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## Abstract

In a series of treaties from 1871 to 1876, Canadian prairie aboriginal claims were extinguished and Indian First Nations were confined to reserves scattered throughout the prairies. In recent years, a number of First Nation claims have been brought forward based on unfair or illegal surrender or exchange of the original land. There are a number of possible economic losses stemming from such cases, but the largest source of economic loss likely stems from the loss of farmland and its associated loss of agricultural use. This paper reviews a procedure for estimating historical agricultural loss of use, discusses several key issues and presents an application based on a hypothetical case example.

## An Economic Study of Loss of Use of Indian Lands: A Case Study of Saskathchewan, Canada

By R.A. Schoney, Ph.D., P.Ag.

### Introduction

After having been on the Canadian prairies for more than 9,000 years, aboriginal peoples found their traditional nomadic existence increasingly difficult to maintain when the buffalo largely disappeared by the 1870s. In return for certain treaty rights including a permanent land reserve to be set aside, they signed one of seven treaties from 1871 to 1876 that extinguished their pre-treaty aboriginal interest in their traditional lands. They were subsequently scattered to a series of reserves throughout the Canadian prairies. In order to facilitate the development of western lands, the Canadian government granted the Canadian Pacific Railway (CPR) 25,000,000 acres of western lands to help finance a national railway. Much of the CPR land was amenable to agriculture. The CPR then subsequently scrambled to bring in immigrants to buy their land and to generate rail traffic. On non-rail lands, homesteading and cheap land policies further increased settlement. By 1907 much of the better agricultural land was gone and the lack of short season wheat varieties discouraged settlement of more northern lands. Since a number of Indian reserve lands were located in prime agricultural areas and close to rail, they became targets for takeover by unscrupulous settlers, politicians, and land speculators. It is asserted by a number of First Nation (Indian) bands that these reserve lands were surrendered illegally and that they are entitled on legal principals to be compensated for their resulting loss.



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## The Problem

While the exact details are unimportant to this paper, the result is that these form the basis of what is referred to as “Specific Land Claims” by the First Nations against the Government of Canada. Recently (June 27, 2006), the CBC reported that there were a total of 750 unresolved specific claims in Canada (CBC Radio). Not all of these claims are specific to land; many claims concern water and natural resources or unfulfilled treaty obligations. Specific land claims can result in relatively large damages being awarded. In his comments to Parliament over Bill C-6: the Specific Claims Resolution Act, Mr. Gurmant Grewal (Member of Parliament, Surrey Central, Canadian Alliance) asserted the following:

*“Documentation related to specific claims settlements in Saskatchewan since the mid-1980s shows that the treaty land entitlement class of specific claims, asserting that Canada did not provide the reserve land promised under treaty, resulted in payments of \$539 million. Individual settlements ranged from a low of about \$3.1 million to a high of \$62.4 million. The average is over \$18.5 million. Other specific claims in Saskatchewan cost a total of about \$128.6 million, with individual settlements ranging from just over \$0.4 million to \$34.5 million.” (37th Parliament of Canada, 2nd Session, November 4, 2003)*

While there are many variations, most specific land claims have a common theme: the First Nations surrendered land (the “old reserve”) to the Canadian Government in exchange for other, less valuable land (the “new reserve”) and/or payments in the early 1900s. The First Nations involved in these claims assert that the exchanges were illegal for a variety of legal reasons including the federal government’s failure to comply with the procedural requirements for surrenders mandated by the Indian Act or the lands being procured or consented to by Canada in breach of its fiduciary duty to the band. Many bands would also further argue that coercion and rigged or irregular band voting contributed to the wrongful surrender. There are a number of possible economic losses stemming from such cases, including lost grave sites, land improvements and lost or forgone income from mineral, forestry, traditional hunting and gathering activities, and agriculture. However, the greatest source of economic loss often stems from the loss of farmland and its associated loss of agricultural use. In the negotiation process,

farmland-related economic losses are held to consist of 1) the net current market value of the lands surrendered; and 2) the “net loss of agricultural use” incurred by the First Nation from the time of surrender to a negotiated date.

The objectives of this paper are to 1) review the procedure for estimating agricultural loss of use; 2) discuss some of the key issues surrounding such estimates; and 3) show the impact of alternative a) land improvement rates; and b) land leased out assumptions on estimated losses using a case example. Note that it is beyond the scope of this paper and the expertise of the author to examine the legal merits of the issues. The case example is based on several specific land claims but many details have been altered because of confidentiality. In the case example, the surrendered old reserve was located on the black soils of Saskatchewan and contained approximately 16,000 acres of good, cultivatable land out of a total of 20,000 acres. It is assumed that the old reserve was surrendered in 1909 and that losses are calculated to a settlement date of 2001.

