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# ADOPTION OF RECOMMENDED FORESTRY PRACTICES IN THREE MISSISSIPPI COUNTIES

By

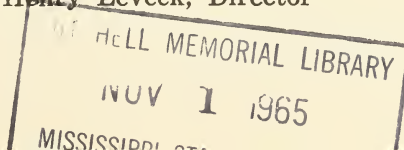
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MISSISSIPPI



# *Adoption of Recommended Forestry Practices In Three Mississippi Counties*

## INTRODUCTION

A few facts and figures selected from the large body of data on forestry in the state of Mississippi point up the importance of forestry to the economy of the state.<sup>1</sup> Among these are the following:

1. 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.
2. Forests represent a \$550,000,000 annual industry.
3. Mississippi leads all other states in the production of hardwood pulpwood.
4. Forests occupy 57 percent (17 million acres) of the state's total land area, and they are expanding at an average rate of some 700,000 acres annually.

Relevant to the role that forestry plays in the economy of the state is the preponderance of small woodland tract ownerships. About 75 percent of the forest acres in the state 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 significance of this distribution of forest tract ownerships, viewed in light of the state's economy, is that "adequate timber management on

small private timberland holdings is severely lacking."<sup>2</sup>

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. In a 10-county group in south Mississippi, where public and forest industry holdings make up more than 40 percent of the land area, the volume of softwood growing stock increased 23 percent during a 10-year period ending in the late 1950's. In the remaining seven counties of South Mississippi, where farm woodlands and other non-industrial holdings greatly predominate, softwood volume declined 11 percent during the same period.

It seems apparent, therefore, that proper management of timber resources of small holdings could produce significantly more income from forests in the state than is now being produced.

There are conditions, however, which work to the economic disadvantage of owners of small holdings, and these conditions constitute a problem which has received considerable attention from foresters, businessmen, social scientists (sociologists) and economists, and educators. They have studied these conditions with the goal of discovering ways to help solve the problem of under-utilization of forest resources, and thereby help owners of small holdings to improve their economic situation.

One of the factors working against the development of small woodland tracts is the fact that investments of labor and capital in forestry yield much later returns than such investments in crops and livestock. Experiments have shown, however, that even in a 10-year period owners

<sup>1</sup>See, for example, the following brochures: **Facts at a Glance**, Mississippi Forestry Commission, Jackson, Mississippi (October 1962); **Multiple Use of Our Forests**, Mississippi Forest Industries, Natchez, Mississippi (1963); **Why a Forest Products Utilization Laboratory**, Mississippi Forestry Association, Jackson, Mississippi. See also "Highlights of the Third Forest Survey of Mississippi," mimeographed report of a study conducted by Southern Forest Experiment Station, New Orleans, Louisiana, in cooperation with firms, industries, public agencies, and individuals throughout the state, n. d.

<sup>2</sup>See "Highlights of the Third Forest Survey of Mississippi," *Ibid.*, p. 2.

of small woodland tracts can increase their income significantly by following certain recommended practices in relation to their woodlands.<sup>3</sup> For the state of Mississippi as a whole it has been pointed out that a continuation of the build-up in pine inventory, along with proper management of woodlands, would result in millions of additional dollars in the state's economy.

The rate at which recommended forest management practices have been adopted by owners and operators of small woodland tracts, however, indicates that the prospect of additional income has not proved to be sufficient inducement to lead them to adopt such practices.

This report contains findings of a study of the use of recommended forestry practices with the focus on non-economic factors. The purpose of the study was to identify non-economic factors related to different rates of adoption of recommended practices, and was based upon conclusions drawn from other adoption studies in addition to facts enumerated above.

<sup>3</sup>USDA, Forest Service, **Timber Crops for Southern Farmers** (U. S. Government Printing Office, June 1949).

