

**AN ECONOMIC ANALYSIS OF LANDOWNER
PROPENSITY FOR WOODLOT MANAGEMENT
AND HARVESTING IN NORTHWESTERN
SASKATCHEWAN.**

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ABSTRACT

The recent development of new processing facilities in Meadow Lake, Saskatchewan has created a long-term market for timber in the region. Although these processing facilities are currently supplied by crown timber reserves, increasing pressure on public forest resources from multiple users has caused processors to consider private woodlots as a supplemental source of fibre. A survey was undertaken to investigate conditions under which landowners may respond to the emerging demand by managing their timber resources for harvest and sale.

Survey results indicate that, although virtually no management or harvesting has occurred in the past, approximately half of those interviewed would consider timber management and harvesting in the future. Logit analysis identified landowner characteristics that were related to landowners' willingness to consider forest management and harvest in the future and the likelihood that they would consider a timber contract. Significant characteristics of landowners in influencing the propensity to manage and harvest their woodlots included: the diversity of farm operations; the length of family tenure of the land; the number of ways respondents use their forest land; and area of forest owned. A preferred timber contract was identified as having: a duration of 1 to 5 years; young growth established at the end of the contract term; and payments for harvesting and management services made through a crop share arrangement.

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ECONOMIC ANALYSIS OF LANDOWNER PROPENSITY FOR WOODLOT MANAGEMENT AND HARVESTING IN NORTHWESTERN SASKATCHEWAN.

INTRODUCTION

Although 2.6%, or 961 000 acres (389 000 hectares), of Saskatchewan's productive, non-reserved forest land is privately owned, few markets have developed for private timber. There have been small markets for firewood and rough lumber but limited opportunities for large scale fibre sales. Historically, aspen (*Populus tremuloides* Michx.), which makes up a large portion of Saskatchewan forests, has been considered a "weed species" with little commercial value. However, recent technological innovations have caused aspen to become a commercially valuable species. Accordingly, a pulp mill was constructed in Meadow Lake, Saskatchewan that utilizes aspen as its primary input. This mill has created a long-term demand for aspen in the northwest region of the province. Although industrial forest products companies are allocated crown timber through Forest Management Licence Agreements (FMLA) increasing pressure from other users of the forest, such as aboriginal and environmental groups, has placed uncertainty on the long-term availability of current fibre allocations. This has caused industrial timber managers to look towards private woodlots as a potential long-term source of fibre.

This study was undertaken to assess whether woodlot owners would respond to emerging timber markets and to investigate mechanisms that could be used to overcome some of the factors that may have impeded the development of a private forest sector. Three goals were identified for the study: 1) to identify landowner characteristics that may be related to willingness to consider timber management/harvest in the future; 2) to investigate the use of various contracts to encourage private forest management and sustainable timber harvesting; and 3) to consider the results of this analysis within the context of government policy and other factors that affect land use decisions.

BACKGROUND

A number of factors support the development of a private forest sector in Saskatchewan. Most privately owned forest land in Saskatchewan is owned by farmers. Thus, the opportunity cost of labour in the winter is relatively low and diversification into woodlot management may be complementary to existing agricultural operations. Furthermore, private forests are generally located on the forestry-agriculture fringe and are accessible through existing transportation infrastructure and frequently in close proximity to processing facilities.

Despite these favourable conditions, several factors may have impeded the development of private timber markets. A number of government policies, ranging from forest tenure to agriculture subsidies and taxation, may affect decisions to manage and harvest timber in Saskatchewan. Tenure agreements generally require companies to establish value added processing facilities. This requirement has led to vertically integrated forest products firms and a general absence of log markets for woodlot owners. Furthermore, tenure policies may discourage licensees from considering alternative sources of fibre supply. Allocation of public timber may provide industrial forest product firms with enough public timber to internally supply their operations; particularly because tenure agreements contain 'use it or lose it' clauses which encourage industrial forest processors to use all of their annual cut (Farm Woodlot Association of Saskatchewan 1991). Also, tenure is generally allocated in such a way that industrial forest processing facilities are spatially separated, which may result in the formation of spatial monopsonies. Accordingly, prices offered for wood may be insufficient to stimulate extensive woodlot management. Finally, stumpage prices charged to the forest industry by the provincial government for crown timber may be lower than returns associated with management and harvesting of private forest land. Accordingly, woodlot owners may have little incentives to undertake forest related activities.

A number of agricultural policies also affect land use decisions on private land. The magnitude of payouts through agricultural programs suggest that such subsidies have considerable impact on land use decisions. In 1992 gross direct payments to producers in Saskatchewan amounted to nearly \$630 million or 25.07% of total farm cash receipts, while net direct payments totalled almost \$444 million or 65.59% of net farm cash income (Statistics Canada 1993). Agricultural subsidies may discourage farm woodlot

development because under subsidy programs such as the Gross Revenue Insurance Program (GRIP), the Net Income Stabilization Account (NISA) or the Canada-Saskatchewan Crop Insurance Corporation programs farm woodlots are not recognized as a farm enterprise. Furthermore, landowners may have difficulty including woodlot income in loan applications to financial agencies such as the Agriculture Credit Corporation - Saskatchewan (ACS).