## Valuation of Agricultural Loss of Use

“Net loss of agricultural use” consists of the present value of the forgone opportunities of the First Nations to farm the surrendered old reserve less the opportunities gained with lands received in exchange (the new reserve), and less any payments actually received for surrendered lands.

In order to simplify the following case example, income from the new reserve received in exchange and payments for lands given up are excluded. In any one time period, the net farm income opportunities forgone consist of a) income forgone from farming their land themselves; or b) leasing it to non-band members, less land improvement costs. Land improvement costs include the cost of clearing timbered land, rock picking, and breaking of newly developed land, and fencing and road infrastructure costs. Two key variables influencing net farm income are 1) the conversion of land to farming (or agricultural improvement); and 2) the proportion of the farmland leased out to non-band members.

## Agricultural Land Improvement and Use

Farmland improvement refers to the conversion of land from its more or less original state to its highest and best economic use as determined by a land appraiser. An overview of the

agricultural land improvement process is presented in Figure 1. Land with agricultural potential is subdivided into two categories: 1) unused farmland; and 2) used farmland. Unused farmland is land with farming potential but it is either unsettled or is used for non-agricultural purposes.<sup>1</sup> Used farmland is land which is used for farming purposes and has become part of a farming unit. Used farmland is assumed to incur road infrastructure costs. When farmland is first “used,” it consists of all unimproved land. Unimproved land has two subcategories: 1) non-agricultural and waste land; and 2) unimproved pasture land. In order to be used in grazing, unimproved pasture land requires fencing. Unimproved land can be converted into improved land at a conversion cost of clearing, rock picking, and breaking. Improved land has three major subcategories: 1) annual crop and fallow land; 2) hay ground; and 3) improved pasture land. As with unimproved pastureland, improved pastureland requires fencing.

There does not seem to be much controversy surrounding the agricultural improvement process and the starting point is a matter of record. At issue is the agricultural improvement rate. Before agricultural improvement rates can be discussed, a brief history review is in order. Saskatchewan First Nations were not resettled on reserves until the early 1880s. Early First Nation development was hampered by depopulation from disease, paternalistic and misguided Indian policies, uncertainties associated with resettlement, and in many cases, a poor agricultural resource base. The federal authority at the time, the Department of Indian Affairs and Northern Development (DIAND), promoted development through an extensive system of Indian agricultural agents who served as teachers and overseers. However, these good intentions were often thwarted by paternalistic and overly centralized government policies such as the permit system, unscrupulous agents, poor administration, and misguided social philosophies.<sup>2,3</sup>

Unfortunately, there is little empirical evidence of post-surrender land improvement rates for other First Nations having similar circumstances and comparable farmland. Here, the First Nation maintains that in an unfettered environment, they would have developed and farmed these lands in the same fashion as their neighboring non-Indian farmers. The counter argument is that the First Nation would not have developed at the same rate. In order to accommodate the two positions and to show their

corresponding impact on loss estimates, three improvement rates are estimated. The first approach is labeled “Base” improvement and is based on historical rural municipality (RM) land improvement.<sup>4</sup> In order to accommodate the counter argument of delayed improvement, two alternative improvement patterns are developed based on First Nation rates lagging RM improvement rates by 10 or 20 years.

RM land improvement rates are well documented by the Census of Agriculture after 1916 (Statistics Canada). These are displayed for used agricultural land and annual crop rates in Figure 2. Note that used agricultural land peaks at full improvement in 1986 and then declines slightly. It is not clear if this a real phenomenon or an artifact stemming from the Census difficulties of counting agricultural land.

### **First Nation Operated versus Leased Land**

A second issue is with the capacity and proclivity of the First Nation to farm their own land as opposed to leasing it out to non-band farmers. Historically, many First Nations rented sizable reserve acres to non-band members, particularly after 1950. However, there were few records kept, particularly before 1950. Because the potential return from farming the land themselves is much higher than typical lease rates in the early years, assumptions as to the proportions of band-farmed versus leased are critical. The first step in establishing their potential is to assess the ability of the First Nation to farm their own land in terms of having sufficient numbers of potential farmers. This is based on comparing reserve labor requirements against the total potential available operators. Labor requirements are based on available farmland times the average Saskatchewan acreage per farm operator. While band profiles can be difficult to establish because of poor records, there are relatively good data in the early years when band numbers were most critical. The conclusion is that there were clearly sufficient numbers except for the several years around 1916 to meet potential farm labor requirements.

The band has a history of leasing to non-band members, particularly after 1950. However, the exact amounts are unclear because of missing or incomplete band records. In the following analysis, two alternative leasing scenarios are delineated based on probable lower and upper bounds to leasing rates. The two leasing scenarios are set at 1) 10 percent of land leased before

1950, and 25 percent after 1950; and 2) 25 percent before 1950 and 75 percent of land leased after 1950.