## PROBLEM AND METHOD

The specific problem dealt with in this study was an attempt to identify social and cultural factors associated with the adoption of recommended forestry practices. The general hypothesis formulated for the study was that *differences in the rate of adoption of recommended forestry practices are associated with social and cultural differences.*

Data for the study were obtained from schedules used in the study of "Fire-related Attitudes and Characteristics of Forest Residents and other Users in Selected Mississippi Counties."<sup>4</sup>

Three counties in north Mississippi were selected as the area in which field work for the study would be conducted.

These studies have shown that practices recommended as a result of experiments which have demonstrated their feasibility are not automatically adopted by farmers and homemakers. It seems reasonable to conclude that all such practices must "filter through" a configuration of many factors, any one or more of which may block their adoption. It also seems reasonable to assume that reasons for not adopting such practices may range from rational to irrational, depending on whose scale of values are used as a basis for defining rationality.

In this study, as stated above, the focus is on selected non-economic factors. This is not meant to imply that economic factors are of no importance. On the contrary, it is probable that economic considerations play a vital role in the decision-making process of the individual as he weighs the advantages and disadvantages of using certain forestry practices. The point is that economic factors appear to be part of a configuration of many factors, and that the probability of an increase in income may be less influential in an individual's decision-making process than other factors.

Selection of these three counties—Carroll, Grenada and Calhoun—was based partly on U. S. Census data and partly on the fact that they are located in the Yazoo-Little Tallahatchie Watershed, one of the largest land reclamation projects in the South. The counties are contiguous, but present contrasts as one moves from the southwest portion of Carroll County to the northeast portion of Calhoun County. The contrasts are seen in (1) ownership patterns, (2) median family

<sup>4</sup>Field work for this study was conducted in the summer of 1963. Agencies and departments responsible for securing, tabulating and analyzing the data were the Social Science Research Center and the Department of Sociology and Rural Life (both of Mississippi State University) the Federal Forest Service and the State Forest Service of Mississippi.

income and (3) level of industrialization.

A random sample was drawn from the list of rural residents in the three counties (excluding households that were located outside the watershed) and the sample units were grouped into five different classes. See Table 1. The first class consisted of persons who were farmers, owners and who had a Soil Conservation Service farm plan made on their farms and filed in The Project Forester's office. The remaining classes become self-explanatory as one studies Table 1.

It was found that 427 of the 751 sample units in the total sample were applicable to the study of adoption of recommended forestry practices. The remaining 324 cases were eliminated from the analysis because the household heads did not hold any acres in woodland and could not be classified as potential adopters of recommended forestry practices.

The dependent variable in this study, rate of adoption of recommended forestry practices, was operationally defined simply as the number of practices adopted from a list of nine practices suggested by professional foresters as being relevant to the area.

The 427 household heads were classified according to the number of practices adopted, resulting in a typology consisting of three classes—Non-adopters, low

adopters, and high adopters.<sup>5</sup> The mean number of practices adopted, 2.3, was used as a breaking point with those adopting 3 or more practices classified as high adopters and those using 1 or 2 practices classified as low adopters.

Table 2 lists the nine practices suggested by professional foresters and shows the number of respondents who adopted those practices.

In order to test the general hypothesis, seven specific hypotheses were formulated. For each of these the dependent variable was the same, classification of the 427 respondents as Non, Low or High Adopters. The seven independent variables were (1) education, (2) number of agricultural practices adopted, (3) knowledge about A.C.P. payments, (4) acres in woodland, (5) attitudes toward forestry conservation and investment, (6) contacts with various government service agencies, and (7) sample type.

The seven specific hypotheses were tested statistically by means of the Chi square test of independence with the .05 level of significance as the criterion for acceptance or rejection. An indication of the strength of relationships was provided by calculation of C, the contingency coefficient.

