

**ECONOMIC FACTORS INFLUENCING INDUSTRIAL LANDOWNER
ASSISTANCE PROGRAMS ON PRIVATE FOREST LAND IN THE SOUTH**

by

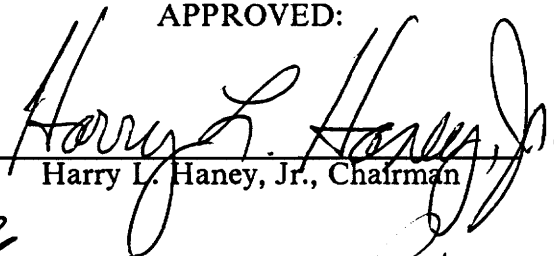
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(ABSTRACT)

The survey of medium-to-large forest industry firms across the South found 11,215 landowners enrolled in formal industrial landowner assistance programs in 1989. LAPs appeal to landowners with relatively large holdings who normally have financial returns as a part of their objectives. Forest industry has encouraged this group of owners to participate because of the efficiency in managing large tracts. The average LAP tract size of 428 acres is much larger than the average southern NIPF holding of 47 acres by a factor of ten (Birch et al. 1982). Forest industry enrolled 4,798,274 acres in their LAPs in 1989. Most firms indicated that they planned to increase the size of their LAPs by a total of 1,094,000 acres (23%) over the next five years.

The popularity of LAPs in the forest industry appears to be based primarily upon their reliability and cost in comparison to other timber supply strategies (i.e., fee land, leased land, and the open market). Over half (53%) of the firms reported that they had successfully purchased at least 90 percent of the desired timber put up for sale in their LAPs.

In case studies of three company programs, a capital budgeting analysis showed that the LAP was the least costly alternative for one firm and that the open market was the least costly timber supply strategy, followed closely by LAPs, for two firms. The LAP was the least costly strategy for Company C primarily because the probability of procuring timber in the LAP (0.95) was much greater than the probability of procurement on the open market (0.30). Since more than half of the surveyed firms were successful in purchasing a substantial part (90%) of the desired timber offered for sale in their LAPs, these results suggest that firms which operate in areas of heavy competition for timber, with correspondingly low probabilities of procurement success on the open market, may find LAPs to be their least expensive timber supply strategy.

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Chapter I

INTRODUCTION

Nonindustrial private forest (NIPF) landowners own approximately 122 million acres, or 67 percent of the forest land in the southern United States (USDA Forest Service 1988). The southern forest industry is highly dependent on these lands for much of their raw material needs.

Public ownership, primarily national forests, account for 10 percent of the South's forest land, but contributes a limited amount of the timber supply for industry due to multiple-use demands on the resource (USDA Forest Service 1988). The public demand for multiple, nontimber uses is expected to increase, making this an unreliable source of future timber supply.

Forest industry controls 23 percent of the forestland in the South through long-term leases and ownership (USDA Forest Service 1988). The expense of holding land is likely to be a deterrent to increasing the acreage under industry control.

Most firms depend on open market purchases of timber from NIPF landowners as a major part of their timber supply strategy, including a few that rely on this resource for almost 100 percent of their raw material needs. The uncertainty of open market supplies in competitive environments, however, has spawned an alternative strategy - landowner assistance programs.

A landowner assistance program is a formal or informal agreement between a company and a landowner in which the company provides forest management advice, silvicultural services, and harvesting assistance. In return, the company is usually given an opportunity to bid on the timber harvested (Cleaves and O'Laughlin 1983). The details concerning the minimum qualifications for enrolled land, types and prices of services offered, and terms of agreement and termination in LAPs vary by company.

It is difficult to determine the beginning of landowner assistance programs in the South, since many forest products companies have informally assisted selected landowners with advice and some technical forest management services for years. International Paper Company dates its program to 1939, when it named four field men to advise and educate landowners in the management of their timberlands. Early landowner assistance programs also include the DeWeese Tree Farm Family in 1949 (which later became part of the Weyerhaeuser Tree Farm Family Program), and programs begun by Brunswick Pulp and Paper (1950), West Lumber Company (1953), S.D. Warren-Scott (1954), West Virginia Pulp and Paper, which is now Westvaco (1956), and Cape Fear Wood Corporation (1957). These companies' programs were initiated when the forest industry realized that the unrestricted harvesting on NIPF lands, without assisting or educating landowners in reforestation or management, would be detrimental to the industry and the South in the long-run (Nonnemacher 1989).

Today, the overall number of LAPs, number of landowners in LAPs, and acreage covered under LAPs is on the rise in the South. However, the trend is not uniform across the South's forest products firms because some have scaled down or eliminated programs in the face of this trend. The potential private and social benefits from increased NIPF productivity due to LAPs suggests the need for this research to assess the characteristics, strategies, costs, and importance of LAPs.

Objectives

The overall objective of the study is to examine the economic factors influencing industrial landowner assistance programs on private forest land in the South. Specific objectives of the study are as follows:

1. Conduct a mailed survey of firms offering formal landowner assistance programs for NIPF landowners in the South. The purpose of the survey is to ascertain the current characteristics and management strategies of LAPs.
2. Conduct personal and telephone interviews with industrial LAP managers to obtain more background information on the operation of LAPs.
3. Estimate the cost of LAPs as compared with fee land, long-term leases, and the open market supply as strategies of timber supply.

Organization of Thesis

The chapters of the thesis are outlined as follows:

1. In the Literature Review chapter, an examination of representative literature concerning technical forest management assistance, NIPF landowners, and forest industry timber supply is presented.
2. In the Survey Methods and Results chapter, the results of the mailed industry questionnaire, telephone interviews, and personal interviews, which identify characteristics, strategies, and trends in industrial LAPs are reported.
3. The Capital Budgeting Analysis chapter contains a comparison of LAPs with fee land, long-term leases, and the open market as industrial timber supply strategies on the basis of cost, as well as other factors.
4. In the Discussion and Conclusions chapter, the importance of industrial LAPs to the forest industry and society, are examined. The conclusions for policy and suggestions for further research are advanced.

Chapter II

LITERATURE REVIEW

The literature review will discuss various factors influencing the forest industry's implementation of landowner assistance programs and the participation of landowners in these programs. The characteristics of nonindustrial, private forest landowners throughout the nation with an emphasis on the South will be reviewed. In particular, landowner motives for owning and managing forests that led them to participate in LAPs will also be discussed. The availability and effectiveness of technical forestry assistance on NIPF lands is elaborated. This is followed by a discussion of the forest industry's sources of timber supply, including LAPs, and the methods of capital budgeting used by the forest industry.

Harvesting and Reforestation Decisions

The nonindustrial private forests (NIPF) are an important natural resource of the southern United States. Approximately 122 million acres of commercial timberland are owned by NIPF landowners in the region (USDA Forest Service 1988). For several years, forestry leaders have expressed the concern that harvested sites in the South are not being actively reforested. Boyce and Knight (1979) noted that a significant shortfall of small unmerchantable pines was showing up in remeasured survey plots. They contended that this situation was being caused by a failure to regenerate pine after harvest, especially on NIPF lands. An additional report (Boyce and Knight 1980) indicated that young hardwoods were replacing pines in the South. Failure to reestablish pine forests when mature stands are harvested is the most important factor in the transformation of NIPF lands from pine to hardwood. These findings imply that forest industries dependent upon southern pine may face a decline in the supply of softwood timber. Industrial LAPs as well as other sources of technical forestry assistance may play an important role in encouraging NIPF landowners to reinvest in forestry.

In a survey of NIPF landowners in the South, Kaiser (1983) found that among landowners who had not reforested after harvest, the primary motivation was a belief that their site would reforest naturally to pine. Other reasons given for not reforesting were high costs, returns from forestry being too low and occurring too far into the future, and other uses for harvest revenues. He found that harvesting was supervised by foresters on only 37 percent of the acres harvested, and that reforestation was more likely to occur on these acres. Royer and Kaiser's findings (1985) support these results.

Royer (1985) examined the reforestation decision made by NIPF owners as a function of tract ownership characteristics, personal characteristics, market variables, and public policy variables. His study results indicated that income and the size of forest ownership by landowners had a strong positive influence on the probability of reforestation. Pulpwood, but not sawtimber prices, also had a positive but modestly significant effect on reforestation decisions. In a New Hampshire study, Binkley (1981) found that owners of small holdings were less likely to harvest timber than owners of larger holdings, and that price was a major factor in the decision to harvest timber. Straka et al. (1984) also found a positive relationship between size of holding and forest management intensity. These researchers suggested that current efforts to encourage landowners to practice intensive forestry by emphasizing the rate of return from timber investment may be less cost-effective than developing larger management units. The creation of landowner associations or cooperatives was proposed as a method by which the diseconomies of scale associated with small holdings may be partly overcome. However, these proposals have met with limited success in the U.S. in the past.

Forest landowner studies have found varying degrees of association between landowners' harvesting decisions and various independent variables describing landowner characteristics (Larsen and Ganser 1972, Kingsley 1976, and Kingsley and Birch 1977). Landowners' sources of information and their general tendency to practice good forest management have been found to influence their harvesting intentions and behavior (South et al. 1965, and Sollie 1967). Informed landowners who practice good forest management are more likely to harvest their timber when it is perceived as mature, as opposed to being compelled to harvest because of financial need. Kingsley (1979) concluded, however, that the harvesting decision is more spontaneous than well planned for most landowners.

In a study of Mississippi NIPF owners, Baird et al. (1986) divided the landowners into two categories; active timber managers and passive timber managers. Owners who are active timber managers harvest according to a timber management plan or when the condition of their timber warrants it. Their harvesting decisions are determined by a desire to maintain a productive and profitable forest. Passive timber managers may sell timber at any time for any reason, none of which are related to sustained timber production. The timber on their land may be harvested to provide money for financial emergencies, tuition for college, or it may serve as a "nest egg" for retirement. In some cases, the timber was incidental to or served as a hindrance to a more highly valued use of the land.

Although many landowners have indicated that they will never harvest timber, such a statement of no intention to harvest does not necessarily mean that timber on the property will never be available. Turner et al. (1977) found that 35 percent of NIPF landowners surveyed changed their minds concerning timber harvesting over a four year period. They concluded that during a timber crop's merchantable life, most owners will be willing to permit some harvesting. Firms that develop landowner assistance programs should be prepared to deal with the potential for attitudinal changes on the part of their clients.

Landowner Characteristics

Several studies have been conducted to determine what landowner characteristics, if any, are positively correlated with interest in LAP participation. In a characterization

of landowners interested in assistance programs in eastern Texas, Hickman and Gelhausen (1981) found that landowners most interested in assistance programs tended to be absentee owners. They resided in urban areas away from their properties, were younger, more educated, and had higher incomes relative to uninterested landowners. Skinner and Cubbage (1985) found similar results in a study of assistance programs in Georgia. In a survey of Mississippi NIPF landowners (Nabi et al. 1983), respondents interested in LAPs were more likely to have a multiple-use rather than a single-use goal of ownership.

An increasing number of landowners view their timberland as a financial asset. Wisdom (1985) defined a financial asset as land held primarily for its income earning potential. The technical assistance provided in a LAP is a viable method by which income from timberlands can be increased. For example, owners of more than half the total acreage in International Paper Company's Landowner Assistance Program in southeastern Mississippi said that they held the land to provide income (Taylor and Wilkerson 1977). A third of the landowners listed financial security as their objective. Twelve percent managed the land to serve as an inheritance for their children, and 2 percent wanted to create a memorial for a past family member. By contrast, a survey of Westvaco's Cooperative Forest Management participants found that 66 percent of the landowners own their property primarily for purposes other than timber production (Maxey 1989). In part, this disparity may be due to regional differences. In the relatively mountainous areas of Virginia, West Virginia, Maryland, and Kentucky in which many of Westvaco's operations exist, landowners may be more desirous of preserving the beauty of their forests because of their high visibility, rather than conduct timber harvests which may temporarily leave the land unsightly. In the relatively flat landscape of southeastern Mississippi, harvesting operations are not as visible as they are in the

mountains. There are also distinct differences in stumpage prices and logging costs between these regions.

Birch et al. (1982) conducted a nation-wide survey of NIPF landowners and produced a regional tabulation of ownership types and traits. Similar studies were undertaken for various states and regions of the Northeast (Kingsley 1975, 1976 and Birch 1983), in Missouri (Trokey and Kurtz 1982), and in the coastal plain of Georgia (Holemo and Brown 1975). These studies involved extensive interviews with landowners which explored variables such as age and income, and included questions concerning attitudes toward timber management and production. Birch et al. (1982) found that farmers were the largest occupational group in terms of acres owned nationwide, but that white collar workers were the largest grouping in terms of total number of individuals. Eighty-eight percent of the private owners were either sole proprietors or families who collectively hold 55 percent of the private forestland. Family ownerships include partnerships and corporations. He found that the typical forestland owner was male, white, and over 50 years of age. Birch also found that almost as much land was owned by people with less than an eighth grade education as by college graduates. These findings have policy implications for any kind of landowner assistance effort such as LAPs.

In the South, 92 percent of the private ownership units are less than 100 acres. Owners of larger tracts cited timber production as a high priority. However, for the majority of NIPF landowners, timber production is seldom the primary reason for owning land. Most landowners placed increased land value, aesthetics, and recreation as primary satisfactions, now and in the future (Birch et al. 1982).

Technical Assistance Availability

A number of recent studies have examined the availability of technical forestry assistance to NIPF owners. Surveys of industry landowner assistance programs were conducted in Georgia (Cubbage and Skinner 1985) and Louisiana (Cleaves and O'Laughlin 1983). Lewis and Ellefson (1983) list various agencies from which forestry information is available, and "Forest Farmer" (1989) provides a partial list of industry LAPs in the South. State, regional, and national surveys have found an increasing number of private forestry consultants (Hodges and Cubbage 1986, Myers and Goforth 1980, Martin 1977).

With the existence of service foresters, consultants, and industry-sponsored LAPs, there would appear to be a considerable overlap of technical forestry assistance. But in their Georgia study, Cubbage and Hodges (1986) found that each type of technical assistance satisfied separate needs based largely on ownership size. Industry programs were focused on large forest ownerships, consultants concentrated on medium-sized ownerships, and state foresters helped smaller ownerships. Industry LAPs enrolled relatively large ownerships for efficiency. Public service foresters in Georgia, as well as many other states, have an annual limit of 5 person days of assistance per owner. Thus, the majority of the requests from owners of large forests were probably referred to industry LAPs. Owners of smaller tracts, who may not have been willing to employ consultants or large enough to qualify for industry LAPs, were aided primarily by state foresters.

Despite an increasing availability of technical assistance, significant numbers of NIPF owners remain unaware that assistance is available (Birch 1983).