### Annual Farmland Returns

Annual gross returns from farmland consist of the sum of returns from annual field crops, hay, improved pasture, and unimproved pasture. Annual field crops include wheat, barley, oats, rye, flax, and canola. Total annual income in any given year consists of a) net farm income from band farmed land; and b) lease income from land leased to non-band members.

Leasing rates are based on prevailing crop share arrangements found in farm newspapers, magazines and occasional surveys.

The net farm income to land farmed by band members is defined as the residual return to labor, management, and land (RLLM) after the opportunity costs of all other inputs, both fixed and variable, are deducted. There is little information as to actual band RLLM. Hence, the RLLM must be estimated taking into account reserve land productivity, location, and changes in land use over time. Gross income is based on price times yield for each of the seven crops in the historical crop mix plus a pasture value. Annual yields are estimated based on historical RM yields adjusted to the reserve according to a farm appraisal of reserve land productivity. Annual crop mix is based on RM historical proportions and commodity prices are regionally adjusted prices. However, the RLLM amount is not easily estimated and must be based on other data. While some data do exist, they can not directly be used because of differences in farm type, location, soil productivity, and crop mix. The procedure used here is to calculate RLLM as gross farm income times the percent residual to land, labor, and management (%RLLM). Problems associated with estimating %RLLM include: 1) definition; and 2) measurement. Definitional issues center on what constitutes economic income and what the appropriate deductions are. Definitional income issues primarily center on the inclusion/exclusion of voluntary government support programs and income in kind. Definitional expense issues center primarily on the inclusion/exclusion of certain types of deductions such as paid labor. In the case of paid labor, the First Nation argued that in general there was excess labor and any individual farm labor shortages would have been met by an informal labor exchange with other band members and thus, it did not represent a net expenditure.

The measurement issue is associated with the difficulty of establishing %RLLM for such a long time period for farmland similar to the old reserve. There are two basic approaches to establishing %RLLM: 1) microdata; and 2) aggregate provincial income statistics. The microdata approach is based on using Saskatchewan farm records from several farm management associations and published panel data and then estimating missing years based on the corresponding RM data.<sup>5</sup> There are 39 years of actual data out of the total of 87 years. The remaining 48 years of missing data are estimated based on the statistical relationship between %RLLM and RM gross wheat returns per acre.

The alternative is to estimate the %RLLM based on provincial aggregate income statistics.<sup>6</sup> Both approaches suffer from specification problems. In the micro data approach, data can be matched to area and farm type but there is potential selectivity bias as farmers cooperating with provincial record keeping programs are likely to be somewhat better managers than the area average, biasing the %RLLM upwards. Provincial aggregate statistics suffer in that the provincial aggregate consists of many different soil types, climates, and types of agriculture and could differ considerably from the case example reserve.

The two approaches to estimating %RLLM are compared to each other and to leasing crop shares in Figure 3. One approach is not consistently higher than the other and their major differences are readily explainable. During the period of the “dirty thirties” when much of the southern part of Saskatchewan suffered from severe drought and wind erosion (hence, the name “dirty”), the provincial average %RLLM is considerably less than that based on the black soil zone microdata. This is because that soil zone had considerably better yields. The negative provincial %RLLM’s in 1931 and 1937 reflect the extreme and widespread droughts in the southern part of the province in these years. This was followed by dramatic improvements in farm incomes during the WWII years and the strong wheat exporting position of the brown soil zone likely caused aggregated returns to increase over that of the black soil zone. However, in 1961 and 1988, the microdata farms in the black soil zone also experienced a drought that was not as widespread and did not affect the rest of the province as severely. The other period of considerable difference is the

1979- 1991 period. This was a period of structural change in the black soil zone – canola emerged as a very profitable crop and there was a shift to less fallow. The other soil zones relied much more on the wheat economy which was starting to show deep and chronic profitability problems.

Both approaches highlight falling returns to labor and management for Saskatchewan grain and oilseed farms over time. In the early years of settlement, the return to labor and management was roughly comparable to the returns to land. Over time, farm cost structure has changed dramatically. Shifts to greater amounts of pesticides, fertilizer, and larger machinery, and less fallow have caused the labor and management cost share to decline. However, it is only comparatively recently that crop share rents have also declined, reflecting the decline in the grain economy.

In conclusion, the microapproach also generates some concern associated with missing years and the potential lack of overall representativeness. The provincial aggregate approach has drawbacks associated with the lack of correspondence to the case reserve area, particularly after 1979. In the following analysis, the microdata approach is used for the base scenario and the provincial aggregate income approach is used for the alternative approach.

