

Value of Provincial Pedigree Seed Industry to the Saskatchewan Economy and Potential Market Impacts to 2025

A Report Prepared for the Saskatchewan Seed Growers Association

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Executive Summary

The Saskatchewan pedigreed seed industry has enjoyed strong, continual growth over the past decade. This is evidenced by the findings of this economic impact assessment. The key findings of this assessment of the pedigreed seed industry based on 2013 data found that:

- The direct economic impact has risen to \$506 million from \$216 in 2001.
- The GDP value of the pedigreed seed industry is \$710 million, up from \$389 in 2001.
- Over 16,000 people are employed, up from 9,000 previously.

Many of the trends in prairie agriculture are readily observable, such as the increase in canola or pulse acreages. Increases in the use of pedigreed seed is not something that is visible to the naked eye, but requires in-depth research in collaboration with the Saskatchewan Seed Growers Association. This is the second economic impact assessment that has been undertaken for the SSGA and as is the case with any industry economic impact assessment, care must be taken to ensure that the comparisons are meaningful and represent typical years for the specific industry. The initial economic impact assessment was done using 2001 data and the results indicated that the data gathered and presented in this report are representative of a normal spring seeding conditions. While the 2013 crop is remembered as a bumper crop, this report does not measure output, it measures the value of the seed that went into the ground in the spring. The spring of 2013 was typical of an average spring with portions of the province dealing with an abundance of surface moisture, while other areas of the province faced concerns over the lack of moisture.

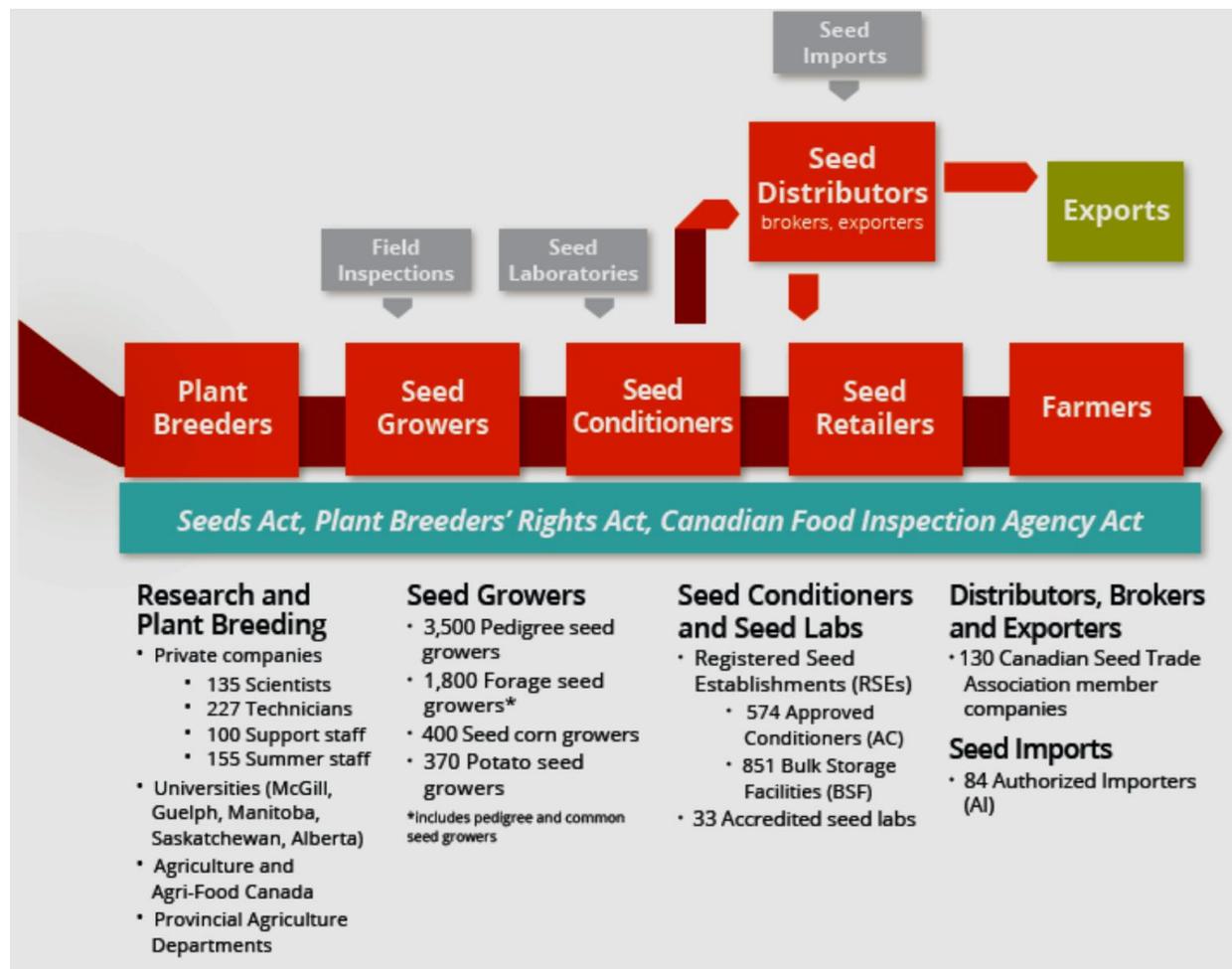
In part, this economic impact assessment confirms trends in Saskatchewan agriculture. As the diversity of crop production has changed since the previous 2001 study, this has had silent, but significant impacts on the pedigreed seed industry. The pedigreed seed industry is generated a higher economic impact in 2013 than it did in 2001, which was done with fewer pedigree seed producers and fewer acres. The pedigree seed industry has shifted towards production of higher value pedigree seed varieties.