**Table 2. Number of Recommended Forestry Practices Adopted by Household Heads in the Three-county Area.**

Practices Adopted	Number Adopting
Planted trees to grow timber	178
Made a road through timber	38
Following a plan and schedule for growing and selling timber	34
Removed cull trees	92
Timber measured before making a sale	28
Sold timber on a written contract	70
Selected and marked trees to be cut	27
Received bids on timber before selling	63
Constructed fire lanes	50

**Table 1. Distribution of 751 Sample Cases Among Five Sample Types.**

Sample Type	No.	%
1. Farmer-owner, forest cooperator	128	17.0
2. Farmer-owner, forest non-coop.	158	21.0
3. Farmer-renter, forest non-coop.	131	17.5
4. Non-farm owner, forest operator	133	17.7
5. Other, non-farm	201	26.8
	751	100.0

<sup>5</sup>The class of Non-adopters was included in the analysis of data because they were considered as potential adopters in the sense that they owned or controlled woodlands.

ANALYSIS

The first hypothesis tested in this study was that there is a relationship between education and the rate of adoption of recommended forestry practices. Education of respondents was defined simply as the number of grades of school completed. For purposes of analysis they were divided into four groups as shown below.

Number of years of school completed	Number*	Percent
1-4	54	12.8
5-8	171	40.6
9-12	163	38.7
16 or more	33	7.9
	421	100.0

\*No information on 6 cases.

Studies of characteristics of adopters have shown rather consistently that the more formal education an individual has the more likely he will adopt new practices. That a direct cause-effect relationship exists between education and adoption of practices would hardly be argued by researchers, but that education is one of several variables constituting a causal complex seems highly probably in light of research findings.

Table 3 shows the distribution of the three adopter categories among the four different educational groups. The statistical test indicated that the hypothesis could be accepted.

Thus it was concluded that a significant relationship did exist between education and the rate of adoption of recommended forestry practices. A contingency coefficient of .57 indicated a fairly strong positive relation. That is, as education increases, the rate of adoption goes up.

Although the hypothesis was accepted, it must be pointed out that there were

some noteworthy exceptions. It will be noted, for example, that close to 15 percent of the high-adopters had completed less than five grades in school, and that slightly more than 21 percent of the respondents who had completed 13 or more grades of school, i. e., had completed at least one year of college, had adopted no practices. It is also interesting to note that there were just as many low adopters as high adopters in the top educational level, those who had completed 13 or more grades of school.

These exceptions lend support to the argument stated earlier that the adoption of recommended practices is dependent upon a configuration of variables, and that no single factor is in itself sufficient cause for observed differences in the number of practices adopted. The fact that some high adopters were found in the lowest educational group and that some non-adopters were found in the highest educational group points to the operation of other factors in the decision making process of the respondents.

The second hypothesis tested was that there is a relationship between the number of agricultural practices adopted and the number of forestry practices adopted by respondents in this study. Respondents were asked whether they had adopted any one or more of five specified agricultural practices. Of the 256 respondents for whom agricultural practices were applicable, 15 had adopted none of the five specified practices. The mean number of practices adopted by the remaining 241 respondents was 2.8. This was used as

Table 3. Rate of Adoption of Recommended Forestry Practices by Education of 421 Respondents.\*

Adopter Categories	Education by Grade				Totals
	1 - 4 N=54 %	5 - 8 N=171 %	9 - 12 N=163 %	13 or more N=33 %	
Non-Adopter	46.3	43.9	41.7	21.2	41.6
Low Adopter	38.9	41.5	35.6	39.4	38.7
High Adopter	14.8	14.6	22.7	39.4	19.7
Totals	100.0	100.0	100.0	100.0	100.0

\* No information on 6 cases.

a basis for grouping respondents into Low and High categories, and resulted in the distribution shown below.

Number of Agricultural Practices Adopted	Number	Percent
None	15	5.8
1-3	157	61.4
4-5	84	32.8
	256	100.0

When the respondents were grouped according to number of agricultural practices adopted and number of forestry practices adopted, they fell into the distribution shown in Table 4.

It is apparent that a significant relationship did exist between adoption of agricultural practices and adoption of recommended forestry practices. An additional test was conducted taking into account only those respondents who had adopted at least one agricultural practice. This test indicated that the relationship still existed.