### **Adjustment for Time**

The timing of losses and the choice of compounding rates are critical in establishing final loss. Past negotiations have fixed the framework for the calculation of the final amount into two time adjusted amounts: 1) inflation adjusted to a real value amount (80% of annual losses); and 2) nominal interest (for which capital markets have presumably embedded both inflation and real time value of money into the actual rates) adjusted to a present value (PV) amount (20% of annual losses). In the following section, nominal losses represent the actual annual dollar loss estimates; real losses are inflation adjusted to a base year of 2001 and present value represents the compounded value using a time value of money to 2001. While it would be desirable to use an inflation rate relevant to the case example, these data do not exist and generally past negotiations have specified that an all Canada rate must be used. The compounding interest rate could be based on nominal bank or

government rates. Here, the Indian Band Trust Fund rate is used based on the premise that farm monies earned could have been put in the band's capital or revenue accounts and earned interest. While fixed in early years, in more recent years, the trust fund rate is based on long-term Bank of Canada Bonds.

The importance of inflation adjusted versus present valuation based on nominal interest rates is clearly visible from the following Figure 4. Using a 2001 base settlement date, the 1909 PV multiplier is 293 while the inflation adjustment multiplier is only 16.4. Since the nominal interest rate includes inflation as well as a real interest rate, the difference is caused by the effect of the real interest rate compounding. Hence, changes in income in the early years from differing assumptions as to improvement rates, leasing and land use can cause major differences in loss estimates. As might be expected from the differences, there is major controversy as to the appropriate blend of inflation adjusted and time value of money when many generations are spanned. Arguments against awarding full present value are two fold. One argument advanced is that loss should be based on only that which has accrued to the current band generation. This argument reasons that only a small portion of the annual loss would have been reinvested and thus only this amount should be present-valued. Thus, it is argued that the final loss should be a blend of inflation-adjusted and present valued losses. A second argument is based on more practical terms, plaintiffs should not generally receive full present value when many years are involved because the present value amounts become astronomical. It is argued in such cases, the full present value would unjustly reward the plaintiff and unfairly punish the defendant.

A counter argument is that forgone income in the early years had a very high opportunity cost and that this forgone income compounded itself across generations by retarding improvement and the ability to build up human capital. This argument would call for a valuation approaching the full present value amount. The decision as to the relative merits of the two arguments can only be made by the courts and is likely to be case specific. In this case, the 80/20 blend was mandated by the negotiation process and is displayed to show the impact of a negotiated settlement on the two positions.

### Net First Nation Lost Income

Estimated First Nation net farm income is presented in Figure 5 in nominal, real and present value amounts. The importance of the early years in setting losses is readily apparent. Nominal and real net farm losses are relatively low due to an undeveloped agricultural economy. However, since the PV multipliers are very large, this period has a major influence on the PV of losses.

### Estimated Net First Nation Losses

Estimated losses are displayed in Table 1 by agricultural improvement and leasing assumptions. Using microdata and the base scenario (no lag in RM improvement rate, 10% pre-1950 leasing and 25% post 1950-leasing), estimated losses are \$17,650,722, \$50,587,023, and \$250,270,809, respectively, in nominal, real, and present value terms. If a blend of 80 percent real and 20 percent present value losses is used (as was mandated by negotiation process), then the estimated loss is \$90,523,780. As expected, delaying land improvement causes the present value of losses to decline dramatically because it reduces early incomes that have high PV multipliers. The present value of estimated losses decreases by 27.1 percent and 40.2 percent, for 10- and 20- year lags, respectively. Note that using an 80/20 percent inflation-adjusted/PV blend reduces the overall differences somewhat.

While the alternative leasing scenarios have significant impact on the present value of losses, they are much less than the impact of lagged improvement rates. Compared to the base 10/25 percent leasing rates, the present value of estimated losses decreases by 11.7 percent for the 25/75 percent leasing rates for the no-lag in improvement rate scenario. Changing leasing out patterns has much less effect than lags in land improvement because most of the increased leasing occurs after 1950 when 1) the present value multipliers are considerably less; and 2) the return to labor and management has dwindled greatly so that the advantage of band farming is not as great as it was in the early years.

The last comparison is between the two approaches to estimating %RLLM. Somewhat surprisingly there is not a great deal of difference between the final present value estimates. Differences range from 0.5 percent increase in the present value (base scenario) to 3.8 percent (20-year lag and 25/75% leasing).

Using an 80/20 percent inflation-adjusted/PV blend reduces the overall differences only slightly.

### Conclusions and Limitations

This case study assesses economic loss based on only income forgone from agricultural use, it does not consider the economic income associated with wildlife or other non-agricultural use. While loss estimates are always case specific, it does reveal some important relationships. First, it emphasizes the importance of income estimates in the early years when the present value multipliers are high. Second, while income in the later years is important, the residual to labor and management has dwindled over time and thus there is less advantage to band farming over leasing land to non-band farmers. Third and finally, it demonstrates the importance of long time periods in setting economic losses. In Canada-First Nation negotiations, agricultural losses are deemed to consist of the current value of surrendered farmland and loss of use. Originally, much of the discussion centered on compensation for the surrendered land. However, this case study demonstrates that for many First Nations, it is the loss of use which generates most of the loss. Here, it is many times the current farmland value. Using 2001 farmland values, the surrendered land is worth approximately \$7,000,000-\$8,000,000. Using the 80/20 blended loss, and depending upon the assumptions employed, loss of use ranges from 7 to 12 times the current fair market value of the land.

