

ESTIMATED DOLLAR INPUT INTO AGRICULTURAL ZONE FORESTRY
MANITOBA AND SASKATCHEWAN 1968-69

by

B.W. Karaim and A.G. Teskey

FOREST RESEARCH LABORATORY
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Estimated Dollar Input into Agricultural Zone Forestry

Manitoba and Saskatchewan, 1968-69

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INTRODUCTION

Agricultural Zone Forestry was established as a problem area by our research laboratory in 1967. Discussion in program committee meetings led to the conclusion that economic information was needed about tree growing in the agricultural areas of Manitoba and Saskatchewan. Members of the multidisciplinary team involved, mutually agreed that an estimate of annual expenditures by species, tree use and operational activity would prove very valuable in assisting them to plan research projects. This same information would also be used by the regional program planning committee in deciding what portion of available resources should be allocated to agricultural zone forestry as a problem area.

The Economics Section undertook the task of collecting and analysing the necessary information. Their objective was to estimate the dollar value of all inputs going into tree growing in the agricultural zone of Manitoba and Saskatchewan for the year 1968-69, and to determine who spends the money, how much they spend and on what operations it is spent.

This is an internal report, covering work completed to December 1969.

METHODS

Expenditures in the public and private sectors were considered separately. Federal, provincial and municipal governments, corporations and institutions make up the public sector, while the private sector is comprised of urban and rural residences.

All information on federal and provincial expenditures was collected through personal interviews. A 25% random sample of rural municipalities was drawn for Manitoba and appropriate officials were personally interviewed. On the other hand, a mail questionnaire (see Appendix) was sent to all small towns, villages and municipalities in Saskatchewan whose population was less than 3000.

Officials of urban centres in Manitoba and Saskatchewan with populations greater than 3000 were personally interviewed.

With the cooperation of the Department of Regional Economic Expansion (P.F.R.A. Tree Nursery, Indian Head, Saskatchewan), a questionnaire (see Appendix) was added to every tenth application form that was being sent to some 15,000 bona fide farmers. A 5% sample of private residences (up to and including 3 family dwellings) in Metropolitan Winnipeg was

randomly selected from assessment records. These homes were to have been visited by personnel experienced in identifying tree species and recording required data. However, due to a shortage of funds and staff, the proposed sampling technique was temporarily replaced with a mail survey (see Appendix for the questionnaire).

RESULTS AND DISCUSSION

Estimated¹ Dollar Input into Agricultural Zone Forestry by the Public Sector in 1968-69

As of December 1, 1969, all of the public sector (as listed in the Appendix) had been covered, revealing an estimated \$2,435,400 spent or budgeted to be spent in 1968-69. This sum was accounted for in the following manner: Federal government \$896,000, provincial governments \$421,800, municipalities \$653,000 and corporations and institutions \$464,600 (see Appendix for details).

It must be noted that figures for small towns, villages and municipalities are estimates derived from sample returns, whereas all others remain as original estimates received from corresponding officials.

A 25% sample (by personal interview) of the 181 small towns, villages and municipalities in Manitoba was used to estimate expenditures by all small towns and villages (\$13,600) and by all rural municipalities (\$22,500).

On the other hand, Saskatchewan with 763 small towns, villages and municipalities did not lend itself to coverage on a personal interview basis, especially with Winnipeg as the base of operations. With a limited operating budget it was decided that a mail survey would be the most feasible method of sampling rural Saskatchewan. Questionnaires and return envelopes were sent to the secretary-treasurers of the respective towns, villages and municipalities. Two follow-up letters were sent to the non-respondents, bringing the overall response rate to 95%.

Seventy per cent of the respondents indicated that their governing bodies spent no money on trees and shrubs in the year 1968-69. Of the 30% that did allow for such expenditures, small towns and villages constituted 18% and municipalities 12%. These positive responses produced estimates of \$32,200 for all small towns and villages and \$24,800 for all municipalities.

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Since the grand total is an estimation, all returns have been rounded to the nearest hundred.

Estimated Public Expenditure by Species

A breakdown of public expenditures by species (using the figure \$2,435,400) is presented in the following table.