Some government programs exist which encourage woodlot management, however their size and extent are very small compared to agricultural programs. The Prairie Farm Rehabilitation Administration (PFRA) provides funding and planning assistance to help farmers plant shelterbelts and return cultivated land to permanent cover. However, no one in Saskatchewan has used the permanent cover program for block tree plantings². The Save Our Soils program provided funding for field shelterbelts and trees were available through the Wildlife Habitat Protection Act for block plantings. Furthermore, the Canadian Forest Service, through the Canada-Saskatchewan Partnership Agreement in Forestry, provides direct federal funding for extension services to assist woodlot managers, and incentive funds for forest improvements. However, although \$65 932 was provided for extension services to woodlot owners in Saskatchewan in 1992, less than \$6 500 was paid directly to landowners for forest management activities³.

Another factor inhibiting woodlot development may be the small size associated with many woodlots which may prevent landowners from achieving economies of scale in harvesting and management. Also, wood processors may face high transactions costs when purchasing wood from many small sellers or harvesting small parcels of private land. Information exchange problems may also impede the development of private timber markets. On the supply side, woodlot owners may be unaware of potential timber markets and may not have the knowledge required to manage their forests given that technology has only recently made aspen valuable. On the demand side, wood processors may not know of woodlot owners who are interested in selling fibre.

Public policy may be able to correct some of these problems and influence the development of private timber markets. However, to direct policy in an optimal manner, policy makers must understand the motivations of woodlot owners, their attitudes towards various policy options, and their likely response to policy initiatives. Little is known about motivations of woodlot owners in Saskatchewan with regards to their forest harvesting and management decisions. Studies that have been undertaken have concentrated on monetary returns to landowners and have tended to ignore nonpecuniary benefits that can be derived from private forests⁴. Identifying landowner characteristics associated with an interest in timber management, harvest, and contracts may help policy makers assess and modify policies and programs.

EXPECTED RESULTS

A number of studies have investigated landowner characteristics that are associated with management and harvesting activities, timber supply, and whether landowners are profit and/or utility maximizers. These past studies along with economic theory suggest a number of variables that could be significant in this analysis.

²Personal communication with Rich Gaube, Prairie Farm Rehabilitation Administration, through Donna Dosman, May 19, 1993.

³Personal communication with V. Begrand, Canadian Forest Service, on August 24, 1993.

⁴The Farm Woodlot Association of Saskatchewan (FWAS) commissioned a report to describe and analyze NIPF wood supply in the province (Harding 1989) and Saskatchewan Agriculture Development Fund commissioned another to investigate the potential of private forests in Saskatchewan to meet timber demand (FWAS 1991)

Expectations on willingness to consider future timber management and harvesting

A number of landowner characteristics were expected to influence future management and harvesting intentions. Economies of scale associated with larger holdings are expected to result in a positive correlation between size of land holdings and management and harvesting activity (Jamnick and Beckett 1988; Binkley 1981; and Carlen and Muller 1985). *Distance* between the respondent's residence and his/her woodlot is expected to be negatively correlated with the likelihood of timber management and harvest. This may be due to difficulties encountered by absentee landowners when arranging for timber harvesting and marketing (Carlen and Muller 1985; Jamnick and Beckett 1988). The length of property ownership by the respondent's *family* is expected to be positively correlated to harvest. This may be due to the increasing likelihood of historical precedent for timber harvest as the length of tenure increases. Respondents with longer tenures may be more likely to have experience and knowledge of wood management and harvest techniques than others (Jamnick and Beckett 1988).

Increased farm *diversity* is expected to be positively correlated to timber management and harvest. Diversified farmers are more likely to have the equipment and skills that are needed for a new operation. Increased diversification may also imply a more innovative farmer who may be more likely to regenerate following harvest (Straka and Doolittle 1988). Similarly, a positive correlation was expected between *education* and willingness to manage and harvest timber. Educated people may be better informed and more aware of opportunities.

Previous research on the relationship between owner's *age* and forest management and harvest is inconclusive. Binkley (1981) found age to be positively correlated to harvest, and explained this phenomenon by noting that if trees are considered an investment then, as the remaining lifespan of older people shorten, they are more likely to liquidate their investments. Carlen and Muller (1985) found age to be negatively correlated to timber harvest and noted that old age often leads to declining strength thereby causing older people to be less likely to harvest themselves. However, older people may be more likely to sell standing trees. Carlen and Muller also suggested that a desire of landowners to leave standing timber for the next generation may result in a negative correlation.

The number of consumptive and non-consumptive *uses* of forests were expected to be, respectively, positively and negatively correlated with timber management and harvesting. Respondents who have used their forest consumptively may be more willing to manage and harvest their timber whereas those who have used it non-consumptively may gain more utility from non-timber benefits associated with their forests than from potential revenue from their timber.