The relationship between loss of use and current farmland value also has an important human dimension. It was not just the loss of land that was important, it is the loss of use over three or more generations that was devastating to First Nations.

### End Notes

<sup>1</sup> These definitions have been developed to match Census land use definitions and available data.

<sup>2</sup> The permit system required agent issued permits to buy farm inputs and to sell farm products. Capital investments or expenditures often required approval at a much higher level.

<sup>3</sup> For an excellent reference on Indian reserves and Canadian government policy refer to Carter (1990).

<sup>4</sup> A variety of reasons are advanced for slower improvement rates including inability to use reserve assets to secure debt and because of cultural differences. The Federal negotiators argue that this has manifested itself on the current reserves by slower agricultural improvement rates and the tendency to lease reserve lands to off-reserve farmers, particularly after 1950. The First Nations counter with two arguments. First, they argue, that after lands were removed, they were left with inferior land and in some cases they were resettled in areas further north that would not support wheat varieties available in the early years. Second, they argue that initial progress was severely limited by the bureaucratic and paternalistic policies of Indian and Northern Affairs Canada (INAC), such as the permit system and that this should be omitted from consideration.

<sup>5</sup> Microdata sources include crop budgets (Department of Agriculture, 1918); farm panel data (E.S. Hopkins, J.M. Armstrong, H.D. Mitchell, 1932); farm accounting association summaries (Saskatchewan Agriculture 1961-1963, 1965-75 and 1976-1978) and joint Agricultural Canada- Saskatchewan farm panel / workshop data (Schoney, 1995).

<sup>6</sup> Provincial income statistics are taken from Agricultural Statistics, Saskatchewan Agriculture, Economics Branch.

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Figure 1. Farmland improvement process