The Saskatchewan pedigreed seed industry is an integral part of an evolved crop production system. Increasingly, the use of pedigree seed to be planted is becoming more common with farmers as they are expressing a preference to begin the crop production process with the highest quality seed possible. Given this trend in crop production, the pedigree seed industry is facing a promising and profitable future.

1. The Canadian Pedigree Seed Industry

Seed is the critical first link in the agri-food value chain. It is the starting point for growing crops that produce food, feed and other bioproducts for both domestic and export markets (Figure 1). Total economic impact (direct and indirect) of the seed industry in Canada is estimated at \$5.61 billion. The implied employment effect of the seed industry is 57,420 jobs and \$1.67 billion in wages and salaries, and generates about \$81.9 million in tax revenue.

Figure 1: Structure of Canada’s Seed Sector



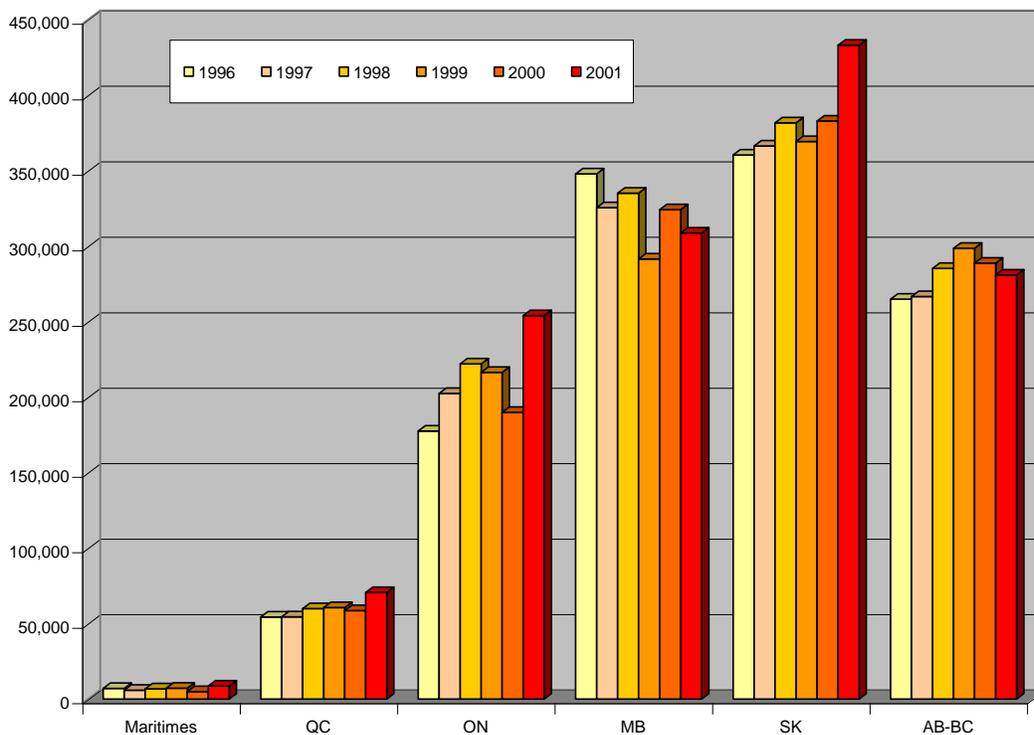
Source: CSTA, 2014.