Expectations on willingness to enter management and harvest contracts

Siegel (1973) and Meyer (1986) point out that contracts have been used for some time in the southern United States to encourage sustainable forest management. Different contracts have been developed for management and harvesting of forests. In this study, willingness to allow someone else to manage or harvest a tract of forest was interpreted as an indication of willingness to enter into a contract. No previous studies were found that relate private forest owner characteristics to their willingness to enter into timber contracts. However, economic theory and intuition suggest that distance, forest tract size, level of diversity, age, and prior experience could be significant factors.

A positive correlation was expected between the *distance* from the respondents residence to their land, and their willingness to consider a timber contract. Travel would increase the costs of timber management and harvest incurred by absentee landowners, causing them to be more willing to arrange for someone else to manage and harvest their forest. Furthermore, *forest* size was expected to be positively correlated with willingness to consider a timber contract. The time commitment required for landowners, who generally have jobs away from their farms and/or woodlots, to manage and harvest large tracts of timber could be prohibitive and cause them to enter into contracts. Landowners operating more *diverse* farm operations were thought to be more likely to have the skills and equipment required to manage a forest. Thus, a negative correlation was expected between level of diversity and willingness to consider a

timber contract. The physical demands associated with timber management and harvest suggested that *age* would be positively correlated to willingness to enter a timber contract. Past experience was also expected to be related to willingness to enter a timber contract. Landowners who had allowed someone else to harvest their timber in the past would be more likely to have the experience and expertise required to enter into a contract in the future. Also, as the length of family tenure increases, the likelihood that landowners had been involved in a harvest contract in the past would increase, thus a positive correlation was expected between length of family tenure and willingness to enter a timber contract.

Expectations on contract characteristics

Contracts can generally be described in terms of five characteristics: the agency with whom the contract is entered; the duration of the contract; the method of payment for services received by the landowners; the method of payment to the landowner for the timber they sell; and the condition of the land at the end of the contract term. There were no *a priori* expectations in this study as to landowner characteristics that may be correlated to preferences for various contract characteristics.

DATA COLLECTION

The population for this study was identified as those persons who owned at least 40 acres of bush ⁵ within one quarter, or continuous between quarters, within 100 kilometres of Meadow Lake, Saskatchewan. A minimum bush requirement was intended to reflect economies of scale associated with timber harvest. Forty acres was selected in accordance with the minimum bush requirement identified by the Canadian Forest Service for inclusion in their private lands program. Mistik Management Ltd. ⁶ recommended a maximum distance of 100 kilometres from the mill site to reflect reasonable haul distances. Aerial photos were examined to identify land with adequate bush cover in the target area. These forested areas were then cross matched to township maps to identify the land owners. Since available aerial photography for the region was taken between 1979 and 1982, some of the land had been cleared subsequent to the time the photos were taken.

A random sample was drawn from the population of 1970 landowners and each respondent was surveyed using a personal interview format ⁷. A target of 100 interviews was set and 133 names were drawn randomly from the population to allow for a less than 100% response rate. In total, 89 persons were interviewed⁸.

The survey questionnaire was composed of three parts; a copy of the survey can be found in the appendix. Respondents were first asked to inventory their landholdings and farm operations. Part two contained questions pertaining to historical, current, and future intentions for forest usage and an assessment of the landowner's familiarity with woodlots. The third part allowed an investigation of the use of timber contracts. Landowners were asked to identify their preferences for a series of timber contract options including four different contracting agencies. The four agencies presented were a landowner

⁵The term bush is frequently used in Saskatchewan to refer to private forests.

⁶Mistik Management Ltd. is the company that runs the woodlands divisions of the Millar Western Pulp Mill in Meadow Lake and Norsask Forest Products, a sawmill in Meadow Lake.

⁷More reliable results were expected through personal interviews than through mail questionnaires or telephone interviews because the survey asked detailed questions about inventory and future intentions.

⁸ Of the 44 people drawn but not sampled 16 had cleared their land and no longer met the minimum bush requirement; 8 people had sold their land to others already included in the population; 8 people could not be located; and 12 people were not available for miscellaneous reasons.

organization, a forest products company, a government agency, and an independent contractor.

ESTIMATION OF MODELS

Logit models were estimated in order to analyze the effect of landowner characteristics on their preferences. The logit model uses the logistic distribution and takes the form:

$$F(Z) = \frac{e^Z}{1+e^Z} \quad (1)$$

where Z is a function of landowner characteristics (Maddala 1983).

A number of logit models were developed to provide information on relationships between landowners characteristics and harvesting and management intentions. Further models attempted to predict whether respondents would prefer to manage and harvest their forest land themselves or have someone else manage and harvest it for them. A number of variables that were identified above as potentially important factors were not highly significant and were removed from the final models. The variables included in the final models are defined in Table 1.

Several specification tests were used to assess the accuracy of the regressions. Overall significance was assessed using the percent predicted correct and other statistical tools⁹. Variance decomposition analysis indicated that collinearity was not a problem in the data.

