption | Attitude | | | | | | Totals | |
|---------------------|----------|-------|----------|------|--------|-------|--------|---|
| | Agree | | Disagree | | Totals | | No. | % |
| | No. | % | No. | % | No. | % | | |
| Non-Adopters | 151 | 50.0 | 144 | 39.3 | 295 | 44.2 | 44.2 | |
| Low Adopters | 116 | 38.4 | 133 | 36.3 | 249 | 37.2 | 37.2 | |
| High Adopters | 35 | 11.6 | 89 | 24.3 | 124 | 18.6 | 18.6 | |
| Totals | 302 | 100.0 | 366 | 99.9 | 668* | 100.0 | 100.0 | |

*18 cases of no opinion.

with the statement (interpreted as a negative attitude toward forestry), only 11.6 percent were high adopters. Proportionately, more than twice as many of the High Adopters disagreed with the statement.

The second attitudinal item considered was: Putting money into trees is a waste of money. The distribution of responses to this item was much more unequal than it was to the first item. See Table 8.

Approximately three-fourths of the respondents disagreed with the statement, indicating some awareness of the economic possibilities of forestry, but 20 percent of the High Adopters stated that they agreed with the statement. Agreement with this statement was assumed to reflect a negative attitude toward forestry, and it would appear that those High Adopters who agreed with the statement had experienced some disappointments in relation to their forestry practices.

The relationship between rate of adoption and this particular attitudinal item was found to be significant, and examination of Table 8 shows the nature of the relationship. More than half of those who agreed with the statement were Non-Adopters and approximately 60 percent of those who disagreed had adopted at least one practice. The conclusion was that adoption

of recommended forestry practices is influenced by attitudes toward investment in forestry.

The third attitudinal item was: They are daming up too many creeks and rivers in this country. Agreement with this statement was interpreted as reflecting a negative attitude toward forest conservation practices, and only 30 percent of the respondents did agree with the statement. See Table 9. However, the test of significance indicated that no relationship existed between rate of adoption and this attitudinal item. Examination of Table 9 shows that the distribution of cases in the cells was very similar.

The fourth attitudinal item was: The future of this area's economy lies largely in the development and use of forests. Again, no significant relationship was found. Slightly more than 20 percent of the respondents disagreed with the statement, and about 50 percent of these respondents had adopted at least one recommended practice.

The fifth attitudinal item was: Only land fit for nothing else should be used for growing trees. Only 18 percent of the respondents disagreed with this statement and the test of significance showed that no relationship existed between rate of adoption and this item.

Table 8. Rate of Adoption of Recommended Forestry Practices by Attitudes Toward Investments in Forestry.

| Rate of Adoption | Attitude | | | | | |
|---------------------|----------|-------|----------|-------|--------|-------|
| | Agree | | Disagree | | Totals | |
| | No. | % | No. | % | No. | % |
| Non-Adopters | 82 | 52.2 | 202 | 41.1 | 284 | 57.8 |
| Low Adopters | 53 | 38.8 | 191 | 38.9 | 244 | 37.7 |
| High Adopters | 22 | 14.0 | 98 | 20.0 | 120 | 18.5 |
| Totals | 157 | 100.0 | 491 | 100.0 | 648* | 100.0 |

*38 cases of no opinion.

Table 9. Rate of Adoption of Recommended Forestry Practices by Attitude Toward Forest Conservation Practice.

| Rate of Adoption | Attitude | | | | | |
|---------------------|----------|-------|----------|-------|--------|-------|
| | Agree | | Disagree | | Totals | |
| | No. | % | No. | % | No. | % |
| Non-Adopters | 78 | 45.1 | 175 | 43.4 | 253 | 43.9 |
| Low-Adopters | 63 | 36.4 | 147 | 36.5 | 210 | 36.5 |
| High Adopters | 32 | 18.5 | 81 | 20.1 | 113 | 19.6 |
| Totals | 173 | 100.0 | 403 | 100.0 | 576* | 100.0 |

*110 cases of no opinion.

Summary and Implications

The focus of this study was the rate of adoption of recommended forestry practices and the objective was to identify factors related to differential adoption behavior. Justification of the study was the fact that adoption of agricultural and homemaking practices recommended as a result of experiments is not automatic. That is, the superiority of a new practice over practices already in use does not guarantee its adoption by those who would be defined as potential users. Further, the rate of adoption and the time of adoption of new practices both vary significantly.

In order to test the general hypothesis that adoption of recommended forestry practices varies concomitantly with other factors, a random sample of 686 households in five Mississippi counties was drawn. Interviews were conducted in each of the households and statistical analyses were conducted following the completion of data collection.

Independent variables selected for this study were race, age, education, occupation, tenure status, agricultural practices adopted, and five attitudinal items. Tests of hypothesized relationships revealed that race, age, tenure status and three of the attitudinal items had no influence on the rate of adoption. Education, occupation, number of agricultural practices adopted and

two of the attitudinal items were found to be related to the adoption of forestry practices.

As in all studies of this nature, causal relationships have been suggested but not proved. What has been demonstrated is the existence of significant relationship between the adoption of recommended forestry practices and certain situational variables, and this has strengthened the theory that adoption behavior is not a discrete phenomenon but is instead part of a configurational phenomenon. That is, whether an individual farmer or housewife will adopt a new practice depends not only on the demonstrated superiority of the practice but on personal characteristics and situational factors.

The main implication of the results of this study for agencies interested in promoting the adoption of recommended practices is that their promotional activities should take account of the fact that something more than the practice itself is involved. Non-Adopters and Low Adopters in this study were characterized by less education, lower adoption of agricultural practices, non-farm occupations and the opinion that investment in forestry is wasteful. Action indicated is that greater effort should be directed toward individuals and groups with these characteristics.