Technical Assistance Effectiveness

The effectiveness of technical assistance programs has been analyzed in several recent studies. In their study of landowners in the Georgia Piedmont, Cabbage and Hodges (1985) evaluated the effects of providing technical forestry assistance to assisted and nonassisted groups of landowners who made timber harvests. They found that landowners assisted by state foresters generally had less pine timber removed, had more softwood volume left after harvest, and had more pine seedlings after harvests of natural stands. Perhaps most important was their finding that assisted landowners received stumpage prices 58 percent greater than landowners making their sales without assistance. Unfortunately, only 23 percent of Georgia's nonindustrial forests received some form of professional forestry assistance in 1983.

Straka et al. (1986) took a somewhat different approach in evaluating Mississippi service foresters' promotional activity and management assistance. They found that service foresters generated direct benefit-cost ratios of 20:1, 8:1, and 3:1 at real discount rates of 4, 7, and 10 percent, respectively. The primary assistance rendered to the landowners was the preparation of management plans. Advising landowners on tree planting and site preparation were the second and third most frequent purposes for service forester visits.

Boyd (1983,1984) estimated the effects of different types of forestry assistance on timber production. He determined that provision of technical assistance was more likely to increase regeneration than subsidy programs. Further, he found that technical assistance was significant in increasing the probability of harvest. These findings appear to

be consistent with the results of three other studies: Brooks (1985), deSteiguer (1984), and Royer (1985). In each of these studies, the researchers explored the relationship between technical and financial assistance and forest investment behavior.

In their surveys of landowner assistance programs, Cleaves and O'Laughlin (1983) in Louisiana, and Cabbage and Skinner (1985) in Georgia found that reforestation success was most influenced by technical assistance. Out of the total 284,970 acres of LAP lands in Louisiana, more acres were reforested during 1980 than were clearcut. Approximately 13 percent of Louisiana's tree planting on NIPF lands was done on LAP lands. In the Georgia study, Cabbage and Skinner report that 57,381 acres of LAP lands were reforested in 1983. In addition to reforestation, both studies indicate that LAPs provided significant assistance in timber marking and cutting, prescribed burning, and management plan preparation.

Taylor and Wilkerson (1977) reported that the most requested practice in International Paper Company's Landowner Assistance Program in southeastern Mississippi was controlled burning. It was followed by boundary line maintenance, light site preparation, planting or direct seeding, timber stand improvement, timber harvesting, and heavy site preparation. The harvesting method most requested by landowners was the clearcutting of poorly stocked stands with low quality timber.

Hodges and Cabbage (1990) reported from a survey of private and public technical assistance foresters across the South that industrial foresters aided in the management of more acres per forester than consultants or state foresters. They found that all foresters assisted more in artificial regeneration as opposed to natural regeneration. However, consultants performed more natural regeneration than industrial or state

foresters. This is perhaps due to a more limited access to equipment and personnel than industry or state forestry agencies. The harvesting methods prescribed by industrial, consulting, and state foresters were also dissimilar. Industrial foresters favored clearcutting, consultants favored selective cuts, and state foresters favored a mix of both methods.

Forest Industry Timber Supply

Generally, forest industry has four sources of timber - fee land, leased land, land-owner assistance programs, and open market purchases. Ownership of fee lands is considered to be necessary for the survival and continued growth of many forest products companies (Clephane 1978, O'Laughlin and Ellefson 1982, Nolop and Williamson 1980). Enk (1975) selected a group of 30 large forest products firms to analyze their decision-making processes and strategies concerning land use. He concluded that most firms used their timberlands primarily to maximize revenue and as a source of raw material. O'Laughlin (1980) conducted a similar study comparing corporate timberland strategies and found that the majority of firms used their timberlands to maximize the productive capability of their mills. Both studies concluded that from 1969 to 1978, short term maximization of growth and profits gave way to strategies to use timber resources to maximize long-term success.

Timberland ownership is a form of tapered integration in which the supply of timber creates a flexibility in making outside purchases. Taper-integrated firms depend on outsiders for a portion of their raw material requirements. They produce some of their re-

quirements internally, but purchase the remainder through outside suppliers (Harrigan 1983, Porter 1980). Cleaves and O'Laughlin (1982) list some reasons for timberland ownership: (1) To assure an adequate timber supply, (2) to capture appreciating land values, (3) to increase bargaining power with suppliers and, (4) to insulate against entry of competitors. Disadvantages of timberland ownership include: (1) Timber management costs and taxes; (2) a company's commitment to a geographic area is risky in lieu of potential changes in demography, governmental policies, and resource depletion; and (3) a firm's takeover risk is increased because the market value of timberlands is often higher than their stock price or book value (Cleaves and O'Laughlin 1982, Clephane 1978).

Even though ownership of timberland provides a firm with more control over wood flow, Segur (1967) found that ownership of land to provide a 100 percent supply was not always an optimum strategy. Ownership of large acreages of timber may become a financial burden unless they are highly efficient, such as plantations on better sites. Some companies own no timberland and concentrate their assets in conversion facilities.

Slinn (1988), has concluded that the total acreage of U.S. timberland owned by forest products companies will decline. But despite the predicted decline in forest industry timberland ownership, more companies will seek to own the more productive lands that are close to their manufacturing facilities. This is due to the rise in transportation costs associated with the deregulation of the transportation industries.

The leasing of timberlands is often the only way that an undercapitalized forest industry firm can provide adequate wood supply protection (Sizemore 1976). Leases can also provide private nonindustrial forest owners with professional timber management at reasonable cost (Shaffer 1984). The leasing of timberland began in the 1930's (Segur

1960). The acreage under various forms of leases in the South appeared to peak at around 6.7 million acres in 1970 (Siegel 1973). Recent surveys indicate that this figure has decreased to about 4.66 million acres in 1984 (Meyer 1984). Meyer discovered that only 34 percent of the firms with leases in 1984 were actively seeking more such agreements, whereas Siegel found that 51 percent of firms with leases in 1970 were seeking more. The decline in the popularity of leasing may have been caused in part by the potential for disputes with the IRS for both industry and landowners over the expensing of contract payments. Cases involving litigation between landowners seeking to break long-term contracts and forest industry firms have increased due to the inflexibility in most contracts and a rapidly changing economic environment. Also, many landowners are wary of long term forestry commitments when higher and better future uses may be possible.

Recently, firms have initiated or expanded landowner assistance programs as a source of wood. According to Shaffer (1982), a LAP agreement between a landowner and company typically involves the following basic terms: (1) The firm prepares a timber management plan for the landowner. If the owner accepts the plan, the firm is then authorized to carry out the various operations (silvicultural, maintenance, and other) described in the plan, often at cost. (2) The firm receives a right of first refusal or another arrangement to buy any stumpage sold from the land during the term of the contract. (3) Contracts are usually not binding, and can be terminated within one to six months by written notice from either party. Studies of LAPs in Louisiana (Cleaves and O'Laughlin 1983) and Georgia (Cubbage and Skinner 1985) confirm the existence of these types of terms and conclude that there is a widely held belief among managers of LAPs that a successful program must have open communication with the landowners and deliver services at a fair price.

Some forest products firms own very little timberland and must depend upon public land and the nonindustrial private forest landowners (especially in the South) for their timber needs. Forestry firms with large acreages of fee land also use public and NIPF lands as additional sources of wood.

Currently, sealed bidding is the preferred method of selling stumpage by landowners and foresters in the more competitive areas of the southern U.S. (Shaffer 1985). Wiener (1979) found that timber sold through sealed bids on national forest land usually brought higher prices than sales sold by auction. In a study of national forest timber sales in Washington and Oregon, Haynes (1980) found that sealed bidding attracted more outside bidders than oral auctions, and thus increased timber prices. The success of purchasing timber on the open market in each region depends on the landownership pattern, the competition among buyers, the timber sellers' plans, and traditional practices (Harris 1988).

Capital Budgeting in Forest Industry

Capital budgeting is used in the forest products industry to determine how much to invest in various projects. Acquisition of raw material sources, such as fee land, leases, and LAPs, must compete with manufacturing facilities, as well as other assets that are used to achieve wealth maximization goals.

In surveys of major forest products firms (Cubbage and Redmond 1985 and Bailes et al. 1979) discounted cash flow techniques were found to be the preferred criteria for

investment decisions. Internal rate of return was the most commonly used decision criterion, despite the theoretical superiority of net present value. Internal rate of return is probably the most widely used decision criterion because managers find it more intuitively appealing than net present value (Brigham and Gapenski 1988). The surveys also found that many firms were disinclined to use quantifiable techniques or other objective methods to account for an abnormal incidence of risk. Subjective estimates, sensitivity analyses, and adjusting the discount rate were used most commonly to adjust for risk. Most firms considered timberland investments to be no more risky than other corporate investments.

Recently, several capital budgeting models have been developed for forest industry. Kronrad et al. (1985) have developed a methodology which helps a forestry firm allocate its budget among different sources of wood in such a way that the needed volumes of wood are procured at least cost. LAPs can be compared to fee land, leased land, and the open market as potential sources of raw material based on costs and the probability that wood will actually be procured from each source.

The Quick-Silver Forestry Investment Analysis Program (Vasievich et al. 1984) is a discounted cash flow analysis program which allows the entry of forestry activities, their associated cash flows, and economic variables as inputs. Quick-Silver combines the cash flows of capital expenditures and expenses such as planting, property taxes, management expenses, and carrying charges, with revenues that are received from thinnings, a final harvest, and nontimber revenues to generate a series of financial criteria for the decision maker's consideration.

Chambers et al. (1986) developed the Forest Products Investment Model (FPIM). The FPIM is a microcomputer-based investment analysis tool which allows the decisionmaker to incorporate future risk into investment analysis. This risk is reflected through user defined probability density functions for operating cash flows and salvage value.

The results of these studies helped in the development of hypotheses about LAPs. The following chapters containing LAP survey methods and results, and capital budgeting case studies, were formulated from information presented in the literature review.

Chapter III

SURVEY METHODS AND RESULTS

In order to accomplish the objectives of this study, information was sought from the forest industry firms that have landowner assistance programs. The methods and results are discussed in this chapter.

Survey Methods

Mail survey

A mail survey of forest industry firms in the South was conducted to determine the current characteristics and management strategies of landowner assistance programs. Firms offering LAPs listed in the "Forest Farmer 1989 Manual Edition" and all firms listed in the January, 1989 "Timber Harvesting" Woodlands Directory with operations

in the South were mailed a questionnaire. The survey results include primarily medium and large forest industry firms that have formalized their landowner assistance programs. The study area included the following twelve southern states: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia (Figure 1).

A total of 71 questionnaires were mailed. Thirteen were mailed to separate operating divisions of larger companies. These divisions will be included as individual companies in the results. Follow-up phone calls and letters helped to produce a response rate of 89 percent or 63 responses. A copy of the questionnaire is shown in Appendix A. Some of the questions were adapted from earlier studies (Meyer 1984, Skinner 1989, Skinner and Cabbage 1985), and others were devised for this study. Questions were designed to provide information on:

1. Current number of acres and landowners enrolled.
2. Minimum qualifications for enrolled land.
3. Terms of agreement and termination.
4. Types and prices of services offered.
5. Degree of competition and cooperation between LAPs and other forms of technical forest management assistance.

Telephone interviews

Telephone interviews were conducted with land managers of three firms that had terminated their LAPs. Questions of relevance were:

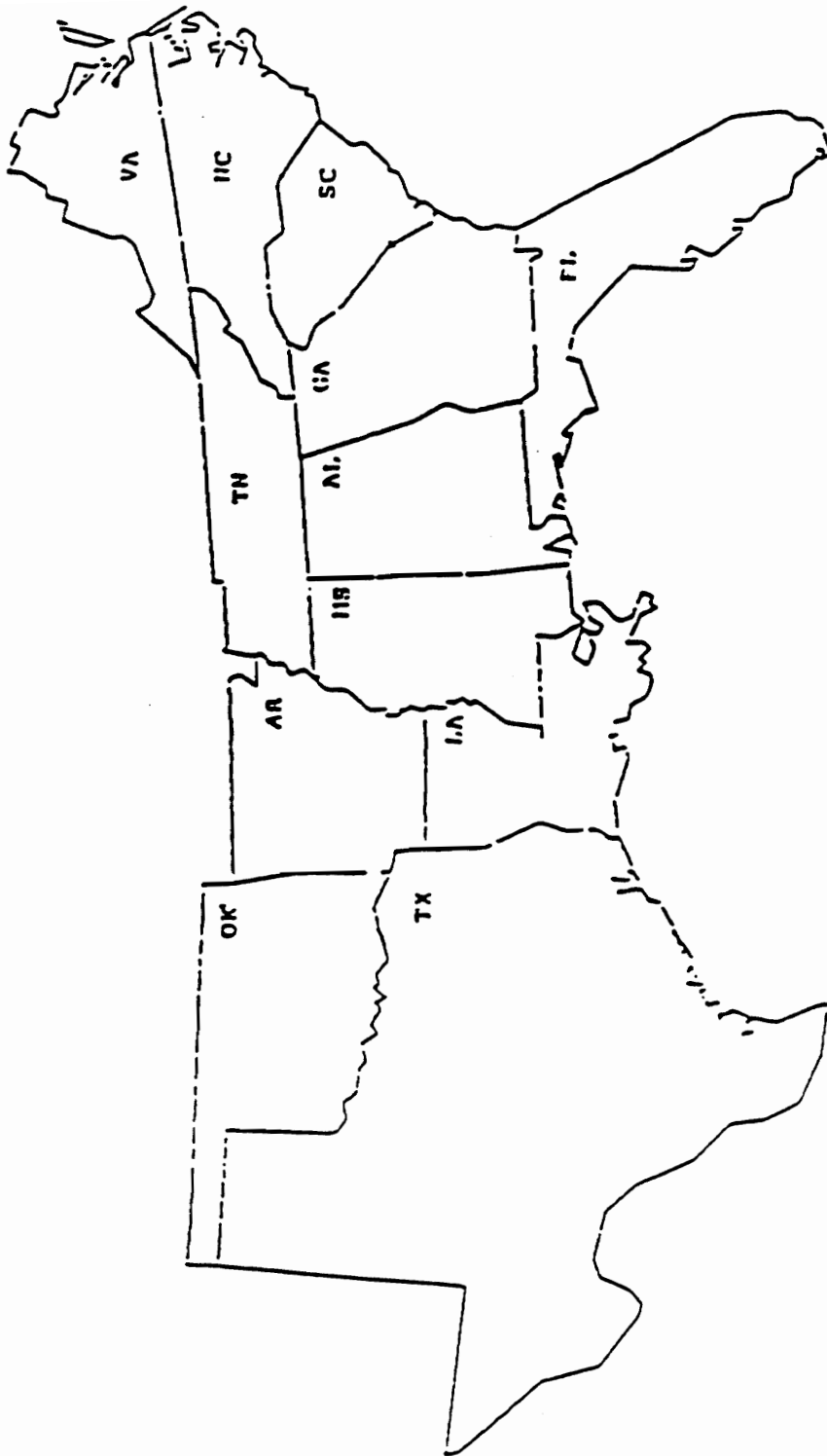


Figure 1. Southern states included in forest industry questionnaire.