Table 1. Definition of variables used in logit models

Variable name	Definition
Age	Age of the respondent
Divers	# of different farm enterprises the respondent is involved in
Family	# of decades the respondent's family has owned at least one parcel of the current land base
Past	Dummy variable where 1 indicates that a contract was used for past harvesting activity
Trees	100's of acres of trees owned by respondent
Uses	The number of ways respondents use their forest land (consumptive and non-consumptive)

RESULTS

Results of this study suggest that there is significant interest among woodlot owners in developing the private forest sector in northwest Saskatchewan. Although only approximately one quarter of the respondents had harvested wood from their land in the past ten years, and less than 10% had sold timber, approximately half indicated that they would consider harvesting trees in the future. There was also considerable interest in timber contracts with approximately half of the respondents indicating they would consider a timber management or harvest contract in the future. Landowners appeared to be well suited to developing this sector. The mean landholding was approximately 800 acres, and nearly 270 acres of this

⁹A likelihood-ratio test statistic, Maddala's R-squared and McFadden's R-squared were also calculated but are not included in the tables of results.

was bush land. Many of the landholders are likely to have some of the skills and equipment needed to meet this demand since three quarters of the respondents owned at least one tractor and nearly half were involved in two or more farm enterprises.

Results of the model estimation show reasonably high levels of overall significance with the percent predicted correct ranging between 64 and 70 percent. The results from logit models that regressed, respectively, the willingness to consider management and harvesting in the future on selected landowner characteristics are listed in Tables 2 and 3. The variables *family* and *uses* were, respectively, significantly negatively and positively correlated with the dependent variable in both models. The degree of *diversification* was positively correlated with willingness to consider managing timber stands. The area of *trees* owned was not a highly significant factor in willingness to consider management; however, it was left in the final model because it had the expected sign, did not effect the other coefficients, and improved the model's forecasting ability.

Table 2. Logit results of the impact of selected characteristics on a landowner's willingness to consider managing their forest land in the future.

Variable	Coefficient	Standard Error	$\rho =$
Constant	-0.87747	0.6651	0.18705
Family	-0.29031	0.1090	0.00773
Divers	0.4892	0.2818	0.08254
Uses	0.51946	0.1952	0.00780
Trees	0.13252	0.1126	0.23914

Percent predicted correct = 70%

Table 3. Logit results of the impact of selected characteristics on a landowner's willingness to consider harvesting from their forest land in the future.

Variable	Coefficient	Standard Error	$\rho =$
Constant	0.28607	0.5624	0.61098
Family	-0.21565	0.09784	0.02751
Uses	0.409252	0.1794	0.02257

Percent predicted correct = 64%

Tables 4 and 5 list, respectively, the results from logit regressions that examined the relationship between landowners' characteristics and their interest in considering timber management and timber harvest agreements. The area of *trees* owned and the level of farm *diversification* were significantly negatively correlated with consideration of a management contract. Willingness to consider a harvest contract was positively correlated with both the length of *family* tenure of the land and the *age* of the landowner. Although it was not highly significant, *past* experience with a harvesting contractor was left in the model that analyzed willingness to consider a timber management contract because it improved the model's forecasting ability and did not effect the other coefficients in the model.

Table 4. Logit results of the impact of selected characteristics on a landowner's willingness to consider entering a timber management agreement in the future.

Variable	Coefficient	Standard Error	$\rho =$
Constant	1.0197	0.5082	0.04479
Trees	-0.35475	0.1375	0.00989
Divers	-0.45880	0.2653	0.08373
Past	0.44907	0.3691	0.22368

Percent predicted correct = 69%

Table 5. Logit results of the impact of selected characteristics on a landowner's willingness to consider entering a timber harvesting agreement in the future.

Variable	Coefficient	Standard Error	$\rho =$
Constant	-1.5541	0.8100	0.05503
Age	0.39772	0.1974	0.04394
Family	0.17442	0.1047	0.09559

Percent predicted correct = 69%

Summary statistics of the responses to questions on landowner preferences for contract characteristics identified some general preferences that are presented in Tables 6 through 9¹⁰. When presented with various agencies, respondents showed a general preference for landowner organizations as a managing agency and an independent contractor as a harvester. Over half of the respondents preferred to pay for management and/or harvesting services received through a crop share arrangement. Nearly 60% of the respondents favoured a contract duration of between 1 and 5 years. Over 60% of the respondents wanted their land to be left with young growth established at the end of the contract term. The strongest preference for payment method for timber sold was to receive a periodic land lease payment and be paid for the timber at the time of harvest. Approximately 35% of the respondents favoured this payment method.

¹⁰The survey was designed to elicit information that could be used in multinomial logit models to identify landowner preferences between various timber contract characteristics. However, there was insufficient variation in the data given the sample size, for these models to produce significant results.

Table 6. Preference for contract duration.

Contract Length	Frequency	%
< 1 year	20	23.0
1 - 5 years	51	58.6
6 - 15 years	11	12.6
15 - 30 years	4	4.6
> 30 years	1	1.1
Missing values	2	

Table 7. Preference for land condition at contract end.