Species	Per Cent of Total Expenditure	Amount in \$
Caragana	21	510,100
American elm	16	388,700
Poplar	12	292,800
Ash	10	243,100
Spruce	7	172,500
Shrubs	7	171,000
Willow	4	97,700
Maple	3	73,100
Siberian elm	3	73,100
Pine	3	73,000
Birch	1	24,500
Dogwood	1	24,300
Russian olive	1	24,300
Miscellaneous	<u>11</u>	<u>267,200</u>
Total	100	\$2,435,400

Estimated Public Expenditure by Tree Use

Of total expenditures in 1968-69 (estimated at \$2,435,400), shelterbelts accounted for \$1,117,400 (46%), park plantings--\$589,200 (24%), ornamentals--\$364,400 (15%) and boulevards--\$364,400 (15%). It must be pointed out, however, that the Dept. of Regional Economic Expansion (Tree Nursery, Indian Head, Saskatchewan) was a very large contributor to the shelterbelt category. About 90% of Indian Head's 1968-69 budget was spent on growing trees for shelterbelts. This portion represented more than 75% of all public expenditures on shelterbelts. Had Indian Head been excluded from calculations, then park plantings would have led the tree use section and shelterbelts would have been last.

Estimated Public Expenditure by Activity

For purposes of this report, activity has been defined to include nursery operations, planting new trees, establishing newly planted trees over a period of three years, tree maintenance at all stages and lastly, removal or transplanting. Total costs were distributed among the above five categories in the following manner:

<u>Activity</u>	<u>Per Cent of Total Expenditure</u>	<u>Amount in \$</u>
Maintenance	49	\$1,193,300
Planting	18	438,400
Establishment	15	365,300
Nursery	12	292,300
Removal or Transplanting	<u>6</u>	<u>146,100</u>
Total	100	2,435,400

Shelterbelts as a Measurement of Rural Input

According to J.H. Cayford and A. Bickerstaff¹ there has been 210,000 acres of afforestation completed in Saskatchewan, and 54,000 in Manitoba. Afforestation means trees planted on land which previously did not carry forest. Allowing for the area taken up by tree plantations, approximately

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J.H. Cayford and A. Bickerstaff. 1968. Man-made Forests in Canada. Dept. of Fisheries and Forestry, Forestry Branch Publication No. 1240, Ottawa. p. 7, Table 3.

1/4 of a million acres of prairie soil are being utilized for shelterbelt plantings. This means that this land is no longer available for crop production. In the following discussion we have assumed that this land is capable of producing a revenue crop and in that sense would represent opportunities forgone when utilized for shelterbelt plantings. Our intent, however, is not to accurately determine land rent per acre but rather to bring to the attention of the reader the fact that such a cost should be considered.

Arbitrarily placing a rental figure of \$10 per acre would show that farmers in Manitoba and Saskatchewan are willing to pay \$2½ million per year to have trees in the form of shelterbelts. This figure, however, is only the fixed part of the cost involved in owning shelterbelts. Variable costs such as those attributed to obtaining nursery stock, planting, establishing and maintaining trees should also be estimated and included in overall expenditures.

A mail questionnaire (see Appendix) was sent to 1500 randomly selected farmers who had shelterbelts. The selection was made from 15,000 names of farmers (on Tree Nursery records, Indian Head, Saskatchewan) who had previously ordered trees from the Indian Head nursery and who were automatically kept on a mailing list for two years thereafter. Return to date has been about 13%, which we feel is sufficient to provide a general idea of expenditures incurred by a farmer growing shelterbelts.

In 1968, trees from the Indian Head nursery were sent to approximately 11,600 individual planters (bona fide farmers). These individuals received some 25,000 bales of trees for which they only had to pay shipping costs estimated at \$100,000. Ninety per cent of the farmers picked their trees up at the local railway station in a round trip that averaged 25 miles.

Seventy-five per cent of the trees received were planted by hand with planting time by hand and tree planter averaging 24 man-hours per farm. Total man-hours attributed to planting for the year 1968 was approximately 280,000 (11,600 x 24). Allowing only \$1 per hour would indicate an annual expenditure of \$280,000 for labour alone. This figure excludes the cost of gasoline, oil, fertilizer, water, and other costs associated with planting trees.

Farmers spent a reported average of 30 man-hours maintaining their established shelterbelts in 1968. Tasks such as: cultivating, hoeing, weeding, spraying, and pruning accounted for most of the 30 hours. Reported costs for materials (gas, oil, chemical spray, fertilizer, etc.) associated with the above activities averaged \$13 per farmer. Applying the same method as was used in estimating planting costs, calculations show that farmers worked 1,650,000 (55,000 x 30)¹ hours maintaining their shelterbelts in 1968. Annual costs for materials

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55,000 represents the number of individual planters on file at Indian Head, Sask. p. 4, 1967 Summary Report for the Tree Nursery, P.F.R.A., Indian Head, Sask.

were estimated at \$720,000 (55,000 x \$13). Allowing \$1 per hour for labour, total maintenance cost for the year 1968 was roughly \$2,370,000 (\$1,650,000 + \$720,000).