1. How long was the program in existence?
2. Why was the program discontinued?
3. How many acres and landowners were enrolled?
4. What happened to the agreements?

Personal interviews

Personal interviews were conducted with three managers of industrial LAPs to obtain:

1. Background information on their LAPs.
2. Reasons why their LAP is successful.
3. Opinions regarding LAPs and their role in the timber supply strategies of their firm and the forest industry as a whole.
4. Cost data for a capital budgeting model case study.

Information obtained from the survey and interviews are discussed in the following section.

Mail Survey Results

Twenty-eight of the 63 responding firms have formal landowner assistance programs. One of the responding firms has 3 divisions in the South that operate as independent units. These independent units answered the questionnaires as if they were separate

companies. Therefore, 30 independent units (referred to as firms or companies) are treated as having formal LAPs in the results. A few firms, who indicated that they provide services to landowners only on an informal basis, were not included. These firms had no formalized programs in which personnel and capital were designated to specifically aid landowners. They provided limited services such as free or discounted seedlings, prescribed burning, and other considerations in exchange for reduced timber prices, right-of-ways across a landowner's property, or similar benefits on a case-by-case basis with landowners.

Acreage estimates

The total number of agreements (11,215) and acres (4,798,274) under LAPs in the South is shown in Table 1.¹ These figures represent a 22 percent and 12 percent increase over the 8,700 agreements and 4,214,000 acres respectively, that Meyer (1984) found in 1984, even though Meyer's survey included many smaller firms not included in the present survey. Assuming that all acreage reported in Table 1 is forested, almost 4 percent of the South's NIPF land acreage is in LAPs sponsored by medium to large firms (USDA Forest Service 1988). The average LAP tract size of 428 acres is larger than the average southern NIPF holding of 47 acres by a factor of 10 (Birch et al. 1982). This indicates that LAP participation appeals to landowners with relatively large holdings, who are more likely to be interested in financial returns from timber management than their counterparts with limited acreage. It further suggests that industry has targeted

¹ In the following tables, the percentage figures may not always sum to 100 percent due to rounding.

TABLE 1.

Total number of landowner agreements and acres covered under landowner assistance programs offered by medium to large firms in the southern U.S. 1989.

	Totals
Number of agreements	11,215
Number of acres	4,798,274
Average tract size (acres)	428

larger holdings for recruitment into their programs for economies of scale in management and administration, as well as for the above reasons.

The average tract size ranges from 109 to 8,462 acres per firm, with most firms reporting an average tract size between 250 and 1,000 acres (Table 2). A majority of the responding companies reported that most of the landowners in their LAPs own less than 500 acres (Table 3). This corresponds with the results of a survey of LAPs in Georgia (Skinner and Cabbage 1985).

The number of agreements in LAPs per firm is shown in Table 4. On the average, there are 374 agreements per firm. If the firm with the greatest number of agreements is excluded from the calculation, the average becomes 248 agreements per firm, which seems typical of the industry. The average number of LAP acres per firm, 159,942 acres (Table 5), decreased to 112,975 acres per firm once the company with the most acres under its LAP is excluded from the calculation.

The state of Louisiana had the highest number of LAP agreements (1,886), while South Carolina had the most acreage (901,270) under LAPs (Table 6). Oklahoma had the largest average LAP tract size of 836 acres. Louisiana had the smallest with 254 acres.

The majority of companies (63%) indicated that they planned to increase the size of their landowner assistance programs over the next five years (Table 7). The amounts of the planned increase per firm range from 5,000 to 250,000 acres, with an average increase of 68,375 acres (Table 8). Altogether, the surveyed companies plan to increase their LAP acreages by a projected 1,094,000 acres over the next five years. Several firms

TABLE 2.

Average tract size in landowner assistance programs per forest industry firm, 1989.

Average (acres)	Firms	
	Number	Percent
< 100	0	0
100 - 250	5	17
251 - 500	11	37
501 - 1000	7	23
1000 - 5000	5	17
> 500	2	7
<u>Total</u>	<u>30</u>	<u>100</u>

TABLE 3.

Estimated number of participants in forest industry
landowner assistance programs by landownership class,
1989.

Ownership class (acres)	Landowners	
	Number	Percent
< 100	1,973	18
100 - 499	3,625	32
500 - 999	933	8
1000 - 5000	443	4
> 5000	58	1
Data not provided	4,183	37
<u>Total</u>	<u>11,215</u>	<u>100</u>

TABLE 4.

Number of landowner assistance program agreements per forest industry firm, 1989.

Number of agreements	Firms	
	Number	Percent
1 - 5	2	7
6 - 10	0	0
11 - 20	2	7
21 - 50	2	7
51 - 75	6	20
76 - 100	3	10
101 - 200	6	20
201 - 500	4	13
501 - 1000	2	7
Over 1000'	3	10
<u>Total</u>	<u>30</u>	<u>100</u>

TABLE 5.

Total acreage under landowner assistance programs per forest industry firm, 1989.

Number of acres	Firms	
	Number	Percent
< 10,000	1	3
10,000 - 24,999	2	7
25,000 - 49,999	8	27
50,000 - 99,999	9	30
100,000 - 199,999	5	17
200,000 - 499,999	3	10
> 500,000	2	7
<u>Total</u>	<u>30</u>	<u>100</u>

TABLE 6.

Number of landowner agreements and acres covered under
landowner assistance programs by state, 1989.

State	Number of landowners	Number of acres
Alabama	981	619,114
Arkansas	1,482	404,148
Florida	503	407,867
Georgia	1,390	503,118
Louisiana	1,886	478,398
Mississippi	601	255,452
North Carolina	713	281,000
Oklahoma	10	8,362
South Carolina	1,820	901,270
Tennessee	239	96,840
Texas	628	204,857
Virginia	962	637,748
<u>Total</u>	<u>11,215</u>	<u>4,798,274</u>

TABLE 7.

Expected trends reported by forest industry firms for the number of landowner agreements under their landowner assistance programs over the next five years.

Expected trend	Firms	
	Number	Percent
Increase	19	63
Decrease	2	7
Constant	8	27
Data not provided	1	3
<u>Total</u>	<u>30</u>	<u>100</u>

TABLE 8.

Projected increase in acreage covered under landowner assistance programs per forest industry firm over the next five years.

Increase (acres)	Firms	
	Number	Percent
< 10,000	1	5
10,000 - 24,999	3	16
25,000 - 49,999	6	32
50,000 - 99,999	1	5
100,000 - 199,999	3	16
> 200,000	2	11
No set goal	2	11
Data not provided	1	5
<u>Total</u>	<u>19</u>	<u>100</u>

indicated that they have definitive acreage goals that they want to achieve, either on a per year basis or over the next three to five years, and then stop enrollment once the goals are reached. One company however, stated that they do not have firm goals for expansion, but often take "suitable" landowners with "suitable" land into their program as they become available.

One company reported that an increase in the size of their landowner assistance program is primarily dependent upon an expansion of mill facilities. If the mill expands, their LAP will probably double its current number of agreements and acres. Another company had just gone through reorganization and was unsure about the future size of its LAP.

Slightly more than half (53%) of the companies report that five percent or less of their timber requirements are provided through LAPs (Table 9). A few companies received no timber from their LAPs in 1989, whereas one company received as much as 36 percent of its requirements from LAPs. This firm has fairly low timber requirements and has a relatively small LAP enrolling less than 40,000 acres. A few companies indicated that their LAPs were relatively new and had not provided much merchantable timber yet. For example, one company stated that much of the land in their LAP had produced at less than half of its potential so far, but they were hoping to increase their yield in the long run.

One of the most important factors in the operation of a landowner assistance program concerns the percentage of timber offered for sale that a firm is able to successfully purchase from its landowners. Do landowners in LAPs tend to sell their timber to the sponsoring companies, or do they sell to other organizations? Somewhat remarkably,

TABLE 9.

Proportion of each forest industry firm's timber supply requirements met from landowner assistance programs, 1989.

Percent of requirements	Firms	
	Number	Percent
0 - 5	16	53
6 - 10	4	13
11 - 20	3	10
21 - 40	2	7
Data not provided	5	17
<u>Total</u>	<u>30</u>	<u>100</u>

over half (53%) of the companies are successful in purchasing at least 90 percent of the desired timber in their LAPs at time of sale (Table 10). Eight companies reported that they had purchased 100 percent of the desired timber put up for sale in their LAPs. Cleaves and O’Laughlin (1983), in a study of Louisiana LAPs, also found that the majority of landowners sold their timber to the assisting firms. Meyer (1984) and Shaffer (1982) note that landowners tend to sell their timber to the assisting firm due to a “right of first refusal” on timber sold by the landowner, and/or a sense of obligation to the company.

A right of first refusal basically means that, if the landowner takes other bids on his timber, the assisting firm has the right to match or exceed the highest offer. Rights of first refusal are also advantageous to companies with LAPs because they serve as a disincentive to competing firms who may consider bidding on the landowner’s timber. These competing firms may forego incurring procurement costs (e.g. timber cruising, appraisal, etc.) associated with bidding on a tract of timber if they know that the timber is under a right of first refusal. By discouraging competition, right of first refusals may allow assisting firms to purchase timber in their LAPs at below market prices. Even if there is no right of first refusal, competing firms may choose not to bid on a landowners’s timber if he or she is in a LAP, because the landowner may feel some obligation to sell to the assisting company (Shaffer 1989).

The divisions responsible for administering landowner assistance programs are shown in Table 11. Most LAPs were either administered by the timberlands group or were managed as a basically separate program from the timberlands and procurement groups. This may be an indication that many firms realize that the professional forestry advice offered by LAPs should not be compromised by the firm’s supply goals.

TABLE 10.

Proportion of desired timber offered for sale by landowners in industrial landowner assistance programs that was successfully purchased by sponsoring firms, 1989.

Percent successfully purchased	Number	Percent
< 60	1	3
60 - 69	2	7
70 - 79	3	10
80 - 89	4	13
90 - 100	16	53
Data not provided	4	13
<u>Total</u>	<u>30</u>	<u>100</u>

TABLE 11.

Administration of landowner assistance programs by
divisional organization, 1989.

Division	Firms	
	Number	Percent
Timberlands	11	37
Procurement	7	23
Timberlands and procurement	4	13
Separate program	8	27
<u>Total</u>	<u>30</u>	<u>100</u>

Terms of agreement

The proportion of firms with certain specific requirements for LAP enrollment is shown in Table 12. The majority of companies have minimum acreage limits (57%) and maximum allowable distances (80%) from processing facilities that landowners have to meet in order to enroll their land in a LAP. Several companies commented that landowners must also have a sincere interest in managing their timberland.

Minimum tract sizes range from 10 to 500 acres (Table 13). The average and median minimum tract sizes are 94 and 50 acres, respectively. Maximum allowable distances from processing facilities range from 35 to 150 miles, with an average of 75 miles (Table 14).

The entrance into some type of written contract or agreement, was the most common obligation imposed on landowners in LAPs that responding companies listed (Table 15). A few firms did note, however, that the written agreements are not legally binding and are basically "good faith" agreements. Some firms indicated that they would accept either a written or oral agreement. The written agreements can usually be terminated in 30 to 90 days by written notice from either the company or the landowner. There appears to be no correlation between a firm's insistence upon written agreements and the amount of management services offered. Firms that require written agreements offered an average of 19 services, while firms not requiring written agreements offered an average of 20 services.

In the present study, 37 percent of firms stated that they required a right of first refusal on timber sales, compared to 51 percent of the firms in Meyer's 1984 study. There

TABLE 12.

Number of forest industry firms with specific requirements for enrollment in their landowner assistance programs, 1989.

Requirement	Firms	
	Number	Percent
Minimum acreage limit	17	57
Maximum distance from mill or woodyard	24	80
Merchantable timber	7	23

TABLE 13.

Minimum tract size required by forest industry firms for participation in their landowner assistance programs, 1989.

Size (acres)	Firms	
	Number	Percent
No minimum	12	40
< 50	7	23
50 - 99	4	13
100 - 149	3	10
> 150	2	7
Data not provided	2	7
<u>Total</u>	<u>30</u>	<u>100</u>

TABLE 14.

Maximum distance from mill or woodyard required by forest industry firms for participation in their landowner assistance programs, 1989.

Distance (miles)	Firms	
	Number	Percent
No maximum	6	20
< 50	1	3
50 - 74	10	33
75 - 99	6	20
100 - 124	4	13
150	1	3
Data not provided	2	7
<u>Total</u>	<u>30</u>	<u>100</u>

TABLE 15.

Landowner obligations for participation in landowner assistance programs, 1989.

Obligation	Firms	
	Number	Percent
Written contract or agreement	17	57
Right of first refusal on timber sales	11	37
Give company opportunity to negotiate or bid for purchase of timber ¹	9	30

¹Ten companies did not state whether they required a right of first refusal or an opportunity to negotiate or bid on timber sales.

are several plausible reasons for this difference in results since 1984. Some firms may have simply eliminated their right of first refusals because it tended to discourage potential LAP participants who were wary of too much commitment. Some firms may have felt that it would be unenforceable and cause public relations problems if litigated. Finally, a few firms, perhaps due to their experience with LAP participants, may have felt that right of first refusals were unneeded.

Along with completed questionnaires, 7 of the responding companies with landowner assistance programs accepted an invitation to enclose copies of written contracts or agreements used in their LAPs. Some of the more common obligations included in the contracts are listed below for both the company and the landowner.

Company obligations:

1. Develop a management plan for the landowner's property and provide management advice, usually free of charge.
2. Provide technical services (e.g., site preparation and timber stand improvement) as prescribed in the management plan, usually at cost. The work may be performed by company personnel or contractors. If done by contractors, the company usually provides technical supervision or quality inspections of completed work.
3. Cooperate with state forestry commission in the prevention and suppression of forest fire on or near landowner's property.
4. The company assumes no liability for any damages or claims for personal injury, or otherwise arising from the landowner's operations on the property.
5. Indemnify and hold harmless the landowner from all claims by third parties arising out of the performance of its obligations under the agreement.

6. Provide information to the landowner on the availability and eligibility requirements for various governmental incentive programs for timber management.
7. If desired, the company will assist the landowner in enrolling in the American Tree Farm Program or a similar program such as Alabama's Treasure Forest Program.
8. Assist the landowner in selling products from the land that the company cannot use at the time of sale, if the removal of said products will improve the quality of the timber stands.