Land Condition	Frequency	%
Same volume of timber as at contract outset	11	12.9
No regeneration	19	22.4
Young growth established	52	61.2
Condition of the land is not important	3	3.5
Missing values	4	

Table 8. Preferred payment option for management/harvesting services received.

Option	Frequency	%
Cash for service	26	29.9
Crop share	45	51.7
Giving the managing agency an option to purchase	16	18.4
Missing values	2	

Table 9. Preference for payment received for timber harvested.

Payment Method¹	Frequency	%
Option 1	23	26.4
Option 2	5	5.7
Option 3	31	35.6
Option 4	11	12.6
Cash at time of harvest	17	19.5
Missing values	2	

¹The payment options were defined as:

Option 1: A contract in which they are paid for all standing timber initially and receive a periodic lease payment for the land throughout the contract period.

Option 2: A contract in which both land and timber are leased through a periodic payment.

Option 3: A contract in which the land is leased with a periodic payment and the timber is paid for at the time it is harvested.

Option 4: A contract in which a periodic payment is paid based on the average annual growth of timber. At the time of timber harvest adjustments are made for over or under payment.

DISCUSSION

Several of the relationships, identified in this study, between landowners characteristics and behaviour did not concur with results of other studies and *a priori* expectations. In fact, some characteristics had opposite than expected signs. Some of the discrepancies, in terms of the significance of variables, between the results of this study and those from previous work may be due to sample size ¹¹. However, a number of other factors may explain deviations between expected and actual results. Some of these reasons are outlined below.

Willingness to consider future timber management and harvesting

Diversity was the only landowner characteristic that yielded the expected sign with regards to willingness to consider future timber management or harvesting. A number of other variables were not significant in either model including: *distance* between residence and forest; *age*; and *education*. The number of years in the family and forest uses yielded significant results with unexpected signs.

Education level may not have been significant because formal measures of education were used. The grade level achieved may not accurately reflect respondents effective education level because in many areas of rural Saskatchewan formal education was, historically, only available until grade eight. Regarding the variable *distance*, Saskatchewan is a large province and urban centres are often some distance from rural communities. If people frequently drive long distances to shop and attend school, they may also be indifferent to driving long distances to their forest land holdings. *Forest* area owned was likely not a significant factor in willingness to manage or harvest because the population was pre-defined as owners with at least forty acres of trees.

The variable *family* was significantly negatively correlated to consideration of future harvest; this

¹¹Personal interviews were used to collect data thus our sample size was smaller than those of previous works.

is contrary to work by Jamnick and Beckett (1988) in New Brunswick where length of family tenure was positively correlated to woodlot harvesting activity. This difference may result from the different ways in which private forests have historically been used in the two provinces. Jamnick and Beckett suggested that, as the length of family tenure increased, the likelihood of past harvesting activity also increased. Thus, past precedent would encourage the respondent to harvest their timber. However, little harvesting activity has taken place on private land in Saskatchewan historically. Thus, as the length of family tenure increased, the likelihood that the forest had been used for timber management and harvesting may not increase; rather, the likelihood that the land had been used for non-timber uses may increase. Therefore, in the case of Saskatchewan, past precedent and experience suggest that landowners may be less likely to consider future harvest as length of family tenure increases. Although the two studies found opposite signs for the variable *family*, the logic and reasoning behind both results are the same.

The expected correlation between consumptive and non-consumptive forest *uses* and willingness to consider forest management and harvesting was not observed. The number of non-consumptive, consumptive, and total *uses* (consumptive and non-consumptive) of the forest were *all* positively correlated to willingness to consider forest management and harvesting, with the strongest correlation being with total number of uses. Respondents may consider private forests to be either waste land or a resource. These results suggest that those who have used the forest in any way consider it a resource and may consider managing or harvesting it. Those who have not used their forest land in the past may not consider it a resource, and may therefore not consider using it in the future.

Willingness to enter management and harvest contracts

The level of *diversity* of farm operations exhibited the expected negative correlation to willingness to let someone else manage the forest. Furthermore, *age* conformed to expectations and was positively correlated to willingness to consider letting someone else harvest timber stands. Past experience conformed with *a priori* expectations and was positively correlated with willingness to consider a timber contract. Although not highly significant *past* experience with a timber contract was positively correlated with willingness to consider a timber management agreement. The length of *family* tenure was positively correlated with willingness to consider a harvesting contract; however this result was incongruous with the negative correlation observed between length of family tenure and willingness to consider future timber management or harvest reported above. This apparent discrepancy may be explained by the hypothetical nature of the question regarding willingness to enter a timber contract. All landowners were asked to express their willingness to enter into a contract assuming that they were considering timber management and harvesting. Thus, if, in the past, landowners had not been involved with these activities, their lack of experience may encourage them to enter into contracts for future timber management and harvesting, rather than conducting the operation themselves.