A summation of land rental, shipping, planting and maintenance costs shows that about \$5½ million were spent by farmers on shelterbelts in Manitoba and Saskatchewan in 1968.

Expenditures by Urban Residents

A computer was used to randomly select 5,000 private lots from Metropolitan Winnipeg's 1968 assessment records. Initial intentions were to personally visit each lot to identify and count all trees and shrubs on that specific property. By doing so it was hoped that a fairly accurate inventory of trees in Winnipeg could be estimated from the sample. In addition, a certain percentage of the selected property owners were to be interviewed to find out how much time and money they spent on their trees and shrubs. An average would be worked out for the number of trees and shrubs per lot and the yearly cost associated with their planting and maintenance. Averages were to be obtained for each of Metropolitan Winnipeg's 13 municipalities and then multiplied by the corresponding number of private homes in the respective assessment area.

Insufficient time and staff necessitated a temporary postponement of a personal interview survey; however, a few municipalities were covered by means of a mail questionnaire (see Appendix). Of the three municipalities surveyed (Fort Garry, Charleswood and Tuxedo), Fort Garry had the highest response rate and seemed to be the most suitable for representing the whole of Metropolitan Winnipeg. Until a more complete survey is conducted, we will base our estimate on the assumption that Fort Garry is a true representation of Metropolitan Winnipeg (a very liberal assumption).

Results indicated that in 1968 each home owner spent an average of 15 hours working on his trees and shrubs as well as having paid out \$20 for nursery stock, fertilizer, sprays, powders, tools, etc. Metropolitan assessment records for 1968 list 105,717 residential holdings. From experience, we have found that a small percentage of the total remains in the form of vacant lots, for which we will simply subtract 5,717. With a base of 100,000, private expenditure in Metropolitan Winnipeg for the year 1968 is therefore estimated at \$3.5 million (15 x 100,000 x \$1)¹ + (\$20 x 100,000). Expenditures by private industry, churches, apartments and golf courses are known to occur, however, no attempt was made to estimate them.

An estimation of expenditures in other Manitoba and Saskatchewan urban areas with populations exceeding 5,000 is based strictly on a population ratio with Metropolitan Winnipeg as the denominator. The

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\$1/hr. was used for labour to be consistent with previous estimates.

ratios were then multiplied by \$3.5 million and the results tallied. Expenditures estimated on this basis totalled \$2.8 million, which boosted urban spending figures in Manitoba and Saskatchewan to \$6.3 million for the year 1968.

In summary, expenditures by the private sector in Manitoba and Saskatchewan for the year 1968 are estimated at approximately \$11½ million. When expenditures by the public sector are added to those of the private sector, total dollar input into Agricultural Zone Forestry in Manitoba and Saskatchewan for the year 1968 amounts to an estimated \$14 million.

An Estimation of the Number of Trees and Shrubs in the Municipality of Fort Garry

The following results of the mail survey conducted in Fort Garry are projected simply as an illustration of the type of information that would be generated for each municipality within Metropolitan Winnipeg. All estimates are made on the basis of a 30% response rate from a random sample of 200 private homes. Results indicate that the average property had approximately 10 trees, 9 shrubs, and 22 feet of hedge. Since there are 4,975 private lots in Fort Garry (Metropolitan assessment records), we estimate this municipality to have about 51,600 trees, 44,800 shrubs and 20.7 miles of hedges. The most common species of trees and hedges have been listed and their corresponding number estimated in the following tables.

<u>TREES</u>		
<u>Species</u>	<u>Percentage</u>	<u>Quantity</u>
Oak	18.5	9,500
Fruit trees	16.4	8,500
American elm	8.6	4,400
Colorado blue spruce	7.0	3,600
Willow	6.2	3,200
Ash	6.1	3,100
White spruce	5.7	2,900
Silver maple	5.7	2,900
Poplar	5.0	2,600
Manitoba maple	3.4	1,800
Cut-leaved weeping birch	3.1	1,600
Manchurian elm	2.8	1,400
Mountain ash	2.1	1,100
Paper birch	1.9	1,000
Russian olive	1.9	1,000
Scots pine	1.9	1,000
Basswood	1.1	600
Cedar	1.0	500
Mugho pine	.3	200
Miscellaneous	<u>1.3</u>	<u>700</u>
Total	100.0	51,600