A cautious interpretation of this relationship is indicated. That is, until the time sequence of adoption of agricultural and forestry practices can be established it seems logical to assume that a cause-effect relationship could exist in either direction. In other words, successful results from the use of recommended agricultural practices might create a more favorable reception to recommendations from professional foresters with regard to forestry practices, but the reverse might also be true. A third possibility exists, and that is that adoption of agricultural and forestry practices might occur within the same time period.

The fact that a significant relationship was found may be viewed as support of

<sup>6</sup>See Herbert F. Lionberger, *Adoption of New Ideas and Practices* (Ames, Iowa: The Iowa State University Press, 1960) p. 34.

**Table 4. Rate of Adoption of Recommended Forestry Practices by Number of Agricultural Practices Adopted by 256 Respondents.**

Adopter Categories	Number of Agricultural Practices Adopted			
	None N=15	1-3 N=157	4-5 N=84	Totals N=256
	%	%	%	%
Non-adopter	13.3	40.8	27.4	34.8
Low adopter	73.3	42.7	35.7	42.2
High adopter	13.3	16.5	36.9	23.0
Totals	100.0	100.0	100.0	100.0

the theory that adoption behavior is part of a typical behavioral pattern. A tendency to adopt new practices soon after they are introduced is characteristic of individuals who typically are under 50 years of age, who are "risk-takers," who actively seek new ideas, who participate in many non-local groups, who have large farms, and whose income is relatively high.<sup>6</sup>

The third hypothesis was that *there is a relationship between knowledge about A.C.P. payments and the rate of adoption of recommended forestry practices.* Here again the hypothesis was accepted. See Table 5.

It was found in the analysis that more than 80 percent of the high-adopters were aware that A.C.P. payments were available for forestry conservation practices, but that more than 25 percent of the respondents who knew about such payments had not taken advantage of them. Further, almost half of the respondents who were not aware that A.C.P. payments were available had adopted one or more practices recommended by professional foresters.

It is apparent, therefore, that adoption of recommended practices does not depend solely on awareness that A.C.P. payments are available. On the other hand, however, more than 60 percent of those who knew about such payments had adopted one or more practices, whereas only 45 percent of those who were not aware of A.C.P. payments had adopted one or more practices. This pattern seems to fit the adopter ideal type described above.

**Table 5. Rate of Adoption of Recommended Forestry Practices by Knowledge of A.C.P. Payments of 405 Respondents.**

Adopter Category	Knowledge That A.C.P. Payments Were Available		
	Yes N=281 %	No N=124 %	Total* N=405 %
Non-adopters	38.4	54.0	43.2
Low adopters	39.9	35.5	38.5
High adopters	21.7	10.5	18.3
Totals	100.00	100.0	100.0

\* Does not include 22 cases of "No Answer."



What might seem to require no more than face validity is the hypothesis that the landowner with a relatively large number of acres in woodland will adopt more forestry practices than the landowner with only a few acres. That such is not necessarily true becomes evident upon inspection of Table 6. The statistical test called for acceptance of the hypothesis, which led to the conclusion that a relationship did exist between the rate of adoption of recommended forestry practices and the number of acres of woodland held by the respondent. There were almost four times as many high adopters proportionately in the 100 acre or more category as there were in the 1-24 acre category. Contrariwise, as the number of acres in woodland increased the proportion of non-adopters in each size category decreased. There were twice as many non-adopters proportionately in the 1-24 acre category as there were in the 100 acre or more category.

Despite the obvious relationship, however, it seems significant that more than a fourth of the respondents with 100 acres or more had adopted none of the recommended practices. Here again is what may be viewed as evidence that a cause-effect relationship is something more than a simple two variable phenomenon.

It is obvious that something in addition to size of woodland operated as a causal factor or factors.