A study conducted by the George Morris Centre in 2013 estimated the total economic impact (direct and indirect) of the seed industry to be \$5.61 billion. The sector’s estimated contribution to Canada’s GDP is about \$2.5 billion (based on the GDP multiplier). The total economic impact of pedigreed seed production is estimated at approximately \$2.58 billion per year. This is based on an estimated direct economic output (sales) of \$879 million and estimated indirect sales of almost \$1.7 billion.

Wheat was the most widely grown crop among pedigreed seed producers at 438,000 acres in 2013, followed by soybeans at 299,000 acres and barley at 135,000 acres. Private sector invested about \$110 million in plant breeding, research and varietal development in 2012. There were 1.2 million pedigreed seed acres produced by 3,565 seed growers in 2013. Consolidation and increase in average farm size has decreased the number of seed farms from a high of 5,723 in 1982. The average size of farms producing seed increased to 340.8 acres in 2012 from 126.5 in 1978.

The change in total pedigree seed acres across Canada is evident from the comparison of Figures 2 and 3. Fifteen years ago, Saskatchewan was the noticeable leader in pedigree seed production, followed by Manitoba, Alberta/BC and Ontario. In this time period, the number of inspected acres ranged from 1.25 million acres to 1.35 million acres.

Figure 2: Pedigreed seed acres Canada, by province 1996 - 2001

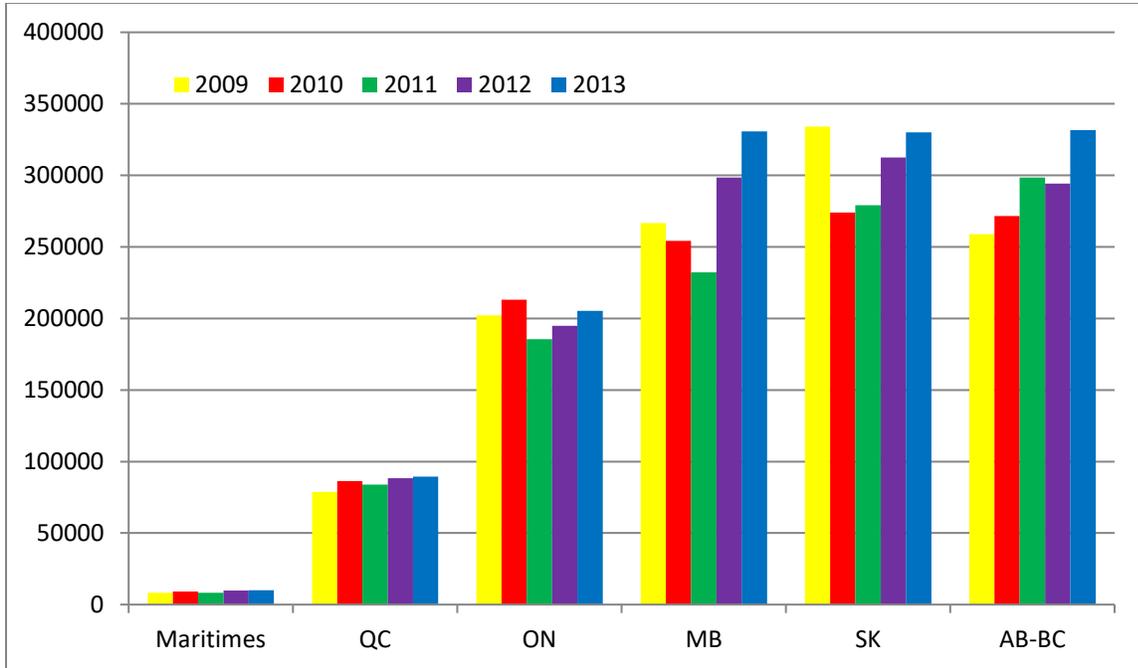


Source: CSGA data

As illustrated in Figure 3, overall seed production has trended slightly downward, ranging from a low of 1.12 million inspected acres to a high of 1.31 million acres. Seed production has increased in Quebec by over 50%, yet still accounts for less than ten percent of overall seed production. Seed production in Ontario has held constant on average, however there is considerably less year-to-year variation. Manitoba has observed a decline in seed as inspected acres ranged from 280,000 acres to 350,000 acres in the 1996-2001 period, with the 2009-2013 period ranging from 230,000 acres to 330,000 acres. Inspected acres in Saskatchewan have experienced the most noticeable drop, with an average decline of 75,000 acres between the two periods. The inspected

acres in Alberta/BC acres have increased slightly between the two periods and been above average for the past three years.

Figure 3: Pedigreed seed acres Canada, by province 2009 - 2013



Source: CSGA data

Pedigree seed production is dominated by the three Prairie provinces. The following section examines that changing dynamics of pedigree seed production in Saskatchewan.