HEDGES

<u>Species</u>	<u>Percentage</u>	<u>Length in miles</u>
Cotoneaster	49.0	10.2
Honeysuckle	9.6	2.0
Caragana	9.2	1.9
Manchurian elm	8.4	1.7
Lilac	7.7	1.6
Miscellaneous	<u>16.1</u>	<u>3.3</u>
Total	100.0	20.7

APPENDIX

ESTIMATED DOLLAR INPUT INTO AGRICULTURAL ZONE FORESTRY
BY THE PUBLIC SECTOR IN 1968-69

	<u>Sum in \$</u>
<u>FEDERAL GOVERNMENT</u>	
Department of Regional Economic Expansion (P.F.R.A.)	594,800
Canadian Forestry Service	211,900
Department of Agriculture (Research Stations)	
Morden, Manitoba	64,000
Indian Head, Saskatchewan	10,000
Swift Current, Saskatchewan	6,700
Melfort, Saskatchewan	6,000
Scott, Saskatchewan	2,000
Brandon, Manitoba	300
Regina, Saskatchewan	200
Winnipeg, Manitoba	100
Saskatoon, Saskatchewan. Included as part of university.	896,000
 <u>PROVINCIAL GOVERNMENTS</u>	
a) Manitoba	
Department of Agriculture	128,000
Department of Highways	46,000
Department of Tourism and Recreation	6,200
Department of Mines and Natural Resources	1,100
Provincial building maintenance	14,800
	196,100
b) Saskatchewan	
Department of Natural Resources (Prince Albert)	113,600
Operation and maintenance of recreational facilities	111,600
Department of Highways	500
	225,700
 <u>Municipalities</u>	
Manitoba	
Metropolitan Winnipeg	305,400
Brandon	12,500
Portage la Prairie	5,200
Rural Municipalities	22,500
Rural Towns and Villages	13,600
	359,200

Sum in \$

Saskatchewan

Regina & Wascana Centre Authority	146,600
Saskatoon	35,000
Prince Albert	15,000
Swift Current	9,200
Moose Jaw	7,000
Yorkton	6,100
Melfort	5,000
North Battleford	3,500
Weyburn	3,000
Melville	2,200
Estevan	2,200
Lloydminster	1,000
Kindersley	500
Nipawin	400
Humboldt	100
Rural municipalities	24,800
Rural towns and villages	<u>32,200</u>
	293,800

Corporation and Institutions

Manitoba

Manitoba Hydro	148,100
Manitoba Telephone System	108,900
Winnipeg Hydro	34,800
University of Manitoba	<u>22,500</u>
	314,300

Saskatchewan

Saskatchewan Power Corporation	106,900
University of Saskatchewan (Saskatoon)	40,000
Saskatchewan Government Telephones	<u>3,400</u>
	150,300

Grand total - \$2,435,400

A Survey of Expenditures on Trees and Woody Shrubs in
Towns, Villages and Rural Municipalities in Saskatchewan

We are trying to estimate the total dollar input associated with growing trees in the agricultural zone of Saskatchewan. As part of this input we need to know the amount of money spent by your government including the portion of office and administration costs associated with the direct costs of tree growing. Your best estimate is fine. Please do not worry about being accurate to the last cent or even the last dollar. All individual returns will be kept strictly confidential and only grand totals and averages will be used. Even if your government does not spend any money on trees it is important that you return this questionnaire. We hope the following questions will explain the details of the information we need and make it easier for you to assist us.

1. Does your government
 - a) own a tree planter? Yes ___ No ___
 - b) ever remove dead trees or branches (such as after storms)? Yes ___ No ___
 - c) ever plant, prune, spray or cultivate trees? Yes ___ No ___
 - d) have any parks, cemeteries, boulevards, ornamental plantings, shelterbelts or centennial projects with trees or shrubs? Yes ___ No ___

Is there anything else involving trees or shrubs? (please comment) _____

2. How much of your annual expenses would you estimate was spent on anything to do with trees or shrubs under the following categories of expenditure.

	\$ <u>1966</u>	\$ <u>1967</u>	\$ <u>1968</u>	\$ <u>1969</u>
a) general government	_____	_____	_____	_____
b) public works	_____	_____	_____	_____
c) recreation and community services	_____	_____	_____	_____
d) miscellaneous	_____	_____	_____	_____
e) other (please specify) _____	_____	_____	_____	_____
 Total annual tree expenditures	<u>\$_____</u>	<u>\$_____</u>	<u>\$_____</u>	<u>\$_____</u>

3. For each "total annual tree expenditure," estimate how it was divided up among the different tree species. (Example only: elm 15%, ash 20%, caragana 50%, willow 5%, etc.)