The fifth hypothesis tested in this study was that *there is a relationship between rate of adoption of recommended forestry practices and attitudes of respondents toward forest conservation and toward forestry as an investment.* Respondents were classified as having either favorable or unfavorable attitudes toward forestry conservation and investment on the basis of answers to questions contained in the schedule. Of the 427 respondents included in this study, 115 were classified as having an unfavorable attitude toward forest conservation, 302 as having a favorable attitude and 10 as having no opinion or "Don't Know." See Table 7.

The hypothesis was found to be acceptable, and it was observed that respondents with a favorable attitude toward forest conservation were more likely to adopt recommended practices than those with an unfavorable attitude.

This conclusion notwithstanding, it was observed that almost half of the respondents who had expressed an unfavorable attitude toward forest conservation had adopted one or more of the recommended practices. Further, 36 percent of

**Table 6. Rate of Adoption of Recommended Forestry Practices by Acres in Woodland.**

Adopter Categories	Acres in Woodland				Totals*
	1 - 24 N=110	25 - 49 N=88	50 - 99 N=101	100 or more N=123	
	%	%	%	%	%
Non-adopter	58.2	40.9	37.6	27.6	40.8
Low adopter	33.6	50.0	32.7	41.5	39.1
High adopter	8.2	9.1	29.7	30.9	20.1
Totals	100.0	100.0	100.0	100.0	100.0

\* Does not include 5 cases of "No Answer."

**Table 8. Rate of Adoption of Recommended Forestry Practices and Attitudes Toward Forestry as an Investment.**

Adopter Category	Attitude Toward Forestry as an Investment		
	Favorable N=117	Unfavorable N=280	Total* N=397
	%	%	%
Non-adopter	53.0	36.4	41.3
Low adopter	32.5	41.4	38.8
High adopter	14.5	22.2	19.9
Totals	100.0	100.0	100.0

\* Does not include 30 cases of "Don't Know".

**Table 7. Rate of Adoption of Recommended Forestry Practices by Attitude Toward Forest Conservation.**

Adopter Category	Attitude Toward Forest Conservation		
	Favorable N=115	Unfavorable N=302	Total* N=417
	%	%	%
Non-adopter	49.6	37.7	41.0
Low adopter	40.9	37.7	38.6
High adopter	9.5	24.6	20.4
Totals	100.0	100.0	100.0

\* Does not include 10 cases of "Don't Know" answers.

those with a favorable attitude had adopted none of the practices.

The relationship between rate of adoption and attitude toward forestry as an investment was only slightly less significant than that between rate of adoption and attitude toward forest conservation. See Table 8.

Here again it is significant that 47 percent of the respondents who expressed an unfavorable attitude toward forestry as an investment had adopted one or more of the recommended practices. Two possible explanations of this condition seem plausible. On the one hand, it might be explained as a function of the particular question asked the respondents with regard to investment in forestry. Respondents were asked whether they agreed or disagreed with the statement that "putting money into trees is a poor investment." It is probable that respondents interpreted the statement in different ways, but the data did not permit an investigation of this probability. On the other hand, it might be that respondents with an unfavorable attitude who had adopted recommended practices had in some way become dissatisfied with the results of the practices.

Despite these exceptions, however, it seems clear that a favorable attitude toward forestry conservation and investment plays a significant role in the decision making process regarding forestry practices.

The sixth hypothesis tested was that *there is a relationship between rate of adoption of recommend forestry practices and number of contacts with agricultural and forestry agencies.*

Respondents were questioned concerning their contacts with eight different government (state and Federal) agencies. The mean number of contacts was 1.84, and respondents were classified on the basis of number of contacts with those having had three or more contacts as High and those with 0-2 contacts as Low.

**Table 9. Rate of Adoption of Recommended Forestry Practices by Number of Contacts with Government Agencies.**

Adopter Category	Number of Contacts		
	Low N=290 %	High N=136 %	Total* N=426 %
Non-adopter	47.6	27.9	41.3
Low adopter	36.9	42.6	38.7
High adopter	15.5	29.4	20.0
Totals	100.0	100.0	100.0

\* Does not include one case of "No information."