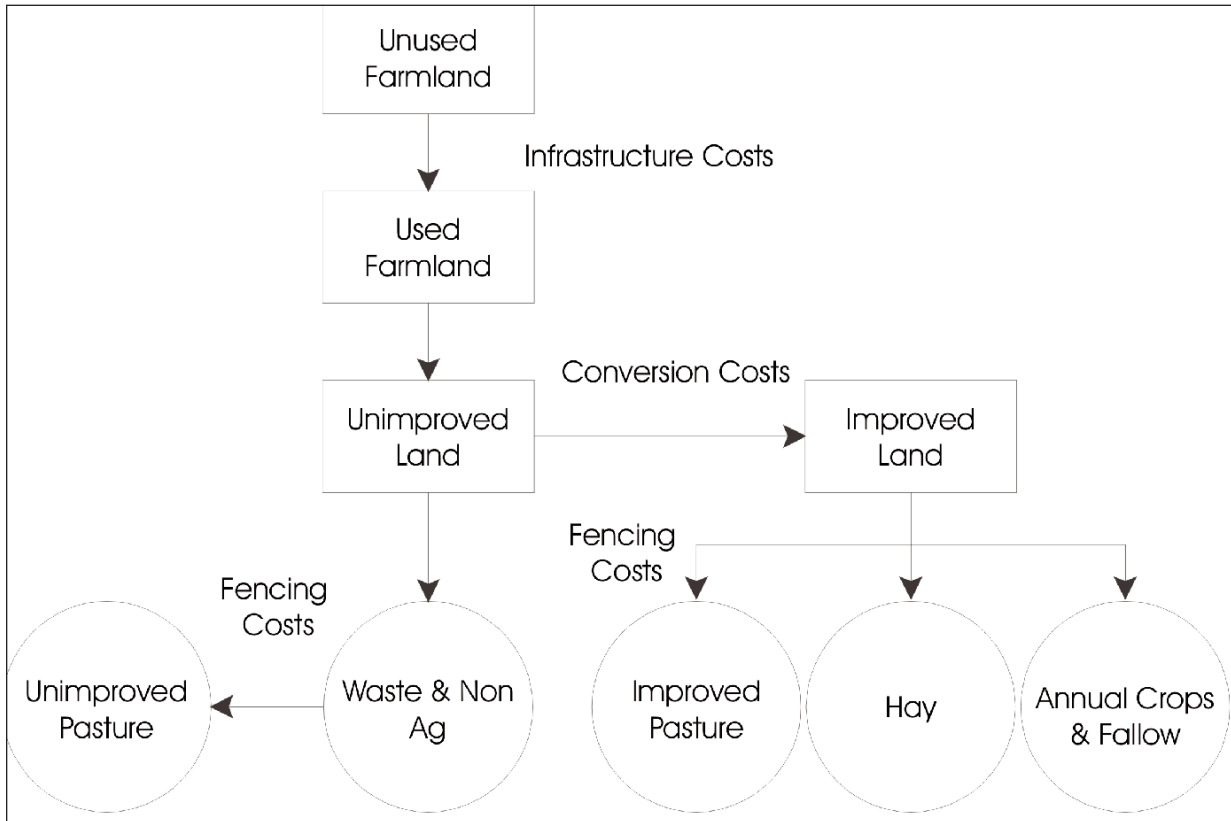


Figure 2. RM (Rural Municipality) improvement rates as a percent of maximum (data are smoothed; Source: Statistics Canada Census of Agriculture)

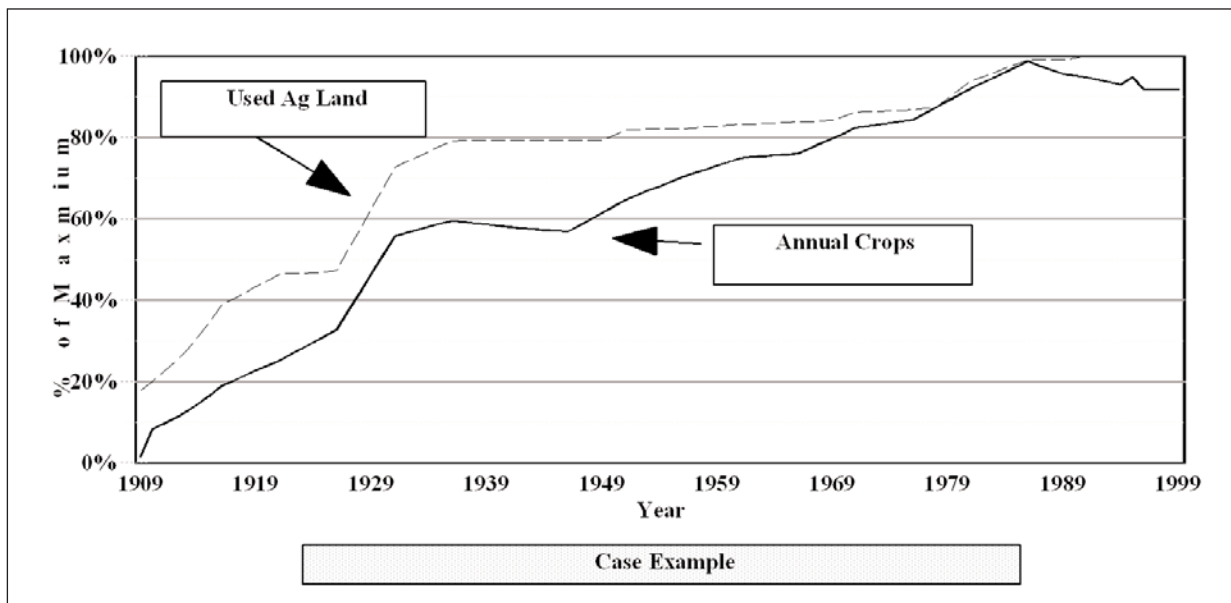


Figure 3. Estimated percent return to land, labor, and management (%RLLM) by Data Source and Crop Share Lease