Neither the area of *trees* owned nor the *distance* from respondents residence to their forest land yielded the expected results. Contrary to expectations the area of *trees* owned was negatively correlated to consideration of a management contract. This may reflect the fact that the population was restricted to those landholdings with more than 40 acres of trees. A 40 acre forest may be too small to meet economies of scale associated with forest management. However, the area of *trees* was not significantly related to willingness to consider a harvest contract. Forty acres may be a large enough tract of forest to meet economies of scale associated with forest harvesting. Furthermore, *distance* was not a significant explanatory variable in willingness to consider timber management or harvest contracts. This may be due to cultural attitudes towards distance as described previously.

CONCLUSIONS AND IMPLICATIONS

Recent technological development has created a new demand for aspen pulpwood in the northwest region of Saskatchewan. Industrial forest product companies are considering private woodlots

as an alternative supply of fibre and are interested in knowing if landowners are willing and able to supply them with fibre over time. Policy makers are interested in alternative policy options that could be used to encourage regional development. It is, therefore, important to identify landowners who may be interested in supplying timber and to evaluate alternative policies and programs that could be used to encourage sustainable forest management.

Some of the results presented above differ from woodlot studies that have been undertaken in other parts of North America; however, economic theory can be used to explain both these results and the results of previous studies. This variability of results demonstrates the importance of not extrapolating findings between regions. Economic decisions are made in a broad environment that includes: regional socio-demographic characteristics; the historical development of the region; landowner preferences; and the macro-environment within which decisions are made. Rural Saskatchewan developed differently than the Maritimes and many other regions of North America. Forestry is generally less important to Saskatchewan's economy and the level of non-industrial private forest ownership is lower than in other regions with more developed private forestry sectors. In many of these regions the private forest sector developed simultaneously with agriculture and industrial forestry. Similarly, government programs and subsidies vary between provinces and can distort the decision making environment.

With the emergence of a new valuable resource on private woodlands, it is an opportune time to review government policy, including agricultural policy and the Saskatchewan Forest Act, to identify potential land use biases. Rural Saskatchewan and the farm culture are in transition. Although respondents typically were raised on a farm, less than 50% currently farm full-time and only 22.5% farm part-time. The average respondent was between 46 and 55 years old and had some high school education. As the land is taken over by younger people, the level of education and ownership objectives may also change. These changes may already be apparent from the decline in the number of respondents farming compared to the number that grew up on a farm, and the discrepancy between historical harvest levels and interest in future timber harvests. Along with this transition, government policy is also likely to change in response to increasing pressure from abroad, and concerns over government debt.

Forest policy, such as tenure allocation and stumpage policies, have been identified as a possible impediment to the development of private woodlots. Restructuring tenure could prevent problems associated with monopsonies, lack of log markets, and information exchange. Government policy may also have to address a variety of issues relating to increased woodlot harvesting levels. The harvest of private forests will affect the environment through changes to total forest cover and watershed. It is necessary to identify regulatory options that will facilitate the development of private timber markets while minimizing possible detrimental impacts.

Further research should address a number of assumptions included in this study. Landowners with less than 40 acres may be willing to manage and harvest timber in the future. For example, new varieties of aspen may provide landowners with an opportunity to intensively manage small stands for profit or forest belts may be used to produce timber. Furthermore, the assumption that 100 kilometres is a reasonable haul distance for aspen is based on current economic conditions in the region. In other areas of the prairies 200 kilometre hauls are not unusual. As the demand for aspen changes, the definition of a reasonable haul distance in northwestern Saskatchewan may also change. Future studies should also consider the impact of stand attributes, including tree species, quality and volume, on landowner preferences for forest management and harvesting. Markets for private softwood products are more developed than for hardwoods, yet new demand is primarily for hardwoods. Studies could investigate landowner characteristics that are associated with past management and harvesting of softwoods and assess whether the species mix affects respondent's interest in future timber management and harvesting.

Finally, this study only investigated timber contracts as a means of encouraging sustainable timber management on private land. Several other mechanisms could also be used. Alternative mechanisms such as landowner organizations, marketing boards, and changes to the forest act should be investigated. Further, some of the macro policy factors that affect private land forestry were identified but not analyzed. Work is required to investigate the full impact that factors such as agricultural policy, taxation, and forest policy have on land use decisions.

The results of this study suggest there is potential for private woodlot development that may contribute to rural development. However, the economic development of rural Saskatchewan is affected by a combination of cultural, technological, and current policy factors. If future policies are to further social welfare they should consider as many of these changes as is possible.

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APPENDIX, SURVEY QUESTIONNAIRE

AN ECONOMIC ANALYSIS OF FACTORS INFLUENCING THE FOREST MANAGEMENT AND HARVESTING DECISIONS OF PRIVATE WOODLOT OWNERS IN NORTHWESTERN SASKATCHEWAN - A SURVEY

LANDOWNER NAME(S):

TELEPHONE NUMBER:

ADDRESS:

I am surveying people in Northwestern Saskatchewan who own forested land as part of my thesis work towards a Masters of Science degree at the University of Alberta. This research is being funded through the Canada-Saskatchewan Partnership Agreement in Forestry.