The statistical test of the hypothesis indicated that it could be accepted. See Table 9.

Within the group of high adopters there were almost twice as many proportionately who had three or more contacts as there were who had fewer than three contacts. Referring again to the ideal type of adopter discussed earlier in this report, it is seen that the tendency of high-adopters to have more contacts with government agencies fits the type. That is, if high (or early) adopters characteristically seek new ideas, it is reasonable to conclude that the various government agencies (those pertaining to agriculture and forestry) would constitute an easily accessible source of information.

Again, however, it must be pointed out that not all high-adopters were high "contacters." As stated earlier, the significance of these exceptions is that no single variable is sufficient to explain the adoption or non-adoption of recommended practices.

The final hypothesis tested was that *there is a relationship between rate of adoption of recommended forestry practices and sample type classification of respondents.* Four sample types were used in testing this hypothesis: (1) Farmer-owner, forest cooperator, (2) farmer-owner, non-cooperator, (3) farmer-renter, and (4) non-farm, forest operator. In view of the manner in which sample types were defined, it might seem obvious that a relationship would exist between the variables. That such a relationship did exist was borne out in the statistical test of the hypothesis, but the distribution of

Table 10. Rate of Adoption of Recommended Forestry Practices by Sample Type.

Adopter Category	Sample Type				
	Farmer-owner Forest cooperator	Farmer-owner Non-cooperator	Farmer Renter	Non-farm Forest cooperator	Totals
	N=128 %	N=144 %	N=22 %	N=133 %	N=427 %
Non-adopter	14.0	48.6	68.2	55.6	41.5
Low adopter	47.7	35.4	31.8	34.6	36.6
High adopter	38.3	16.0	00.0	9.8	19.9
Totals	100.0	100.0	100.0	100.0	100.0

cases as shown in Table 10 shows clearly that to have a forest management plan filed in the federal forest office of the county was no guarantee that recommended forestry practices were being followed.

It will be noted that a large majority of respondents who had a forestry management plan made on their farms and on file in the federal forester's office had adopted one or more of the recommended practices. Of this group of respondents, however, most had adopted fewer than three of the nine recommended practices. This fact could be misleading, however,

because of the nature of the nine different practices. It is quite possible, for example, that practices relating to the sale and harvesting of timber were applicable in only a few cases. That is, if the landowner had sold timber in the recent past and subsequently had a forest management plan developed for his woodland, it would hardly be expected that he would have adopted practices relating to the sale and harvesting of timber.

This possibility, as an example, serves to illustrate the complexity of research of this type, and points up needed improvements in research techniques.

## SUMMARY AND IMPLICATIONS

This study of social and cultural factors related to the adoption of recommended forestry practices provides additional evidence of the complex character of the decision-making process. It has demonstrated the existence of significant relationships between the adoption of recommended forestry practices and a series of seven variables. All of the hypotheses were accepted, indicating that significant relationships between the dependent variable, rate of adoption, and the seven independent variables did exist. Although the question of causal relationships remains unanswered, this study has shown that the adoption of recommended forestry practices is not unlike the adoption of recommended agricultural and homemaking practices on which considerably more research has focused.

The high adopter, as defined in this study, typically is (1) better educated, (2) adopts more agricultural practices, (3) is better informed, (4) has larger

woodland holdings, (5) has more favorable attitudes toward forest conservation and investment, (6) has more contacts with agricultural and forestry agencies, and (7) is more likely to have had a forest management plan developed for his place and on file in the local forester's office than low adopters and non-adopters.

Needed improvements in research techniques were brought to light in this study. In the first place, there is a need to develop more effective data collection instruments, i. e., schedules. One of the major weaknesses of the study was the lack of adequate attitudinal data on respondents. Only a few of the attitudinal items proved capable of eliciting answers sufficiently discriminatory for statistical analysis.

There is also a need for more refined statistical procedures. Use of multivariate analysis or regression techniques should greatly improve the investigation.