Landowner obligations:

1. Continue to pay all taxes on land and timber.
2. Warrant to the company that the landowner is in lawful possession of the subject property, and has full legal right to enter into the agreement.
3. Provide the company and its designated contractors with the right of ingress and egress to the property at all times for the purpose of carrying out the terms of the agreement.
4. Agree to hire a surveyor to establish boundary lines if necessary.
5. Agree to promptly pay the company or any vendors with whom the company contracts on the landowner's behalf, upon satisfactory completion of work or vendor's contract.
6. The landowner assumes no liability for any damages or claims for personal injury, or otherwise arising from the company's operations on the property.
7. Indemnify and hold harmless the company from all claims by third parties arising out of the performance of its obligations under the agreement.
8. The landowner agrees that the company cannot guarantee the success of any of the previously described programs and shall not be held liable.

9. Notify the company concerning any timber sales on the property.
10. Allow the company to negotiate for the purchase of any timber offered for sale (In some cases, if a negotiated price is not agreed upon, the company may exercise a right of first refusal on the timber).
11. Provide the company with a right of first refusal on all sales of timber from the property (At the extreme, if a landowner fails to give a right of first refusal, the company may require that the landowner pay them a certain percentage of the timber sale value).

Most, but not all of the preceding obligations may be included in a typical landowner assistance program agreement to some degree.

Types and prices of services offered

The preparation of a management plan is the most frequently offered service to a landowner who enrolls in a landowner assistance program. Pulpwood marking and sale, and site preparation burning are the most frequently offered practices (Table 16). These results are similar to the findings of Skinner and Cabbage (1985) in Georgia.

All of the services were offered free of charge. Whereas, the majority of the practices such as timber stand improvement, site preparation, regeneration, and road construction and maintenance were performed at the company's cost, excluding administrative expenses (Table 17). Some practices, such as forest land acquisition and sale, boundary location and marking, and Christmas tree management, were mostly offered free. Timber marking and sale is another practice performed mostly free, but in some cases it is of-

TABLE 16.

Types of forest management services and practices offered by
landowner assistance programs, 1989.

Forest management services and practices	Firms	
	Number	Percent
<u>Services:</u>		
Prepare management plan	29	97
Timber inventory and appraisal	28	93
Forest investment analysis	15	50
Tax advice	13	43
Tree farm inspections	25	83
<u>Practices:</u>		
Forest land acquisition & sale	10	33
Boundary location & marking	20	67
Xmas tree establishment/mgt.	1	3
Timber stand improvement		
Precommercial thinning	8	27
Prescribed burning	24	80
Chemical hardwood injection	19	63
Sprayed brush control	18	60
Site preparation		
Prescribed burning	28	93
Bulldoze/KG blade	25	83
Drum chopping	23	77
Disking/scarifying	15	50
Chemical application	23	77
Regeneration		
Machine planting	25	83
Hand planting	27	90
Provide seedlings	26	87
Harvesting		
Sawtimber	23	77
Pulpwood	24	80
Roads		
Firelane construction	21	70
Firelane maintenance	19	63
Road construction	17	57
Timber marking and sale		
Sawtimber	27	90
Pulpwood	28	93

TABLE 17.

Conditions under which forest management services and practices are offered to landowners by landowner assistance programs, 1989.

Forest management services and practices	Number of firms responding ¹	Conditions			
		Free	Discounted	At cost	Market price
Services:					
Prepare management plan	23	23	0	0	0
Timber inventory and appraisal	25	25	0	0	0
Forest investment analysis	14	14	0	0	0
Tax advice	13	13	0	0	0
Tree farm inspections	23	23	0	0	0
Practices:					
Forest land acquisition & sale	7	6	0	0	1
Boundary location & marking	12	6	0	3	3
Xmas tree establishment/mgt.	1	0	0	0	0
Timber stand improvement					
Precommercial thinning	7	0	0	4	3
Prescribed burning	16	5	0	7	4
Chemical hardwood injection	10	1	0	8	1
Sprayed brush control	12	1	0	9	2
Site preparation					
Prescribed burning	16	2	1	8	5
Bulldoze/KG blade	15	1	0	9	5
Drum chopping	15	1	0	10	4
Disking/scarifying	10	1	0	6	3
Chemical application	13	1	0	7	5
Regeneration					
Machine planting	15	2	0	10	3
Hand planting	16	2	0	11	3
Provide seedlings	21	6	2	7	6
Roads					
Firelane construction	13	3	0	5	5
Firelane maintenance	12	2	0	5	5
Road construction	13	3	0	5	5
Timber marking and sale					
Sawtimber	23	18	1	0	4
Pulpwood	23	18	1	0	4

¹Some firms chose not to provide data for this table.

ferred free only if the assisting firm purchases the timber. The fees charged for the various services and practices are summarized in Table 18. Their usefulness is limited because most firms chose not to respond to this question.

Cost comparison of assistance programs with the open market

When the overhead cost of operating a landowner assistance program is included, most companies (77%) report that wood obtained from their LAPs costs more or about the same as wood purchased on the open market (Table 19). This includes the cost of managing LAP timber. Of the three firms who reported that wood obtained from their LAPs costs less than open market wood, one firm credited the cost difference to the fact that most of their LAP timber is within a 100 mile radius of their mill, and is thus cheaper than open market wood purchases outside this zone due to lower transportation costs.

Many of the firms commented that in the short run, landowner assistance programs are expensive, but in the long run, they give the assisting firm a reliable source of wood, which gives them an advantage over other firms. Most firms stated that they paid market prices or more for timber in their programs, otherwise the programs would not be successful. The exception was one firm which noted that in negotiations with landowners, they were generally able to buy timber at a slight discount. Two other firms reported that they paid 3 and 10 percent more for timber on the open market than in LAPs. This may be an indication of the "cost" of management services received that landowners incur in terms of stumpage price by participating in a LAP. It is quite possible, that in negotiations over timber sales, some landowners may receive less than top

TABLE 18.

Range of fees charged for forest management services and practices by landowner assistance programs, 1989.

Forest management services and practices	Number of firms responding ¹	Measurement Unit	Fees charged		
			Low	Avg.	High
<u>Services:</u>					
Prepare management plan	1	acre	-	2.00	-
Timber inventory and appraisal	1	acre	-	2.00	-
Forest investment analysis	0	-	-	-	-
Tax advice	0	-	-	-	-
Tree farm inspections	0	-	-	-	-
<u>Practices:</u>					
Forest land acquisition & sale	0	-	-	-	-
Boundary location & marking	4	mile	50.00	73.75	100.00
Xmas tree establishment/mgt.	0	-	-	-	-
Timber stand improvement					
Precommercial thinning	1	acre	-	45.00	-
Prescribed burning	6	acre	.50	4.25	7.00
Chemical hardwood injection	5	acre	15.00	48.00	90.00
Sprayed brush control	5	acre	30.00	58.00	75.00
Site preparation					
Prescribed burning	9	acre	.50	5.10	8.00
Bulldoze/KG blade	8	acre	45.00	77.25	113.00
Drum chopping	7	acre	40.00	55.00	80.00
Disking/scarifying	5	acre	25.00	46.50	70.00
Chemical application	6	acre	70.00	80.20	90.00
Regeneration					
Machine planting	7	acre	26.50	39.00	52.00
Hand planting	7	acre	26.00	37.00	45.00
Provide seedlings	7	thousand	21.00	27.00	30.00
Roads					
Firelane construction	2	mile	-	125.00	-
	2	hour	-	31.00	-
Firelane maintenance	3	mile	-	58.00	-
		hour	-	30.00	-
Road construction	2	mile	-	5250.00	-
Timber marking and sale					
Sawtimber	2	acre	-	15.50	-
Pulpwood	2	acre	-	15.50	-

¹Only a few firms chose to provide actual cost data.

TABLE 19.

Forest industry estimates of cost of wood obtained through landowner assistance programs compared with cost of wood obtained on the open market, 1989.

Cost	Firms	
	Number	Percent
More	12	40
Less	3	10
About the same	11	37
No data provided	4	13
<u>Total</u>	<u>30</u>	<u>100</u>

market prices for their timber. A landowner's probability of receiving the highest possible price is considerably less when he sells the wood without allowing others a chance to bid on it in the open market (Frazer 1982).

Estimate of competition between technical assistance sources

Industrial landowner assistance programs generally experience very little to moderate competition for the provision of technical forest management assistance to nonindustrial, private forest owners (Table 20). Industry LAPs appear to experience the most competition from other industry LAPs, followed by forestry consultants, and public service foresters. Some consulting foresters have expressed misgivings towards industrial landowner assistance programs (Frazer 1982, Larson 1985), but several companies have commented that they have good relationships with consultants and public service foresters, and often refer landowners to them. One company reported that they will not knowingly recruit the clients of consultants. This may be an antitrust violation. Although it varies by state, some LAPs cooperate with public forestry agencies in delivering services such as burning and reforestation. Some also refer landowners to consultants for timber sales of products not consumed by the sponsoring firms.

A few firms, who encountered little competition from other sources of technical assistance, commented that there are far more landowners desiring forest management assistance than there are foresters of any employment to handle the demand. Hodges and Cabbage (1990) estimate that approximately 5 percent of the forest landowners in the South enlisted the aid of a forester to actively manage their land in 1987. With this apparently large number of landowners who do not utilize the services of a professional

TABLE 20.

Forest industry's estimates of competition from other sources for provision of technical assistance to nonindustrial, private forest owners, 1989.

Source of competition	Degree of competition		
	Little/None	Moderate	Heavy
	-----number of firms-----		
Forestry consultants	13	13	4
Public service foresters	21	9	0
Industry landowner assistance foresters from competing firms	11	14	5
Other	0	1	1

forester, there appears to be considerable opportunities for LAPs to expand. This assumes, of course, that the sponsoring firms have the projected demand for wood and the capital to expand. This also assumes that landowners are willing and financially able to have their timberlands managed.

In any discussion concerning competition between the landowner assistance programs of different companies, a common question might be; why should competition exist between LAPs if they increase the supply of timber and decrease stumpage prices, therefore helping all forest industry firms in the long run? Most LAPs primarily increase the supply of timber available to the assisting firms rather than the supply of timber available to competing firms, because as shown previously, most firms successfully purchase the vast majority of timber in their LAPs. Therefore, competition between LAPs occurs to some degree because firms prefer to have landowners with desirable timber in their program instead of another firm's LAP.

Additional comments from firms

Several firms noted that landowner assistance programs provide them an opportunity to explain and demonstrate good forest management practices and encourage landowners to more actively manage their land for timber. The LAPs also help to promote a good image of forestry as well as the forest industry.

Several firms mentioned that in order to develop a successful LAP, trusting relationships must develop between landowners and competent, experienced LAP foresters. The LAP forester must be fair with the landowners, but he also must do what is in the

company's best interest as well. A program that is not cost effective for the company is not good for the landowner in the long run, because the company will discontinue the service. Finally, a few firms stated that LAPs should not be judged solely on how much wood they bring in, as opposed to some other measures such as the number of acres planted or enrolled.

Telephone Interviews

Telephone interviews were conducted with three firms who had discontinued their landowner assistance programs. The discontinued LAPs had been in existence for an average of 17 years, and had an average of 35,000 acres enrolled in their last year of existence. Each firm indicated that they no longer honored any of the landowner agreements in the programs.

One company stated that their LAP was discontinued because the costs were higher than expected, and because of adverse litigation. Apparently, there was a high rate of mortality among the seedlings planted on landowners' property, and some landowners sued to get their money back. One company terminated their LAP because they felt that there were enough forestry consultants, public service foresters, and government incentive programs available in their area to help private landowners manage their forests. Another company gave no specific reasons for the termination of their LAP, saying only that it was a "corporate decision".

Personal Interview Results

Personal interviews were conducted with three managers of industrial landowner assistance programs. Information obtained from these interviews helped confirm some of the mail survey results, as well as provide additional background on the operation of LAPs.

Each company interviewed, stated that their LAP was created to help meet future wood supply needs and to serve as a public relations tool in which good relationships are developed between the company and landowners. One company's LAP evolved out of their procurement foresters' relationships with landowners in which the procurement foresters often provided advice to landowners on the management of their timber.

There was a consensus among the three firms, that in situations in which they were unsuccessful in purchasing timber from one or more of their landowners, that they had at least contributed to the overall supply of timber. They believed that this would decrease stumpage costs in the long run. Only one of the three firms required a right of first refusal on LAP timber sales. The same firm also required a written agreement which was legally binding for the first five years. It was adopted to help ensure that only landowners who are serious about actively managing their lands for timber will participate. The other two firms do not require a right of first refusal and have written agreements which are not legally binding.

Each firm considered a right of first refusal on LAP timber sales to be an advantage to the assisting firm because this provision discourages competition. They felt that

competing firms were somewhat reluctant to bid on timber under such LAP agreements. One firm stated that they would not pursue timber under right of first refusal agreements with other companies. The two firms without right of first refusals commented that they did not need them because of the goodwill and trust they had built with landowners over the years. Participation in a LAP without a right of first refusal was not considered to be discouraging to competition among potential buyers.

Two firms felt that, in negotiating with landowners for timber sales, the assisting firm could gain an advantage because market prices are not typically paid in negotiated sales. They cautioned however, that landowners should never be treated unfairly and that other considerations such as free seedlings are taken into account. The remaining firm stated that timber sale negotiations are not necessarily advantageous to the assisting firm because fair market prices must always be paid. This point of view is debatable, however.

Two firms indicated that they have good relations with consulting foresters, and that some landowners utilize the services of both LAP foresters and consultants. Although they stated that consultants in their area do not look at their LAP as a threat, they acknowledged that competition between LAPs and consultants does exist. One firm indicated that consultants do not particularly like their LAP because they believe that it threatens their livelihood. This firm also noted the existence of differences in the silvicultural practices of consultants and industry. For example, consultants tend to favor natural regeneration, whereas industry favors artificial regeneration. The reasons seem obvious because industry has more capital resources at their disposal. In their survey of technical assistance foresters in the South, Hodges and Cabbage (1990) found these differences to be fairly common.

All three companies attempted to avoid the appearance of a conflict of interest, in which the LAP forester represents both timber buyer and seller. They did this by keeping their land management assistance separate from their wood procurement function. The LAP forester's sole responsibility was to provide technical land management advice and services. Each firm's procurement foresters were responsible for bidding on or negotiating for each LAP landowner's timber at time of sale. However, the degree to which this arrangement succeeds in avoiding a conflict of interest is open to debate. For example, it can be argued that the separation of function and responsibility does not completely resolve the conflict of interest problem if the same firm which provides a landowner with technical assistance also attempts to purchase the timber.

Each firm reported that, as the number of acres and landowners in their LAPs increases, the number of foresters working with the programs increases as well. Each reported that their LAP personnel have a planned workload that allows them time to make sufficient contact with the landowners. One firm however, did express a desire to spend even more time with each landowner. Two of the firms felt that landowners, especially those residing in fairly rural areas, identified more with their LAP forester rather than the assisting firm. Each firm acknowledged the need for LAP foresters with the ability to communicate effectively with landowners and to develop solid, trusting relationships. One firm stated that their LAP forester positions were permanent, and not training positions. Their goal was to have only experienced foresters working in their program. Another firm admitted that personnel turnover was a problem in their program, and that landowners had to adjust to working with different foresters.