This project is being undertaken because very little information is available on the use of private land for forestry. I hope that by finding out more about you and your woodlot I will be able to identify ways that may improve the opportunities for woodlot development.

The information I gather will be kept strictly confidential. I am interested in the aggregate results for the region, not individual results.

I'd like to begin by finding out about your land holdings.

OPERATIONS:

1. LAND HOLDINGS

How many acres do you own in total? _____

	1/4	Total Acres	Length of Ownership (years)	How Did You Obtain It (buy from family or other...)	How Long Has It Been In Your Family (years)	How Many Acres are Rented Out	Type of Rental Arrangement (crop share or cash lease)	Distance From Residence (miles)
Cultivated Area (Acres)								
Improved Pasture (Acres)								
Unimproved Pasture (Acres)								
Trees/Bush (Acres)								
Other (Acres)								

2. LAND LEASED

How many acres do you lease in total? _____

	1/4	Total Acres	How Long Have You Leased It (years)	How Long Is the Agreement For (years)	Is The Land Publicly or Privately Owned	Type of Rental Arrangement (Crop Share or Cash Lease)	Distance From Residence
Cultivated Acres							
Improved Pasture (Acres)							
Unimproved Pasture (Acres)							
Trees/Bush (Acres)							
Other (Acres)							

3. Have you purchased any land in the past ten years?

1. Yes ____

Quarter	Area	Year	Price	Land Type(s) (%)	Reason For Purchase

2. No ____

4. Have you sold any land in the past ten years?

1. Yes ____

Quarter	Area	Year	Price	Land Type(s) (%)	Reason For Sale

2. No ____

5. Do you have a farm operation?

1. Yes ____

What crops do you grow?

What livestock do you own?

None:

Cattle:

Pigs:

Chickens:

Other:

Do you participate in any government programs?

Yes ____, please specify:

No ____

2. No ____

6. What machinery do you own?

Equipment Size	Tractors (hp)	Combines	Trucks	Cultivators	Seeding Equipment	Haying Equipment	Silage Equipment	Other
Small								
Medium								
Large								

-

[illegible]

MANAGEMENT:

8. In the past ten years have you undertaken any forest management activities such as planting new areas, regenerating cleared areas, thinning, weeding, release work, or any other management activity?

1/4	Date	Area	Activities						Was assistance received for completing these activities		Reason for Management
			Plant	Regen.	Weeding	Thinning	Release Work	Other, Specify	What was Provided	Who Provided it	

9. Do you currently have a management plan for your woodlot?

1. Yes ____

Did you develop the management plan?

a. Yes ____, did you receive assistance in developing the plan?

b. No ____, who developed the management plan?

Did you receive financial assistance?

2. No ____

MOTIVATIONS

10. People acquire their forested lands for a number of different reasons ranging from owning the forested land because it is part of their primary residence to purchasing an area for recreation. What are the main reasons that you acquired your forested lands?
11. Forests can be used for a number of different functions ranging from aesthetic satisfaction to timber production. In what ways do you use your forested land?

In what ways do others use your forested lands?

12. Do you perceive that there is a need for help with woodlot management?

1. Yes ____

What type of help do you perceive a need for?

What type of organization would you want to deliver the assistance?

2. No ____

13. Are you aware of any group associations interested in the development of private woodlots?

1. Yes ____

Which Ones?

Do you belong to any such organization?

Yes ____, Which one? _____

No ____, Why not?

2. No ____, Would you be interested in joining such an organization?

14. Would you consider harvesting timber from your forested land in the future?

1. Yes ____, what forest products would you consider selling?

Have you considered selling ...

Product	Volunteered	Prompted	
		Yes	No
Rails			
Posts			
Fuelwood			
Rough Lumber			
Value Added Lumber			
To Supply a Forest Products Company			
Christmas Trees			
Ornamentals			
Other, _____			

2. No ____, why not?

Do you know of markets for forest products that can be produced on your forested land?

a. Yes ____, for what products are their markets?

Are you aware of markets for ...

Product	Volunteered	Prompted	
		Yes	No
Rails			
Posts			
Fuelwood			
Rough Lumber			
Value Added Lumber			
To Supply a Forest Products Company			
Christmas Trees			
Ornamentals			
Other, _____			

b. No ____

Have you considered products such as

Product	Yes	No
Rails		
Posts		
Fuelwood		
Rough Lumber		
Value Added Lumber		
To Supply a Forest Products Company		
Christmas Trees		
Ornamentals		
Other, _____		

15. Would you consider managing the timber on your forested land in the future?

1. Yes ____, what objectives would you manage for?

What activities would you consider undertaking?

Have you considered ... ?

Activity	Volunteered	Prompted	
		Yes	No
Planting previously untreed areas			
Regeneration of harvested or cleared areas			
Weeding			
Thinning			
Release Work			
Other, _____			

CONTRACTS AND OPTIONS

In answering the following questions please assume that a market exists for your timber.

16.1 If you were considering woodlot management would you manage it yourself or would you consider having someone else manage it for you?