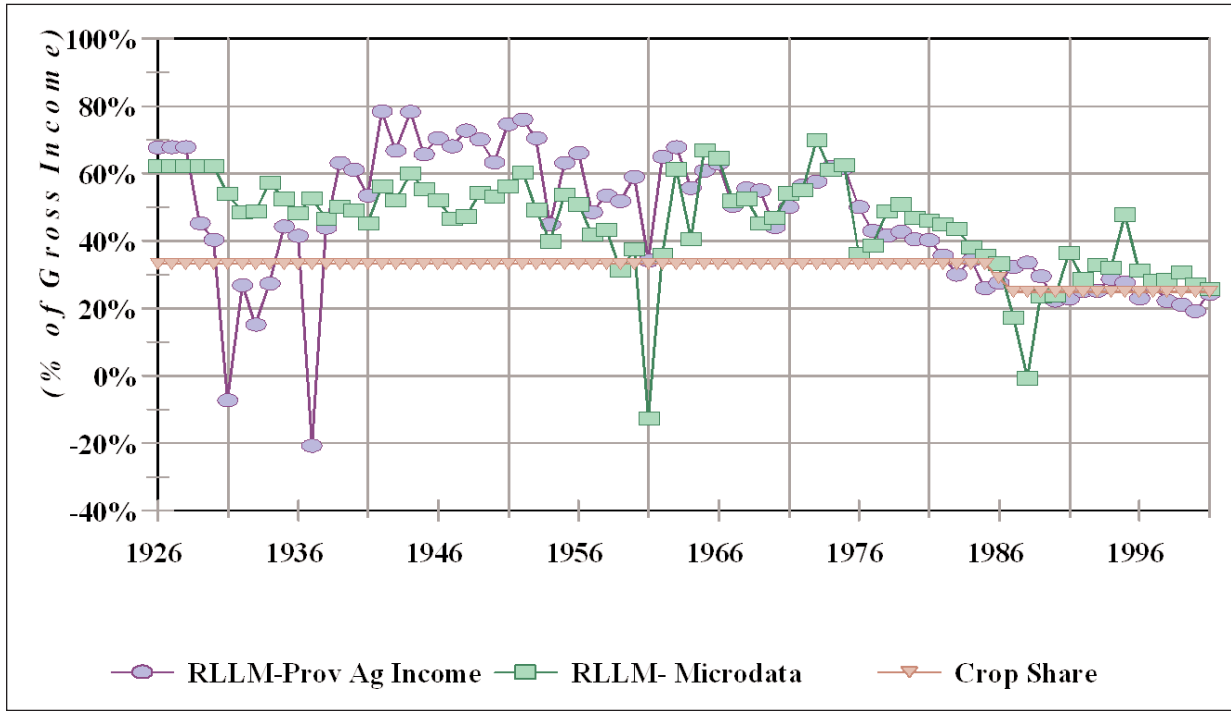


Figure 4. Comparison of real (inflation adjusted) and present value (compounded interest) multipliers

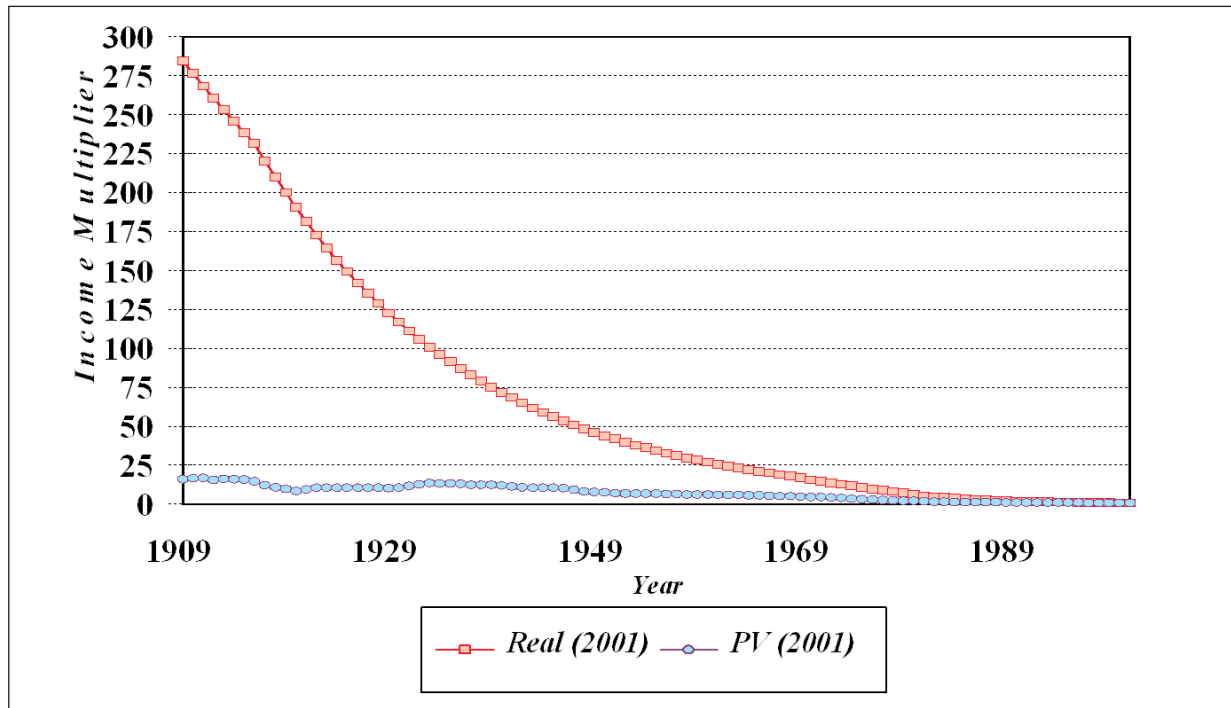


Figure 5. Estimated annual income in nominal, real (inflation adjusted to 2001), and present value (2001) – base assumptions