Each firm reported a high degree of landowner satisfaction with their LAPs. Some of the reasons given for the success and popularity of their LAPs among landowners included:

1. The LAP provides technical advice and forest management plan.
2. Landowners receive income from timber sales.
3. Market prices are paid for timber.
4. Landowners receive personalized attention. The LAP foresters strive to maintain frequent contact with the landowners.

The three firms indicated that the success of their LAPs was judged by the amount of wood purchased, the number of acres planted, and the number of landowners and acres enrolled. On a cautionary note, one firm noted that their upper management personnel were more concerned with the volume and cost of wood that the LAP procured, whereas the LAP foresters tended to be more concerned with how much land was reforested.

Meyer (1984) lists the following disadvantages of landowner assistance programs:

1. A landowner may frustrate a firm by choosing not to act on its management or harvesting advice.
2. The landowner may sell his timber elsewhere, especially if the market is competitive. Thus, the firm receives no financial return from the agreement.
3. LAPs tend to include tracts of relatively small sizes, resulting in high management expenses per acre.

Each of the interviewed companies confirmed that landowners who do not follow their advice are indeed a frustration, but are not considered a serious problem. After all, it is the landowner who ultimately decides what is to be done on the land. The LAP foresters merely provide advice and do not dictate to the landowners.

The problem of not receiving timber from the LAP agreements was not considered to be a serious one, since each firm was able to purchase the majority of their LAP timber. All firms reported that retention of participants in LAPs was satisfactory, and that there were no significant problems concerning the withdrawal of landowners from the program.

When asked if there was a problem with cost-effectiveness in their LAPs due to the management of many small tracts, all firms acknowledged the need for cost-effective management of LAP properties, especially the smaller tracts. One firm attempted to alleviate the problem by grouping small tracts in a particular area together for management. Another firm recognized the possibility of such a problem, but had not actually experienced it. Finally, the last firm also reported no problems with the cost-effectiveness of small tracts, indicating that many of the landowners in their program owned relatively large forest holdings, and that minimum acreage requirements were instrumental in keeping the average tract size in their LAP fairly large.

Chapter IV

CAPITAL BUDGETING ANALYSIS

Forest industries need accurate information about raw material costs in order to develop strategic wood supply plans. This chapter uses three case studies to illustrate a capital budgeting analysis of alternatives for that purpose.

Capital Budgeting Procedures

Landowner assistance programs were compared with fee land, leased land, and the open market supply, as sources of timber for case studies on three companies operating in separate states. Overhead costs (i.e., management, administrative expenses) were excluded. The case studies utilized the Forest Industry Landowner Assistance Evaluator (FILAE) computer program developed by Kronrad et al. (1985). The FILAE allows the user to compare various timber supply sources on the basis of the probable present

value of costs (PPVC) of the wood procurement investment. Since the delivered log values were assumed to be the same for all timber sources within each company, only costs were examined in this exercise. To determine the PPVC incurred per acre in procuring wood from each source in a given future time period, all costs are discounted to the present as shown below:

$$PPVC = I_o + \sum_{t=0}^n \frac{C_t}{(1+r)^t} + P \left[\sum_{t=0}^n \frac{S_t}{(1+r)^t} \right] \quad (1)$$

where,

PPVC = probable present value of costs per acre.

P = probability of harvest such that $(0 < p < 1)$.

I_o = initial reforestation costs per acre.

C_t = annual or periodic management, landholding, and procurement costs per acre.

S_t = stumpage, logging, and transportation costs per acre. The stumpage and logging costs, in addition to the procurement costs in the C_t , are derived by multiplying the cost per unit of wood times the number of units harvested per acre. The transportation cost is found by multiplying the cost per unit of wood by the number of miles. This product is then multiplied by the yield per acre.

r = real discount rate.

t = year in which cost occurs.

n = number of years of investment.

The PPVC per cord of harvested wood is found by dividing the above equation by the probable yield per acre. The probable yield is found by multiplying the probability of procurement by the yield per acre. For each timber source, the PPVC per cord increases as the probability of procurement decreases.

The probabilities used in the calculations were obtained for the case studies from the three firms involved in the analysis and represent the probability that wood will be procured from each potential source or strategy. Fee land, leases, LAPs, and the open market are basic timber procurement strategies employed by firms for obtaining raw material. The probability of procurement is usually highest on fee land. However, it is typically slightly less than 100 percent to reflect the risk from fire, insects, disease, and other involuntary conversions. The probability of procurement from leased land is normally nearly equal to that of fee land, however, since leases are occasionally broken, the estimate is reduced accordingly. Under LAPs, the probability of procurement reflects the landowners' possibility of deciding to leave the program or sell their timber to other buyers. The probability of procurement in the open market equals the average proportion of open market wood, on which the company bids, that the company normally obtains at competitive prices.

The categories of costs involved in wood procurement from each of the four strategies are shown in Table 21. Most, but not all of the costs will be realized under each of the procurement strategies. All costs in Table 21, were obtained or derived from cost data provided by the three firms. All costs are entered into the FILAE in 1990 dollars and are assumed to remain constant over the rotation length. That is, the costs do not include inflation over time. The PPVC was computed using real discount rates of 4 and 5 percent since these rates approximate the average long-run rate of return on investments

TABLE 21.

Costs which may be incurred by a company under the four wood procurement strategies.¹

Type of cost	Wood procurement strategy			
	Company-owned lands (fee land)	Leased land	Landowner assistance program	Open market
Initial reforestation (e.g., site preparation, seedlings, planting, etc.)	Y ²	Y	N ³	N
Annual or periodic management (e.g., fire protection, management plans, boundary maintenance, etc.)	Y	Y	Y	N
Landholding (e.g., opportunity cost, property taxes, leasing fees, etc.)	Y	Y	N	N
Procurement (company forester's time and equipment)	N	N	Y	Y
Stumpage ⁴	N	N	Y	Y
Logging	Y	Y	Y	Y
Transportation	Y	Y	Y	Y

¹Adapted from Kronrad et.al. (1985).

²Y = Yes, cost may be incurred; N = No, cost not incurred.

³Some companies may provide free seedlings.

⁴Wood obtained from fee and leased lands is not necessarily free. It is a cost to the procurement or mill group and a revenue to the land management group in companies with separate profit centers.

before taxes in the private sector of the U.S. economy (USDA Forest Service 1988). The costs and discount rates are both used in the same context with respect to inflation to give consistent results. The real rates were calculated from the following formula:

$$r = \frac{1+i}{1+f} - 1 \quad (2)$$

where,

r = real discount rate

i = nominal discount rate

f = inflation

A 8.16 percent nominal discount rate with a 4 percent inflation rate produced a 4 percent real discount rate when inserted into the formula. A 9.20 percent nominal discount rate with a 4 percent inflation rate produced a 5 percent real discount rate when inserted into the formula. The key variable for accounting for time in these calculations is the real discount rate. The FILAE required the inflation and nominal discount rates only to compute the real rates. Therefore, for any given real discount rate, the PPVC results will be consistent regardless of the inflation or nominal discount rates.

For the case studies, each firm's wood source is assumed to have the same acreage, yield, and timber rotation. It is also assumed that each tract is equidistant from the mill and that market prices will be paid for LAP and open market timber. Finally, all tracts will be planted to loblolly pine plantations. A sensitivity analysis determined the sensitivity of the PPVC for each wood source to a 20 percent change (increase or decrease) in the various input costs.

Case Study Results with Capital Budgeting

Company A

Company A procures wood from three sources: fee land, landowner assistance program land, and the open market. Each source is harvested at age 20, yielding 25 cords per acre of pulpwood. The company incurs logging and transportation costs of \$19.53 per cord and \$.25 per cord per mile respectively from each source. Costs specific to each source are discussed below:

Fee land

The company tract will be reforested at a cost of \$100.00 per acre for site preparation and \$56.30 per acre for planting. Annual costs are \$3.00 per acre for management costs and \$2.00 per acre for property taxes until harvest. The company also incurs an annual landholding opportunity cost of \$9.00 and \$11.25 per acre at real discount rates of 4 and 5 percent, respectively. The opportunity costs are calculated by multiplying the bare land value, obtained from the company - \$225 per acre, by the 4 and 5 percent real discount rates to reflect what this capital value could earn if invested elsewhere. The probability of procurement is 0.95.

Landowner assistance program

The landowner pays the site preparation and planting costs. Free seedlings are provided to the landowner enrolled in the LAP at a cost of \$14.30 per acre. The company also pays an annual management cost of \$2.10 per acre until harvest in addition to a procurement cost of \$1.76 per cord examined and a stumpage cost of \$9.00 per cord, both in year 20. The probability of procurement is 0.70.

Open market supply

The company incurs no land management costs. In year 20, a \$9.00 per cord stumpage price is paid as well as a procurement cost of \$1.76 per cord examined. Company A reported that their procurement cost on the open market and in their LAP was basically equal. The procurement foresters performed their own volume appraisals and did not use the LAP foresters' volume estimates. The probability of procurement is 0.45.

Results

The open market supply offers the wood supply strategy which provides Company A with the lowest probable present value of costs per cord with PPVC's of \$18.80 per cord and \$15.52 per cord at 4 and 5 percent real rates of return (ROR), respectively (Table 22). The landowner assistance program has the next lowest PPVC's at \$20.61 and

TABLE 22

Description of the wood procurement sources of Company A and the probable present value of costs for each source.¹

	Wood Sources		
	Fee land	LAP	Open market
Rotation (yrs)	20	20	20
Yield (cd/ac)	25	25	25
Mill distance (mi)	35	35	35
Acres	100	100	100
Site preparation cost (\$/ac)	100.00	0	0
Planting cost (\$/ac)	56.30	14.30	0
Annual management cost (\$/ac)	3.00	2.10	0
Annual tax cost (\$/ac)	2.00	0	0
Annual lease cost (\$/ac)	0	0	0
Annual opportunity cost (\$/ac) ²	9.00	0	0
Procurement cost (\$/cd)	0	1.76	1.76
Stumpage price (\$/cd)	0	9.00	9.00
Logging cost (\$/cd)	19.53	19.53	19.53
Transportation cost (\$/cd/mi)	.25	.25	.25
Probability of procurement	.95	.70	.45
Probable yield (cd/ac)	23.75	17.50	11.25
PPVC per cord at 4% ROR (\$)	27.50	20.61	18.80
PPVC per cord at 5% ROR (\$)	25.77	17.31	15.52

¹All costs are pretax.

²\$9.00 at the 4% ROR, and \$11.25 at the 5% ROR.

(Table 22). The landowner assistance program has the next lowest PPVC's at \$20.61 and \$17.31 per cord, respectively. The fee land followed as a distant last with the highest PPVC's of \$27.50 and \$25.70 per cord, respectively. Compared to the costs of the open market supply at the 4 percent ROR, the LAP and the fee land cost 10 percent and 46 percent more, respectively. At the 5 percent ROR, the LAP and fee land cost 12 percent and 66 percent more, respectively.

The probable present value of costs for each company in the case study have been calculated in Appendix B.

Company B

Company B obtains wood using all four strategies - fee land, leased land, landowner assistance program land, and the open market. Each of these timber strategies is predicated on a harvest at age 20, yielding 25 cords per acre of pulpwood. The company incurs logging and transportation costs of \$20.17 per cord and \$.25 per cord per mile, respectively. Costs specific to each strategy are discussed below:

Fee land

Company tracts are site prepared at a cost of \$120.00 per acre and planted to loblolly pine at a cost of \$60.00 per acre. The company pays \$4.70 per acre for management costs and \$2.00 per acre for property taxes, annually. In addition, annual opportunity costs

are \$11.00 per acre and \$13.75 per acre costs at 4 and 5 percent ROR, respectively. The bare land value is \$275.00 per acre. The probability of procurement is 0.98.

Leased land

The company manages leased tracts as if they were fee lands. Consequently, the site preparation, planting, and annual management costs are identical to those of the company-owned tract described above. The company pays the \$2.00 per acre property tax and a lease payment of \$8.00 per acre annually. The probability of procurement is 0.98. On leased lands, the probability of procurement is typically expected to be less than that of fee land due to the possibility of problems involving landowners who desire to "break" the lease. Company B emphasized, however, that in their experience, they have never had any contract problems with landowners, and therefore, leased lands are just as reliable as fee lands in terms of timber supply.

Landowner assistance program

The landowner pays site preparation and planting costs. Free seedlings are provided to the landowner at a cost of \$19.72 per acre to the company. The company incurs an annual management cost of \$4.00 per acre, as well as a procurement cost of \$3.68 per cord and a stumpage cost of \$13.75 per cord, both in year 20. The probability of procurement is 0.88.

Open market supply

The company incurs no costs until year 20, when a procurement cost of \$3.68 per cord and a stumpage cost of \$13.75 per cord are paid. Company B reported that their procurement cost on the open market and in the LAP was equal. The procurement foresters performed their own volume appraisals and did not use the LAP foresters' estimates. The probability of procurement is 0.40.

Results

The open market supply provides Company B with the least costly source of wood with PPVC's of \$23.67 per cord and \$19.55 per cord at 4 and 5 percent real RORs, respectively (Table 23). The landowner assistance program tract has the next lowest PPVCs of \$24.75 and \$20.75 per cord, respectively. Leased land's PPVCs were \$28.70 and \$25.72 per cord, respectively. Finally, the fee land had the highest PPVC's at \$30.36 and \$28.65 per cord, respectively. Compared to the costs of the open market supply at the 4 percent ROR, the LAP, leased land, and fee land cost 4.5 percent, 21 percent, and 28 percent more, respectively. At the 5 percent ROR, the LAP, leased land, and fee land cost 6 percent, 32 percent, and 47 percent more, respectively.

Company C

Company C obtains wood using three strategies - fee land, landowner assistance program land, and the open market. Each strategy is based on a harvest at age 20, and

TABLE 23

Description of the wood procurement sources of Company B and the probable present value of costs for each source.¹

	Wood Sources			
	Fee land	Leased land	LAP	Open market
Rotation (yrs)	20	20	20	20
Yield (cd/ac)	25	25	25	25
Mill distance (mi)	35	35	35	35
Acres	100	100	100	100
Site preparation cost (\$/ac)	120.00	120.00	0	0
Planting cost (\$/ac)	60.00	60.00	19.72	0
Annual management cost (\$/ac)	4.70	4.70	4.00	0
Annual tax cost (\$/ac)	2.00	2.00	0	0
Annual lease cost (\$/ac)	0	8.00	0	0
Annual opportunity cost (\$/ac) ²	11.00	0	0	0
Procurement cost (\$/cd)	0	0	3.68	3.68
Stumpage price (\$/cd)	0	0	13.75	13.75
Logging cost (\$/cd)	20.17	20.17	20.17	20.17
Transportation cost (\$/cd/mi)	.25	.25	.25	.25
Probability of procurement	.98	.98	.88	.40
Probable yield (cd/ac)	24.50	24.50	22.00	10.00
PPVC per cord at 4% ROR (\$)	30.36	28.70	24.75	23.67
PPVC per cord at 5% ROR (\$)	28.65	25.72	20.82	19.55

¹All costs are pretax.