1966 _____

1967 _____

1968 _____

1969 _____

4. Take each "total annual tree expenditure" and estimate how it would be divided up among the following categories of tree use: 1) shelterbelts, 2) boulevards, 3) parks, 4) ornamentals, 5) cemeteries and 6) other.

1966 _____

1967 _____

1968 _____

1969 _____

5. Take each "total annual tree expenditure" and estimate how it would be divided up among the following activities in the life of a tree: 1) propagation or nursery, 2) planting out, 3) establishment in the first three years, 4) general maintenance and 5) removal or major renovation.

1966 _____

1967 _____

1968 _____

1969 _____

6. Please make any comments you wish on the above and suggest any problems in tree growing that need to be solved. Also comment on what you think people's goals are that grow trees in Saskatchewan.

Thank you for your kind co-operation.

QUESTIONNAIREEffort Required to grow Field Shelterbelts

In cooperation with the research staff of the Canada Department of Fisheries and Forestry, Winnipeg, we are estimating the total effort required to grow farm shelterbelts. This information will indicate the more important problems facing farmers in their shelterbelt programs. From this information we will be able to direct our research efforts to the most important problems so that all prairie tree growers will benefit. Your help in answering these questions will be greatly appreciated. Please return your answers in the enclosed self-addressed envelope. Thank you for your efforts.

1. (a) Where did you pick up your trees from the nursery (local railway station, bus depot, Indian Head Nursery, etc.) _____
- (b) How many miles is it from your farm to where you picked up your trees _____
2. In the year before planting a shelterbelt did you summer fallow the ground (YES or NO) _____. If YES, how many times _____
How wide was the strip that you summer-fallowed _____ feet.
3. (a) In which of the years - 1967, 1968, and 1969 did you plant shelterbelts

- (b) How many rows of trees did you plant in each shelterbelt _____
If more than one row, please explain _____

- (c) How many miles of single row equivalent belt have you planted on your farm in (1967, 1968, and 1969) _____ miles.
How many people worked at it (include yourself and family) _____
and how many "man-hours" did it take in total _____
- (d) What method of planting did you use (tree planter, by hand, etc.)

- (e) Please describe other operations you did to these trees in the year you planted them, such as hoeing, weed and insect spraying, cultivating, etc.

<u>What was done</u>	<u>Total man-hours</u>	<u>Other costs</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

4. In the year following planting, please describe the operations done to these belts including time, cost and methods used (weed, insect, and disease control, replacing dead trees, cultivation, etc.)

<u>What was done</u>	<u>Total man-hours</u>	<u>Other costs</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

5. Excluding the shelterbelts planted in 1967, 1968, and 1969, how many miles of single row equivalent shelterbelt do you have on your farm now _____ miles.
6. On the average, what do you spend on an established shelterbelt each year in terms of time and dollars?

<u>What was done</u>	<u>Total man-hours</u>	<u>Other costs</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

7. We would really appreciate any comments, good or bad, on farm shelterbelts, both field and farmstead. For example, people say that Shelterbelts do not pay, or that they cause problems with livestock. What about aesthetics and beauty of trees? Do we need to be concerned about soil and water conservation? What do you like about trees and what don't you like about them? Do you think shelterbelts can be justified in terms of economics in the right places? Any other questions or ideas would be most appreciated and all answers to this questionnaire will be treated confidentially.

QUESTIONNAIRE

PLEASE NOTE: If species not known please list as "unknown".

1. TREES (Please record the number of each species and their corresponding height.)

<u>SPECIES</u>	<u>NUMBER</u>	<u>HEIGHT</u>
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2. HEDGES (Please disregard height and record only the species and length of the hedge in feet.)

<u>SPECIES</u>	<u>LENGTH OF HEDGE (in feet)</u>
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3. SHRUBS (Please record number only.)

NUMBER

4. Approximately how much time (hours, days, etc.) did you spend on your trees, hedges and shrubs in 1968 and 1969 (planting, pruning, winter preparation, etc.)

1968 _____ 1969 (est'd) _____

5. How much money (\$) did you spend on the following for trees, hedges and shrubs:

1968	1969 (est'd)
<u>\$</u>	<u>\$</u>

Nursery Stock

Fertilizer

Sprays and powders

Tools and equipment

Other

6. If you hired work done on your trees, shrubs and hedges please state job done and total costs.

1968 -

1969 -

7. What are your feelings towards trees, shrubs and hedges in the urban setting--importance, usefulness, research needs, etc.? Please comment--the back of this sheet is fine.