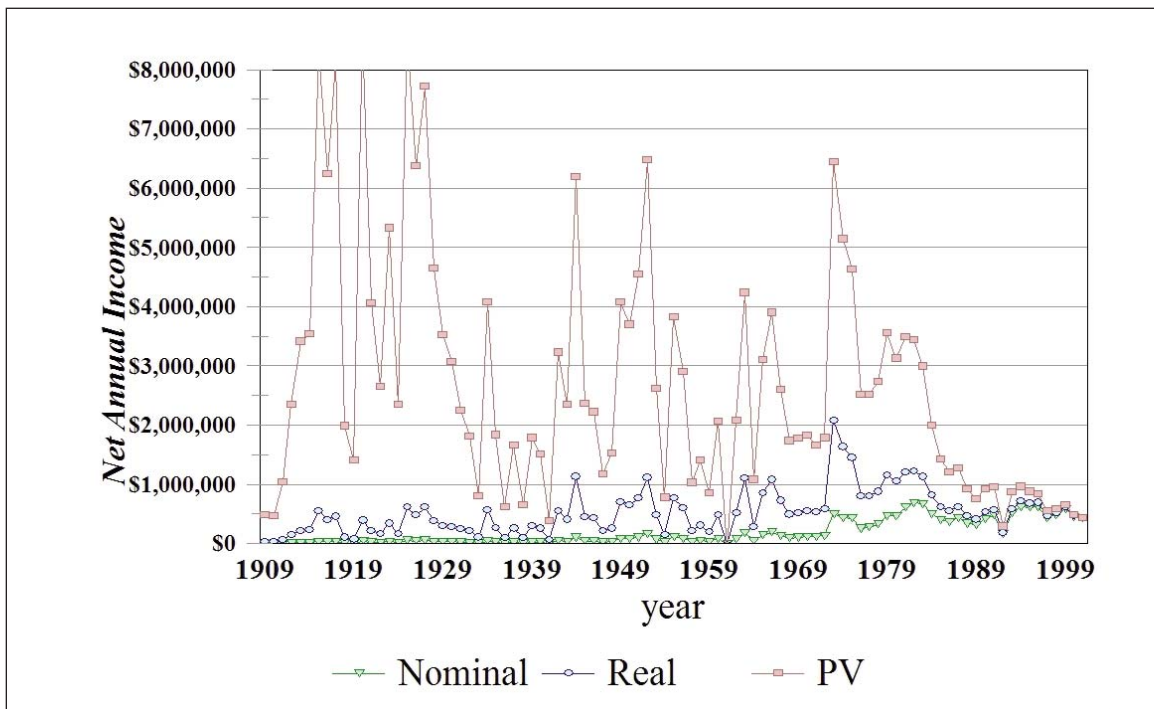


Table 1. Estimated loss in agricultural income generating ability

Assumption				Agricultural Net Loss			
RLLM% Source <sup>a</sup>	Lag in Development Rate (Years) <sup>b</sup>	% Leased Out Land		Nominal	Real (2001) <sup>c</sup>	Present Value to 2001 <sup>d</sup>	80% Real / 20%PV
		Pre 1950	After 1950				
Microdata	0	10%	25%	\$17,650,722	\$50,587,023	\$250,270,809	\$90,523,780
Microdata	10	10%	25%	\$17,006,303	\$44,333,528	\$182,527,733	\$71,972,369
Microdata	20	10%	25%	\$16,474,917	\$39,598,572	\$149,624,448	\$61,603,747
Microdata	0	25%	75%	\$16,472,135	\$44,904,083	\$220,934,271	\$80,110,120
Microdata	10	25%	75%	\$15,899,792	\$39,274,189	\$159,506,188	\$63,320,589
Microdata	20	25%	75%	\$15,095,901	\$34,491,969	\$128,382,811	\$53,270,137
Prov Income	0	10%	25%	\$16,450,554	\$50,842,570	\$251,400,742	\$90,954,204
Prov Income	10	10%	25%	\$15,814,814	\$45,009,142	\$189,127,813	\$73,832,876
Prov Income	20	10%	25%	\$15,235,382	\$39,918,041	\$155,316,968	\$62,997,826
Prov Income	0	25%	75%	\$16,089,526	\$44,974,366	\$218,393,440	\$79,658,181
Prov Income	10	25%	75%	\$15,548,062	\$39,846,950	\$162,235,477	\$64,324,655
Prov Income	20	25%	75%	\$14,706,452	\$34,789,647	\$130,437,744	\$53,919,266

<sup>a</sup> RLLM% refers to the percent of gross return, to land labour and management. Microdata returns are based on farm management accounting and producer panels. Provincial income refers to the percent based on Saskatchewan agricultural income accounts

<sup>b</sup> Lag refers to the time lag between RM and band development rates

<sup>c</sup> Real values are based on an all Canada Consumer Price Index

<sup>d</sup> Compounding to present value is based on Indian Band Trust Rates which are based on a moving average of long term government bonds