²\$11.00 at the 4% ROR, and \$13.75 at the 5% ROR.

a yield of 30 cords of pulpwood per acre. The company pays logging and transportation costs of \$21.19 per cord and \$.23 per cord per mile, respectively. Costs specific to each source are discussed below:

Fee land

The company prepares and plants the site at a cost \$118.00 per acre and \$55.70 per acre, respectively. Annual property taxes and management costs are \$2.00 per acre and \$4.00 per acre, respectively. Annual opportunity costs are estimated to be \$12.00 and \$15.00 per acre, at the 4 and 5 percent real discount rates, respectively. The bare land value is \$300.00 per acre. The probability of procurement is 0.99.

Landowner assistance program

The landowner pays all direct costs of producing timber. The only timberland management cost to the company is the \$2.00 per acre annual management cost. In year 20, the company realizes a \$2.00 per acre procurement cost and pays a \$20.00 per cord stumpage price. The probability of procurement is 0.95.

Open market supply

The company incurs no costs until the timber is procured. In year 20, a \$2.50 per cord procurement cost is incurred, and \$20.00 per cord is paid for stumpage. The probability of procurement is 0.30.

Results

In this case, the landowner assistance program provides the least costly strategy for obtaining wood for company C (Table 24). The PPVC of the LAP is \$24.39 per cord and \$20.23 per cord at the 4 and 5 percent ROR, respectively. The open market supply is the second least costly strategy for obtaining wood with a PPVC of \$26.28 and \$21.70 per cord at the 4 and 5 percent ROR, respectively. Finally, the fee land is the most costly strategy with PPVC's of \$27.43 and \$25.68 per cord at the 4 and 5 percent ROR, respectively. Compared to the LAP at the 4 percent ROR, the open market supply and the fee land cost 8 percent and 12 percent more, respectively. At the 5 percent ROR, the open market supply and fee land cost 7 percent and 27 percent more, respectively.

Sensitivity Analysis

The probable present value of costs were tested to see how sensitive they were to various inputs used in the model. The rationale for the exercise was to determine if the

TABLE 24

Description of the wood procurement sources of Company C and the probable present value of costs for each source.¹

	Wood Sources		
	Fee land	LAP	Open market
Rotation (yrs)	20	20	20
Yield (cd/ac)	30	30	30
Mill distance (mi)	35	35	35
Acres	100	100	100
Site preparation cost (\$/ac)	118.00	0	0
Planting cost (\$/ac)	55.70	0	0
Annual management cost (\$/ac)	4.00	2.00	0
Annual tax cost (\$/ac)	2.00	0	0
Annual lease cost (\$/ac)	0	0	0
Annual opportunity cost (\$/ac) ²	12.00	0	0
Procurement cost (\$/cd)	0	2.00	2.50
Stumpage price (\$/cd)	0	20.00	20.00
Logging cost (\$/cd)	21.19	21.19	21.19
Transportation cost (\$/cd/mi)	.23	.23	.23
Probability of procurement	.99	.95	.30
Probable yield (cd/ac)	29.70	28.50	9.00
PPVC per cord at 4% ROR (\$)	27.43	24.39	26.28
PPVC per cord at 5% ROR (\$)	25.68	20.23	21.70

¹All costs are pretax.

²\$12.00 at 4% ROR, and \$15.00 at 5% ROR.

rankings of the PPVC's of each timber supply strategy, from least costly to most costly, could be altered by changing various combinations of individual costs by 20 percent. Logging costs had the greatest effect on the PPVC of each company. This should be expected because they are a major proportion of the costs. The cost to which the PPVC was least sensitive, varied by company and by timber supply strategy. Only those changes in costs which altered the rankings are discussed below.

For the case study of Company A, a 20 percent change in the cost of any individual management or harvesting practice did not change the ranking of the PPVC's (Appendix C, Tables 1-3). The open market supply remained the least expensive source of wood, followed by LAPs and fee land.

The PPVC's of Company B however, were more sensitive to changes in the input costs (Appendix C, Tables 4-7). A 20 percent decrease in the logging cost on fee land coupled with a 20 percent increase in the logging cost on the leased land, caused the leased land to become \$2.02 and \$.11 per cord more expensive than the fee land at the 4 and 5 percent ROR, respectively. A 20 percent decrease in the annual landholding opportunity cost on fee land coupled with a similar increase in the annual lease payment on the leased land, caused the leased land to become more expensive (by \$.45 per cord) than the fee land at the 4 percent ROR only. The leased land remained more expensive than the LAP land despite a 20 percent change in any input cost. The open market supply, Company B's least costly timber supply strategy, became \$2.60 and \$1.77 per cord more expensive than the LAP land at the 4 and 5 percent ROR, respectively when the logging costs were increased by 20 percent on the open market tract and decreased by 20 percent on the LAP.

For Company C, a 20 percent decrease in logging costs on the fee land coupled with a 20 percent increase in logging costs on the open market tract was necessary to cause the open market to become more costly (by \$2.71 per cord) than the fee land at the 4 percent ROR only (Appendix C, tables 8-10). A 20 percent increase in stumpage costs on the open market coupled with a 20 percent decrease in logging costs on the fee land produced similar results. Company C's least expensive wood source, LAPs, became \$1.97 and \$1.71 per cord more costly than the open market at 4 and 5 percent ROR respectively, when the logging costs were increased by 20 percent on the LAP land and decreased by 20 percent on the open market tract. Similar results were found when stumpage costs were increased on the LAP land and decreased on the open market tract.

Company A's PPVC rankings were not sensitive to 20 percent changes in the inputs. The ranking of the PPVC's in Companies B and C were altered by 20 percent changes in certain costs, however, many of the changes are unlikely. The rankings in these case studies appear quite stable.

Discussion of the Capital Budgeting Results

The previous analysis shows that the open market and landowner assistance programs are the least costly strategies of wood supply for each of the three firms. The open market strategy was the least expensive source of wood for companies A and B, primarily because no costs are incurred until the time of procurement. The probabilities of procurement on the open market were also relatively high (0.45 for Company A, and 0.40 for Company B) when compared to the probabilities of procurement on LAP lands

(0.70 for Company A, and 0.88 for Company B). For all case studies, the only land management costs incurred by the LAPs are seedling costs and annual management costs, thus giving LAPs a lower probable present value of costs than fee land or leased land, whose land management costs include site preparation costs, planting costs, annual management costs, lease payments, and opportunity costs.

For Company C, the landowner assistance program strategy is the least expensive source of wood. The company's probabilities of procurement are 0.30 and 0.95 for the open market tract and the LAP tract, respectively, indicating that the higher a firm's probability of procurement on LAP lands is in relation to the probability of procurement on the open market, the greater the chance that the LAP is the firm's least costly source of timber. It is possible that, when risk is accounted for, LAPs are the cheapest source of wood for many firms in the South. Over half of the mail surveyed firms indicated that their probability of procurement on LAP lands is 90 percent or greater, with eight firms reporting 100 percent success. If any of these firms operate in areas of high competition for timber, the probability of procurement on the open market may be sufficiently low as to allow LAPs to be their cheapest wood source. This is an important finding which may significantly account for the popularity of LAPs in the forest industry. In highly competitive timber markets, a comparatively low-cost timber source can give a firm a distinct advantage over competing firms.

Some industry management practices, such as grass control and hardwood brush control, are excluded from this analysis. If these types of practices are included, the PPVC's of the fee and leased lands would increase in relation to those of the LAPs and the open market supply. The costs of all management practices performed on fee and leased lands are paid entirely by the company, whereas on LAP or other NIPF lands,

these costs are paid partially or in full by the landowners. In companies A and B, the PPVC's for the most costly timber supply strategy - fee land, range from \$6.69 to \$8.70 per cord and \$9.10 to \$10.25 per cord greater than the PPVC's of the least costly strategy - the open market supply, at 4 and 5 percent ROR, respectively. The PPVC's for fee land in Company C are \$3.04 and \$5.45 per cord greater than the PPVC of the firm's least costly strategy - the LAP, at 4 and 5 percent ROR, respectively. If the added costs of intensively managed fee land are included, the range between the fee land costs and the LAP and open market supply costs would increase.

Assistance programs versus the open market supply

Under ideal conditions for a company, the open market supply strategy would be the ideal source of timber. Companies incur no land management expenses and pay no taxes on these lands, which frees their capital for other uses. But such ideal conditions rarely exist, especially over time. The probability of procuring open market wood compared to the probabilities of procuring LAP wood is relatively low due to competition between firms. Neither the available quantity, nor the price of wood on the open market can be predicted in the long term (Kronrad et.al. 1985). The prices paid for open market timber may be higher than prices paid for LAP timber, if there is no multi-firm competitive bidding for the LAP timber. A complicating condition is the the current level of regeneration after harvesting, which is inadequate on NIPF lands (Knight 1987). NIPFs are the primary source of open market wood. The major cost disadvantage of LAPs, when compared to purchases on the open market, is the existence of some timber management costs involved in LAPs.

Assistance programs versus long-term leases

LAPs are generally preferred by landowners to long-term leases. LAPs offer basically the same services, but require less commitment (Meyer 1984). However, lease payments are not guaranteed under LAPs as in most leases. The terms of LAP agreements are easier to break than leases if disagreements arise. This is a major advantage for landowners. In addition, the landowner, in many cases, may be allowed to sell his or her timber on the open market.

From the company's perspective, LAPs have the potential for improving the firm's public relations by fostering a cooperative business relationship between the firm and landowners. LAPs allow the company to obtain timber while permitting landowners some control in timber management. The firm has a potential source of wood without a large outlay of capital.

Potential disadvantages of LAPs include the probability that some landowners may withdraw from the program and/or sell their timber to another buyer; the possibility that LAPs may result in greater management expenses per acre since they tend to include tracts of smaller size than long-term leases; and the frustration that landowners may not follow the management advice rendered by the LAP. These problems, however, were not found to be significant in personal interviews with three LAP managers.

Assistance programs versus fee land

The elimination of property taxes is one advantage of LAPs over fee ownership. The firm's risk of takeover is reduced since the market value of timberlands is often higher than their stock price or book value (Clephane 1978). LAPs have the potential for improved public relations. Finally, a firm's supply of timber is increased without incurring land acquisition costs.

Disadvantages of LAPs vs. fee ownership are basically the same as those of LAPs vs. long-term leases. Additionally, fee land offers the company greater certainty, control, and flexibility in management and harvesting. Owning large acreages of fee timberland can serve as a barrier to the entry of other forest products companies in a particular area (O'Laughlin and Ellefson 1982), as well as stabilize timber prices. Finally, ownership of fee land can increase a firm's debt capacity. This could potentially increase the firm's bond rating.

The results of the capital budgeting analysis, and the above comparisons of LAPs with other industry strategies of wood supply, suggest that the view of landowner assistance programs as a relatively low cost and reliable timber source is enhanced. At least for the case studies of the three firms in the analysis, LAPs appear to be a less costly source of wood than fee or leased lands. LAPs also compete well with the open market in terms of cost. LAPs are more reliable than the open market. It appears unlikely however, that LAPs will completely supplant fee and leased lands for strategic reasons and because of greater flexibility offered by these lands. The open market will always serve as a widely used timber source for the forest industry, due to the large acreage under NIPF landowner control in the South. LAPs provide a viable strategy of wood

procurement which can be utilized in conjunction with any other wood strategies to lower overall raw material costs.

Other Considerations

Most forest industry firms have different management goals, procurement strategies, and manufacturing costs. It is highly probable that the ranking of timber strategies for the firms in this analysis, from least costly to most costly, will differ from other firms. The terms of agreement involved in forest industry leases and LAPs vary considerably by region within the South. Operating conditions, competition, and alternative land uses have a significant impact on the types and amounts of expenses the forest products companies incur. In this analysis, harvesting, transportation, and stumpage costs were held constant for each tract within each company. The distance between each tract and the mill was held constant as well. In practice, harvesting costs on fee and leased lands may be lower than those on LAP or other NIPF lands, due to more intensive management (e.g., roads, brush control, and pre-commercial thinnings) on the industry-controlled lands. Transportation costs may be lower on fee and leased lands, as well as LAP lands, since firms typically manage these lands relatively close to a mill. Although companies desire to procure open market wood in close proximity to a mill, they may be forced to procure wood from greater distances in areas of high competition for open market wood, thus increasing transportation costs. Stumpage costs may be lower on LAP lands than on other NIPF lands if a firm purchases LAP timber through negotiations with a landowner. The price they pay for negotiated timber (due to other considerations) is less than what they would pay if other firms had been allowed to compete

through a sealed-bidding process. Additionally, income taxes would be more favorable to fee lands relative to LAPs since companies can deduct management expenses such as prescribed burning and precommercial thinning in the year in which they occur on fee lands. Given these possible differences in costs and hauling distances, LAPs still appear to be a competitive strategy of wood supply in terms of cost.

In terms of revenue, fee and leased lands may be more desirable. Greater control permits increased timber yields in a shorter span of time. The degree to which greater revenues offset management and acquisition costs varies by firm. Some firms may simply not be able to justify paying today's land prices in those regions that are experiencing high rates of manufacturing, recreational, and residential development. Also, depending on site productivity and the types of silvicultural practices undertaken, increases in management intensity and cost may result in only marginal gains in yield. Firms can realize additional revenues from the leasing of fee lands to hunting clubs, especially in high population growth areas. This includes the need for careful attention to public relations gains and the careful management of relationships with the communities in which forest industry firms operate.

Chapter V

DISCUSSION AND CONCLUSIONS

This study was undertaken to determine the economic factors influencing industrial landowner assistance programs as a source of timber supply for forest industry in the South. It was carried out in two parts. First, a survey of landowner assistance programs across the South was undertaken to determine their current characteristics and management strategies. Second, a capital budgeting analysis compared the cost of LAPs with other timber supply strategies. The survey information and the capital budgeting exercise were combined with secondary data to provide the following analysis of the importance of LAPs to the forest industry and to society as a whole. The report also suggests possible further directions for research involving industrial landowner assistance.

Importance of Assistance Programs to Forest Industry

Forest industry obtains the raw material for its manufacturing operations from fee land, leased land, the open market, and landowner assistance programs. LAPs are increasing in importance as a source of timber supply in the South.

In the present study, 11,215 landowners and 4,798,274 acres were found to be enrolled in LAPs sponsored by medium-to-large firms in the South in 1989. This represents a 22 percent increase in the number of agreements (8,700) and a 12 percent increase in the acreage (4,214,000) over the results found in 1984 (Meyer 1984). Assuming all acreage reported in the present study is forested, almost 4 percent of the South's NIPF acreage is managed under LAP agreements. Furthermore, the surveyed forest industry firms indicated that they plan to increase the size of their LAPs by 1,094,000 acres over the next five years. These figures suggest that LAPs are indeed gaining in importance to forest industry. The reasons for these changes are complex, but the results of the survey and case study analysis offer some insights.