1. Themselves
2. Someone else
3. Both
4. Neither

16.2 Would you reconsider this management arrangement if the second party was a(n):

- | | |
|-----------------------------|----------------|
| 1. government agency, | Yes ___ No ___ |
| 2. forest products company, | Yes ___ No ___ |
| 3. independent contractor, | Yes ___ No ___ |
| 4. landowner organization, | Yes ___ No ___ |

17.1 If you were considering developing a management plan for your forested land would you prefer to prepare your own management plan or have someone else prepare it for you?

1. Themselves
2. Someone else
3. Both
4. Neither

17.2 Would you reconsider the preparation of your management plan if the second party was a(n):

- | | |
|-----------------------------|----------------|
| 1. independent contractor, | Yes ___ No ___ |
| 2. government agency, | Yes ___ No ___ |
| 3. landowner organization, | Yes ___ No ___ |
| 4. forest products company, | Yes ___ No ___ |

18.1 If you were considering harvesting timber from your forested land would you prefer to harvest it yourself or have someone else harvest for you?

1. Themselves
2. Someone else
3. Both
4. Neither

18.2 Would you reconsider your harvest arrangements if the second party was a(n):

1. forest products company, Yes ___ No ___
2. government agency, Yes ___ No ___
3. landowner organization, Yes ___ No ___
4. independent contractor, Yes ___ No ___

19.1 This card lists several different payment options that could be used by you to pay for harvesting and/or management services, please select the method you would prefer.

1. Cash for services
2. A crop share arrangement for timber harvested
3. Giving the managing agency an option to purchase wood
4. Other, please specify _____

19.2 Would your preference change if the second party was a(an):

	Yes	No	New Selection			
			1	2	3	4
Forest Products Company						
Landowner Organization						
Independent Contractor						
Government Agency						

- 20.1 This card list several different time period for which a harvesting and/or management agreement could be in effect. Please select the time period that you would prefer.

1. Less than one year
2. 1 year to 5 years
3. 6 years to 15 years
4. 16 years to 30 years
5. Over 30 years

- 20.2 Would your preference change if the second party was a:

	Yes	No	New Selection				
			1	2	3	4	5
Landowner Organization							
Independent Contractor							
Forest Products Company							
Government Agency							

- 21.1 This card describes five different types of cash payment options you could receive for timber from your woodlot. Please select the option that you prefer.

1. You enter into a contract and are paid for all standing timber initially and receive a periodic lease payment for the land throughout the contract period.
2. You enter into a contract in which both land and timber are leased through a periodic payment.
3. You enter into a contract in which the land is leased with a periodic payment and the timber is paid for at the time it is harvested.
4. You enter into a contract and receive a periodic payment based on the average annual growth of timber. At the time of timber harvest adjustment are made for over or under payment.
5. Other, please specify _____

- 21.2 Would your preference change if the second party was a(an):

	Yes	No	New Selection			
			1	2	3	4
Independent Contractor						
Landowner Organization						
Forest Products Company						
Government Agency						

22. This card describes different conditions in which the land could be left following a contract term. Please select the option that you prefer.

1. The land is returned with the same volume of timber as it had at the outset of the contract.
2. The land is returned following harvesting without regeneration.
3. The land is returned with young growth established.
4. The condition of the land following a contract is not important to me.

PERSONAL INFORMATION:

Finally I would like to find out more about the demographics of woodlot owners. The next few questions are designed for this purpose. All the results of this survey will be pooled and your individual answers will not be used in the research. Your individual responses to these questions, as with your responses to the entire survey, are confidential.

23. Could you please select the appropriate age bracket from this card.

1. Under 25
2. 26 - 35
3. 36 - 45
4. 46 - 55
5. 56 - 65
6. Over 65

24. Were you raised on a farm?

1. Yes ____
2. No ____, what was the approximate population of the area in which you were raised?
 - a. In a town of under 200
 - b. In a town of 201 to 500
 - c. In a town of 501 to 1 000
 - d. In a town of 1 001 to 5 000
 - e. In a town of 5 001 to 10 000
 - f. In a city of 10 001 to 50 000
 - g. In a city over 50 000

25. What is the highest level of education that you have received?

26. This card lists several income brackets; please select the bracket that best represents your household income before taxes.

A. \$0 - \$4,999	F. \$25,000 - \$29,999	K. \$50,000 - \$59,999
B. \$5,000 - \$9,999	G. \$30,000 - \$34,999	L. \$60,000 - \$69,999
C. \$10,000 - \$14,999	H. \$35,000 - \$39,999	M. \$70,000 - \$79,999
D. \$15,000 - \$19,999	I. \$40,000 - \$44,999	N. \$80,000 - \$99,999
E. \$20,000 - \$24,999	J. \$45,000 - \$49,999	O. Over \$100,000

27. What percentage of your income is derived from your land? _____

28. What percentage of your income is derived from your woodlot? _____

29. What is your occupation? _____

(options: unemployed, student, retired, professional, self-employed, trade, sales, other)

Thankyou!!