Landowner assistance programs provide a reliable, low-cost source of raw material relative to the other timber supply strategies. Over half (53%) of the surveyed firms successfully purchased at least 90 percent of the desired timber sold in their LAPs in 1989. Eight companies reported that they purchased 100 percent of the desired timber put up for sale in their LAPs. In their study of Louisiana LAPs, Cleaves and O'Laughlin (1983) also found that the majority of landowners sold their timber to the sponsoring firms. These firms' success in purchasing LAP timber may be due in part to the right of

first refusal on LAP timber, which some firms require, but it may also be due in large part, to a sense of obligation and loyalty that landowners feel towards the assisting firms.

The case studies in the capital budgeting analysis demonstrated that LAPs can be a competitively low-cost source of timber for three forest industry firms when the risk or probability of actually procuring timber is factored into the analysis. For Companies A and B, the open market was the least costly source of wood, with a rate that was \$1.00 to \$2.00 per cord cheaper than LAPs at 4 and 5 percent real rates of return. In Company C, the LAP was the least expensive wood source costing \$1.89 and \$1.47 per cord less than the open market at 4 and 5 percent real rates of return, respectively. This analysis suggests that the greater a firm's probability of procurement in LAPs is in comparison to the probability of procurement on the open market, the greater the chance that LAPs are the firm's least expensive timber supply strategy. For Companies A and B, the probabilities of procurement in the LAP were 0.70 and 0.88, respectively. The probabilities of procurement on the open market were 0.45 and 0.40, respectively. Company C's probabilities of procurement were 0.95 in the LAP and 0.30 on the open market. Since most of the surveyed firms indicated that they purchased the vast majority of desired timber in their programs, LAPs are possibly the cheapest timber supply strategy of many firms that operate in areas of heavy competition for timber in the South. In the forest industry, where 72 percent of solid wood production costs (Ellefson and Stone 1984), and 20-30 percent of pulp and paper production costs (Shaffer 1990) are in raw material, LAPs as a relatively low-cost timber source are a potentially critical competitive factor.

The importance of LAPs in terms of current merchantable timber supply should be kept in perspective however, as the majority of surveyed firms note that less than 5 percent of their timber requirements were supplied by LAPs in 1989. This is partially

explained because the LAP acreage in many firms is small compared to the acreage under other forms of industry control (i.e., fee and leased lands). Also, the total acreage of timberland on which industry procurement foresters procure open market timber is very large in relation to the acreage under LAPs. Several firms indicated that much of their LAP timber is currently at a premerchantable age, and will play a more important role as a source of wood in the long run.

LAPs can increase the overall supply of timber in the South through the combination of their reforestation, timber management advice, and technical assistance. The increase in supply may decrease timber prices in the long run, assuming that timber supply increases at a greater rate than the demand for timber. This belief was voiced by each LAP manager personally interviewed as well as several firms participating in the mail survey.

On NIPF lands, the volume and net annual growth of pine is expected to decrease before the year 2000 (Knight 1987). If such a decrease occurs, many forest industry firms may be prompted to rely more on their fee and leased lands, and/or increase the level of management on NIPF land through technical management assistance offered by LAPs, and other programs. When coupled with expected increases in the demand for wood products (USDA Forest Service 1988), an increase in the accessible timber supply should be highly desirable to the forest industry. Most pulp and paper companies have large-scale economies and capital intense manufacturing facilities. Sufficient quantities of wood must be available to keep a pulp and paper mill in operation, as the economies of continuous operation at full capacity make it uneconomical to shut down a mill for any reason other than scheduled maintenance (Clawson 1977, O'Laughlin and Ellefson 1982).

From the standpoint of increased competitiveness in the world marketplace, an increase in the available supply of efficiently produced wood is necessary if the U.S. forest industry is to remain competitive as a producer of forest products. Competition from foreign countries, Brazil for example, is increasing. With the impending democratization of the former Warsaw Pact countries in eastern Europe, there is a potential for new markets for U.S. forest products. In order to meet increasing domestic demands for wood products as well as effectively compete in overseas markets, the U.S. must have increased productivity on its timberlands. In the South, LAPs can aid in the accomplishment of this goal.

Landowner assistance programs also offer an excellent means of improving the public image of the sponsoring companies, and promoting the practice of forestry. With the reemergence of controversies over the clearcutting of timber, wetlands logging, and preservation versus harvesting of old growth timber on the West coast, much of the forest industry's recent national publicity has been negative. In the South, LAPs can provide an excellent vehicle for promoting forest industry's desired image as a responsible steward of the land by educating landowners and assisting them to achieve desired goals using proper forest management techniques. LAPs develop a rapport between industry and NIPF owners. This is strategically important to the forest industry, since NIPF landowners hold approximately 67 percent of the South's forest land. In our increasingly environment-conscious society, it is vital that the forest industry demonstrate for the American public that forests can be actively managed to preserve the productivity of the soil, provide optimum wildlife habitat, and maintain water quality. LAPs are one way of providing a concrete example that can be communicated to landowners and the general public.

These reasons for the increase in popularity of landowner assistance programs in the forest industry seem pervasive. Why then do many firms choose not to have a LAP?

The start-up costs of a LAP may be considered too high for some firms. Considerable time, effort, and expense must be devoted to creating the program, encouraging landowners to join, and developing trust between the company and landowners before wood materializes from these actions. Firms may feel that a LAP is not cost effective for their area of operation if the technical assistance provided to forest landowners by consultants, public service foresters, and other sources is considered to be sufficient. If a firm's current sources of wood (e.g., fee land, leased land, the open market) are satisfactory for the current and expected future needs, LAPs may appear unattractive. Finally, the majority of landowners in an operating area who desire to participate in a LAP may have already joined a competing firm's LAP, or there may be firms that are in the process of implementing a LAP.

Importance of Assistance Programs to Society

Society can potentially benefit from industrial landowner assistance programs. Landowners can gain financial advantages through the reforestation, management, and harvesting assistance that LAPs provide for their land. Society benefits from the amount of taxes landowners pay as their income increases. Governments use tax revenues to provide services that benefit all citizens, such as highways, schools, and national defense. In Mississippi, for example, technical forestry assistance rendered by service foresters was found to be profitable to the state by increasing tax returns (Straka, et al. 1986).

By helping to increase the supply of timber and thereby reducing timber prices in the long run, LAPs can aid in lowering the prices that consumers pay for wood products. More wood products will be consumed at lower prices, which could lead to an increase in the number of jobs in the forest industry. This is assuming, of course, that the forest industry firms pass the savings from reduced timber prices down to consumers in the form of lower end-product prices and that the demand for wood products is not perfectly inelastic.

A decrease in timber prices would be a disadvantage to timber investors and landowners. This will serve as a disincentive to future forestry investments. However, at present, LAPs contribute only a small proportion (5% or less) of most firms' timber requirements. The degree to which LAPs will influence future timber supply and prices remains to be seen.

Landowners, as well as the rest of society, receive values other than timber from LAP managed forest lands in the form of improved wildlife habitat, watershed protection, soil protection, aesthetic beauty, and recreational opportunities. This does not imply that these values would not exist in the absence of LAPs, for it is highly possible that substitution of LAP services for other (i.e., consultants, public service foresters) services occurs. The size of this substitution is not known, however.

Over the years, various studies have shown that the demand for timber will exceed supplies at current prices, indicating that market equilibrium will be achieved only if real prices increase (USDA Forest Service 1965, 1973, 1981). Additional studies have shown that sawtimber prices have increased at real rates of 1 to 2 percent per year for decades, whereas pulpwood prices have remained relatively constant (Skog and Risbrudt 1982,

USDA Forest Service 1982, 1988). Since real timber price-increases are considered undesirable to the forest industry, a number of private programs, such as LAPs, have been established to add to the timber supply. In the context of foreign trade, rising timber prices may reduce the comparative advantage of the U.S. forest products industry, causing the loss of firms, jobs, and value added.

On the other hand, rising timber prices benefit forest owners, possibly generating the incentives for increasing timberland investments. When a landowner compares the expected rate of return from a forestry investment with the expected rate from the best alternative investment of equal risk, the owner will invest in forestry only if its expected rate of return is greater than that earned by the best alternative investment (Duerr 1960). Higher timber prices can increase the rate of return from forest investments. So it appears that there are possible tradeoffs involved in landowner assistance programs. A decrease (increase) in timber prices, which is advantageous (disadvantageous) to forest industry is disadvantageous (advantageous) to forest landowners.

Conclusions

Industry-sponsored landowner assistance programs are increasingly a method by which nonindustrial, private forest landowners, primarily those with relatively large forest holdings, can regenerate and manage their timberlands in the South. Landowners can benefit from the management advice and the wide range of services that many LAPs offer, usually at cost. Even though most LAPs insist that they pay fair market timber prices, a potential disincentive for some landowners considering LAP participation is the

possibility that less than market prices will be received through timber sale negotiations with the firm, or through the existence of a right of first refusal in the LAP agreement. Savings realized from free management plans and advice, free or discounted seedlings, and management practices performed at cost, may or may not exceed the revenue foregone by accepting a less than top market price.

Perhaps the major disincentive for firms considering the establishment of a landowner assistance program is the high cost involved in developing and initiating the program. Costs can be high during the early years of a LAP with very little timber generated for the mills, as it takes time for trust to develop between the landowners and the company. It is to the advantage of the sponsoring firm to consistently fund and manage the LAP or discontinue it completely. Landowners are distrustful of LAPs that are not consistently supported by the sponsoring firm, and are reluctant to join such programs.

For those forest industry firms who choose to invest the time, manpower, and money in a landowner assistance program, the potential for gaining an advantage over competing firms exists in the form of a relatively reliable and competitively low-cost source of wood. Sponsoring firms appear to have very little difficulty in procuring the majority of desired timber in their LAPs. The majority of surveyed firms indicate that when overhead costs are included, LAP timber normally costs slightly more or about the same as timber purchased on the open market. When overhead costs are excluded, and the risk involved in actually procuring timber is included, using the Forest Industry Landowner Assistance Evaluator computer program (Kronrad et.al. 1985), the present value of costs of LAPs is shown to have the potential to be lower than those of other timber sources (i.e., fee land, leased land, and the open market). This is especially true when the prob-

ability of procurement on LAP lands is much greater than the probability of procurement on the open market.

Further Research

A survey and interview of landowners enrolled in industry-sponsored landowner assistance programs should be conducted to determine their characteristics, motivations, and degree of satisfaction with the programs. Opportunities for cost-effective improvement would be identified. A capital budgeting analysis could be conducted to determine how landowners fare under different types of technical assistance. The importance of multiple benefits to the landowner should be incorporated. Important questions to be answered include: If LAPs succeed in increasing the timber supply and reducing timber prices, how will forest investment decisions be affected? Does the welfare of forest industry preclude that of forest landowners? Is it possible for forest industry to obtain the raw materials it needs at a low cost, while landowners concurrently receive timber prices which encourage them to reinvest in forestry?

There has been much debate concerning whether or not public intervention in the form of government supported technical assistance is needed. A study could be conducted to address this problem by examining how the combination of LAPs and forestry consultants can eliminate the perceived need for public programs. The advantages and disadvantages of LAPs and consultants could be compared. If public programs are deemed necessary, the role they should play in relation to LAPs and consultants could be outlined.

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Appendix A

Landowner Assistance Program Questionnaire

LANDOWNER ASSISTANCE PROGRAM QUESTIONNAIRE

Name, title, and business
address of individual
completing questionnaire:

Name _____

Title _____

Address _____

Phone: () _____ - _____

Please indicate whether your responses
apply to:

_____ firm's entire southern operations

_____ one division or location (indicate in address)

Date: _____

Return questionnaire to:

Kevin D. Crowther
Room 310 Cheatham Hall
Virginia Tech Dept. of Forestry
Blacksburg, VA. 24061-0324

1. Please indicate the total number of landowner assistance (LAP) agreements and approximate total acres involved in the program.

	Number of Landowners	Acres
Alabama	_____	_____
Arkansas	_____	_____
Florida	_____	_____
Georgia	_____	_____
Louisiana	_____	_____
Mississippi	_____	_____
N. Carolina	_____	_____
Oklahoma	_____	_____
S. Carolina	_____	_____
Tennessee	_____	_____
Texas	_____	_____
Virginia	_____	_____

2. Estimate the number of your landowner assistance program participants (individuals) in each of the following ownership classes (in acres).

Number of landowners	Number of landowners
_____ < 100 acres	_____ 1000 - 5000 acres
_____ 100 - 499 acres	_____ 5000 + acres
_____ 500 - 999 acres	

3. Which division of your firm administers the landowner assistance programs?

_____ Timberlands _____ Procurement

_____ Both

_____ Other (specify)

4. In 1989, approximately what percentage of your firm's total requirements were met from landowner assistance programs? _____%

5. In 1989, approximately what percentage of the timber offered for sale by landowners in your program was successfully purchased by your firm? Do not include sales of products or species your firm was not interested in purchasing. _____%

6. Over the next five years do you expect the number of agreements under your landowner assistance program to: (check one)

_____ Increase _____ Decrease

_____ Stay about the same

If you expect an increase in the number of landowner assistance program agreements, how many acres do you hope to enroll over the next five years? _____

Comments: _____

7. Does your landowner assistance program have any specific requirements for enrollment with respect to the following:

Yes No

_____ _____ Minimum acreage limits. Acreage limit
Acreage limit (acres) _____

_____ _____ Distance from mill or concentration yard.
Mileage limit (miles) _____

_____ _____ Volume of merchantable timber.

_____ _____ Other - specify _____

8. What obligations are imposed on the landowners in the program? (e.g., written contract or agreement, right of first refusal on timber sales, other). _____

9. What level of competition for providing forest management technical assistance to nonindustrial private landowners do you experience from:

	Little/None	Moderate	Heavy
Forestry consultants	_____	_____	_____
Public service foresters	_____	_____	_____
Industry landowner assistance foresters from competing firms	_____	_____	_____
Other _____	_____	_____	_____

Comments: _____

10. When your firm's overhead cost of running the landowner assistance program is included, how does the cost of wood obtained from your assistance program normally compare with wood obtained on the open market?

_____ more _____ less _____ the same

Comments: _____

11. Check the services offered by your firm's landowner assistance program and indicate the average fee (if any) normally charged for each in 1989. Enter the most common unit on which fees are based. Please indicate whether each service was normally provided free, at a discount, at cost, or at the market price.

	Services offered ()	\$/Unit avg. fee	Is service provided free, discounted, at cost, or market price?
<u>Services:</u>			
Prepare management plan	_____	_____	_____
Timber inventory and appraisal	_____	_____	_____
Forest investment analysis	_____	_____	_____
Tax advice	_____	_____	_____
Tree farm inspections	_____	_____	_____
<u>Practices</u> (performed or arranged)			
Forest land acquisition & sale	_____	_____	_____
Boundary location & marking	_____	_____	_____
Xmas tree establishment/mgt.	_____	_____	_____
Timber stand improvement			
Precommercial thinning	_____	_____	_____
Prescribed burning	_____	_____	_____
Chemical hardwood injection	_____	_____	_____
Sprayed brush control	_____	_____	_____
Site preparation			
Prescribed burning	_____	_____	_____
Bulldoze/KG blade	_____	_____	_____
Drum chopping	_____	_____	_____
Disking/scarifying	_____	_____	_____
Chemical application	_____	_____	_____
Regeneration			
Machine planting	_____	_____	_____
Hand planting	_____	_____	_____
Provide seedlings	_____	_____	_____
Harvesting			
Sawtimber	_____	_____	_____
Pulpwood	_____	_____	_____
Roads			
Firelane construction	_____	_____	_____
Firelane maintenance	_____	_____	_____
Road construction	_____	_____	_____
Timber marking and sale			
Sawtimber	_____	_____	_____
Pulpwood	_____	_____	_____

12. If your firm pays more for timber on the open market than you pay for timber in your landowner assistance program, please estimate the approximate percentage difference _____%

Comments: _____

13. Would you be interested in a study concerning the attitudes and degree of satisfaction of landowners who are enrolled in landowner assistance programs?

_____ yes _____ no

14. We welcome any further comments or suggestions concerning landowner assistance programs (advantages, problems, etc.) in general or your landowner assistance program in particular.

Appendix B
Calculation of the Probable Present Value of Costs

All costs in the equations are already discounted.

In each equation: PPVC = probable present value of costs
(RC) = regeneration cost (site preparation plus planting costs)
(MC) = annual management cost
(TxC) = annual tax cost
(AIC) = annual lease cost
(OC) = annual opportunity cost
(LgC) = logging cost
(TrC) = transportation cost
(SC) = stumpage cost
(PC) = procurement cost
(P) = probability of procurement
(PY) = probable yield (cd/ac)

Company A

Fee land - 4% ROR

$$\begin{matrix} \$27.50 = [156.30 + 40.77 + 27.18 + 122.31 + .95(222.83 + 99.83)]/23.75 \\ \text{(PPVC)} \quad \text{(RC)} \quad \text{(MC)} \quad \text{(TxC)} \quad \text{(OC)} \quad \text{(P)} \quad \text{(LgC)} \quad \text{(TrC)} \quad \text{(PY)} \end{matrix}$$

Fee land - 5% ROR

$$\begin{matrix} \$25.77 = [156.30 + 37.39 + 24.92 + 140.20 + .95(184.02 + 82.44)]/23.75 \\ \text{(PPVC)} \quad \text{(RC)} \quad \text{(MC)} \quad \text{(TxC)} \quad \text{(OC)} \quad \text{(P)} \quad \text{(LgC)} \quad \text{(TrC)} \quad \text{(PY)} \end{matrix}$$

LAP - 4% ROR

$$\begin{matrix} \$20.61 = [14.30 + 28.54 + 20.08 + .70(222.83 + 99.83 + 102.69)]/17.5 \\ \text{(PPVC)} \quad \text{(RC)} \quad \text{(MC)} \quad \text{(PC)} \quad \text{(P)} \quad \text{(LgC)} \quad \text{(TrC)} \quad \text{(SC)} \quad \text{(PY)} \end{matrix}$$

LAP - 5% ROR

$$\begin{matrix} \$17.31 = [14.30 + 26.17 + 16.58 + .70(184.02 + 82.44 + 84.80)]/17.5 \\ \text{(PPVC)} \quad \text{(RC)} \quad \text{(MC)} \quad \text{(PC)} \quad \text{(P)} \quad \text{(LgC)} \quad \text{(TrC)} \quad \text{(SC)} \quad \text{(PY)} \end{matrix}$$

Open market - 4% ROR

$$\begin{matrix} \$18.80 = [20.08 + .45(222.83 + 99.83 + 102.69)]/11.25 \\ \text{(PPVC)} \quad \text{(PC)} \quad \text{(P)} \quad \text{(LgC)} \quad \text{(TrC)} \quad \text{(SC)} \quad \text{(PY)} \end{matrix}$$

Open market - 5% ROR

$$\begin{aligned} \$15.52 &= [16.58 + .45(184.02 + 82.44 + 84.80)]/11.25 \\ (\text{PPVC}) \quad (\text{PC}) \quad (\text{P}) \quad (\text{LgC}) \quad (\text{TrC}) \quad (\text{SC}) \quad (\text{PY}) \end{aligned}$$

Company B

Fee land - 4% ROR

$$\begin{aligned} \$30.36 &= [180.00 + 63.87 + 27.18 + 149.49 + .98(230.13 + 99.83)]/24.5 \\ (\text{PPVC}) \quad (\text{RC}) \quad (\text{MC}) \quad (\text{TxC}) \quad (\text{OC}) \quad (\text{P}) \quad (\text{LgC}) \quad (\text{TrC}) \quad (\text{PY}) \end{aligned}$$

Fee land - 5% ROR

$$\begin{aligned} \$28.65 &= [180.00 + 58.57 + 24.92 + 171.36 + .98(190.05 + 82.44)]/24.5 \\ (\text{PPVC}) \quad (\text{RC}) \quad (\text{MC}) \quad (\text{TxC}) \quad (\text{OC}) \quad (\text{P}) \quad (\text{LgC}) \quad (\text{TrC}) \quad (\text{PY}) \end{aligned}$$

Leased land - 4% ROR

$$\begin{aligned} \$28.70 &= [180.00 + 63.87 + 27.18 + 108.73 + .98(230.13 + 99.83)]/24.5 \\ (\text{PPVC}) \quad (\text{RC}) \quad (\text{MC}) \quad (\text{TxC}) \quad (\text{AIC}) \quad (\text{P}) \quad (\text{LgC}) \quad (\text{TrC}) \quad (\text{PY}) \end{aligned}$$

Leased land - 5% ROR

$$\begin{aligned} \$25.72 &= [180.00 + 58.57 + 24.92 + 99.70 + .98(190.05 + 82.44)]/24.5 \\ (\text{PPVC}) \quad (\text{RC}) \quad (\text{MC}) \quad (\text{TxC}) \quad (\text{AIC}) \quad (\text{P}) \quad (\text{LgC}) \quad (\text{TrC}) \end{aligned}$$

LAP - 4% ROR

$$\begin{aligned} \$24.75 &= [19.72 + 54.36 + 41.99 + .88(230.13 + 99.83 + 156.88)]/22.0 \\ (\text{PPVC}) \quad (\text{RC}) \quad (\text{MC}) \quad (\text{PC}) \quad (\text{P}) \quad (\text{LgC}) \quad (\text{TrC}) \quad (\text{SC}) \quad (\text{PY}) \end{aligned}$$

LAP - 5% ROR

$$\begin{aligned} \$20.82 &= [19.72 + 49.85 + 34.67 + .88(190.05 + 82.44 + 129.56)]/22.0 \\ (\text{PPVC}) \quad (\text{RC}) \quad (\text{MC}) \quad (\text{PC}) \quad (\text{P}) \quad (\text{LgC}) \quad (\text{TrC}) \quad (\text{SC}) \quad (\text{PY}) \end{aligned}$$

Open market - 4% ROR

$$\begin{aligned} \$23.67 &= [41.99 + .40(230.13 + 99.83 + 156.88)]/10.0 \\ (\text{PPVC}) \quad (\text{PC}) \quad (\text{P}) \quad (\text{LgC}) \quad (\text{TrC}) \quad (\text{SC}) \quad (\text{PY}) \end{aligned}$$

Open market - 5% ROR

$$\begin{aligned} \$19.55 &= [34.67 + .40(190.05 + 82.44 + 129.56)]/10.0 \\ (\text{PPVC}) \quad (\text{PC}) \quad (\text{P}) \quad (\text{LgC}) \quad (\text{TrC}) \quad (\text{SC}) \quad (\text{PY}) \end{aligned}$$

Company C

Fee land - 4% ROR

$$\$27.43 = [173.70 + 54.36 + 27.18 + 163.08 + .99(290.13 + 110.22)]/29.7$$

(PPVC) (RC) (MC) (TxC) (OC) (P) (LgC) (TrC) (PY)

Fee land - 5% ROR

$$\$25.68 = [173.70 + 49.85 + 24.92 + 186.93 + .99(239.59 + 91.02)]/29.7$$

(PPVC) (RC) (MC) (TxC) (OC) (P) (LgC) (TrC) (PY)

LAP - 4% ROR

$$\$24.39 = [27.18 + 27.38 + .95(290.13 + 110.22 + 273.83)]/28.5$$

(PPVC) (RC) (PC) (P) (LgC) (TrC) (SC) (PY)

LAP - 5% ROR

$$\$20.23 = [24.92 + 22.61 + .95(239.59 + 91.02 + 226.13)]/28.5$$

(PPVC) (RC) (PC) (P) (LgC) (TrC) (SC) (PY)

Open market - 4% ROR

$$\$26.28 = [34.23 + .30(290.13 + 110.22 + 273.83)]/9.0$$

(PPVC) (PC) (P) (LgC) (TrC) (SC) (PY)

Open market - 5% ROR

$$\$21.70 = [28.70 + .30(239.59 + 91.02 + 226.13)]/9.0$$

(PPVC) (PC) (P) (LgC) (TrC) (SC) (PY)

Appendix C

Sensitivity Analysis

TABLE 1

Company A sensitivity analysis - Fee land

Due to a 20 percent real change in:	Change in present value of cost per unit of wood is:	
Type of cost -----	4% ROR -----	5% ROR -----
Site preparation costs	\$.84/cd	\$.84/cd
Planting costs	.47/cd	.47/cd
Annual management costs	.34/cd	.31/cd
Annual land tax costs	.22/cd	.20/cd
Annual opportunity cost of land	1.03/cd	1.18/cd
Logging costs	1.78/cd	1.47/cd
Transportation costs	.80/cd	.66/cd

TABLE 2

Company A sensitivity analysis - landowner assistance program

Due to a 20 percent real change in:	Change in present value of cost per unit of wood is:	
Type of cost -----	4% ROR -----	5% ROR -----
Planting costs	\$.16/cd	\$.16/cd
Annual management costs	.32/cd	.29/cd
Stumpage costs	.82/cd	.67/cd
Logging costs	1.78/cd	1.47/cd
Transportation costs	.79/cd	.66/cd
Procurement costs	.23/cd	.19/cd

TABLE 3

Company A sensitivity analysis - Open market supply

Due to a 20 percent real change in:	Change in present value of cost per unit of wood is:	
Type of cost -----	4% ROR -----	5% ROR -----
Stumpage costs	\$.82/cd	\$.68/cd
Logging costs	1.79/cd	1.48/cd
Transportation costs	.80/cd	.66/cd
Procurement costs	.35/cd	.30/cd

TABLE 4

Company B sensitivity analysis - Fee land

Due to a 20 percent real change in:	Change in present value of cost per unit of wood is:	
Type of cost -----	4% ROR -----	5% ROR -----
Site preparation costs	\$.98/cd	\$.98/cd
Planting costs	.49/cd	.49/cd
Annual management costs	.52/cd	.48/cd
Annual land tax costs	.22/cd	.20/cd
Annual opportunity cost of land	1.22/cd	1.40/cd
Logging costs	1.84/cd	1.52/cd
Transportation costs	.80/cd	.66/cd

TABLE 5

Company B sensitivity analysis - Leased land

Due to a 20 percent real change in:	Change in present value of cost per unit of wood is:	
Type of cost -----	4% ROR -----	5% ROR -----
Site preparation costs	\$.98/cd	\$.98/cd
Planting costs	.49/cd	.49/cd
Annual management costs	.52/cd	.48/cd
Annual land tax costs	.22/cd	.20/cd
Annual lease cost	.89/cd	.82/cd
Logging costs	1.84/cd	1.52/cd
Transportation costs	.80/cd	.66/cd

TABLE 6

Company B sensitivity analysis - Landowner assistance program

Due to a 20 percent real change in:	Change in present value of cost per unit of wood is:	
Type of cost -----	4% ROR -----	5% ROR -----
Planting costs	\$.18/cd	\$.18/cd
Annual management costs	.49/cd	.45/cd
Stumpage costs	1.26/cd	1.04/cd
Logging costs	1.84/cd	1.52/cd
Transportation costs	.80/cd	.66/cd
Procurement costs	.38/cd	.32/cd

TABLE 7

Company B sensitivity analysis - Open market supply

Due to a 20 percent real change in:	Change in present value of cost per unit of wood is:	
Type of cost -----	4% ROR -----	5% ROR -----
Stumpage costs	\$1.26/cd	\$1.04/cd
Logging costs	1.84/cd	1.52/cd
Transportation costs	.80/cd	.66/cd
Procurement costs	.85/cd	.70/cd

TABLE 8

Company C sensitivity analysis - Fee land

Due to a 20 percent real change in:	Change in present value of cost per unit of wood is:	
Type of cost -----	4% ROR -----	5% ROR -----
Site preparation costs	\$.79/cd	\$.79/cd
Planting costs	.38/cd	.38/cd
Annual management costs	.37/cd	.34/cd
Annual land tax costs	.18/cd	.17/cd
Annual opportunity cost of land	1.10/cd	1.26/cd
Logging costs	1.93/cd	1.59/cd
Transportation costs	.80/cd	.66/cd

TABLE 9

Company C sensitivity analysis - Landowner assistance program

Due to a 20 percent real change in:	Change in present value of cost per unit of wood is:	
Type of cost -----	4% ROR -----	5% ROR -----
Annual management costs	\$.19/cd	\$.17/cd
Logging costs	1.93/cd	1.59/cd
Transportation costs	.80/cd	.66/cd
Stumpage costs	1.82/cd	1.50/cd
Procurement costs	.19/cd	.15/cd

TABLE 10

Company C sensitivity analysis - Open market supply

Due to a 20 percent real change in:	Change in present value of cost per unit of wood is:	
Type of cost -----	4% ROR -----	5% ROR -----
Logging costs	\$1.93/cd	\$1.59/cd
Transportation costs	.80/cd	.66/cd
Stumpage costs	1.83/cd	1.51/cd
Procurement costs	.76/cd	.63/cd

Vita

Kevin Crowther was born in Newton, Mississippi on July 23, 1966. He graduated from Newton High School in 1984. He attended Mississippi State University and received a Bachelor of Science degree in Forest Management in 1988. In 1989, he married the former Elaine Chapman. They have two children, Amber and Adrianna.

In June of 1990, Kevin will receive a Master of Science degree in Forest Management-Economics from Virginia Tech. He has accepted a job with Procter & Gamble Cellulose and will begin work in Oglethorpe, Georgia.