2. Pedigree Seed Production in Saskatchewan

Comparing the data from the previous study to this study, that is 2001 data with 2013 data, Tables 1 and 2 shows there is a drop in the acres of pedigree seed production by 100,000 acres or 24%. Over this same time period, total Canadian acres of pedigree seed production rose by 10% from 1.16 million acres to 1.27 million acres.

Table 1: Saskatchewan number and percentage of Canadian pedigreed acres (2001)

Crop	Pedigree Acres	Total Canadian Acres	Percentage Sask.
Cereals	232,000	692,000	34%
Oilseeds	38,000	101,000	38%
Pulses	106,000	148,000	72%
Forages	57,000	224,000	25%
Totals	433,000	1,165,000	

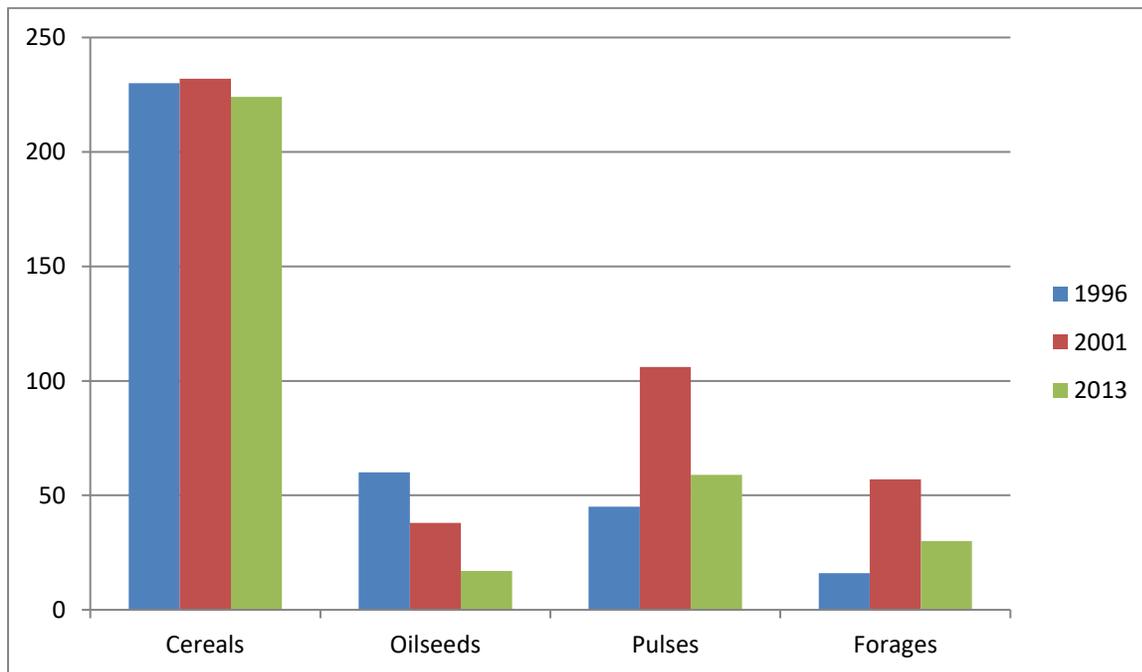
In terms of which crop types experienced the greatest decline, Table 2 identifies that only cereals production has remained consistent, with just over one-third of production being done in the province. Oilseed production has changed dramatically over this period as a mere 100 acres of canola seed production occurs in Saskatchewan, compared to 66,000 acres in Alberta. In 2001, Saskatchewan accounted for the vast majority of pedigree pulse production but Saskatchewan's share of this market has been reduced due to rapid rise in pedigree soybean production in both Manitoba and Ontario. Total pulse seed production has more than doubled in Canada over this period, rising from 148,000 acres to 389,000. Overall forage production in Canada has dropped by 36% and the provincial drop of 47% is reflected in the national trend away from forages.

Table 2: Saskatchewan number and percentage of Canadian pedigreed acres (2013)

Crop	Pedigree Acres	Total Canadian Acres	Percentage Sask.
Cereals	224,000	636,000	35%
Oilseeds	17,000	109,000	16%
Pulses	59,000	389,000	15%
Forages	30,000	143,000	21%
Totals	330,000	1,277,000	

Figure 4 presents a 17 year perspective on the changes in pedigree production by crop type. Cereals production is relatively constant across this interval, while oilseed production has demonstrated a continual downward trend. Pulse production experienced a substantial increase in 2001, which has noticeably declined from this peak. Forages follow a similar trend to pulses, but on a smaller scale.

Figure 4: Acres of pedigreed seed production in Saskatchewan, by crop kind



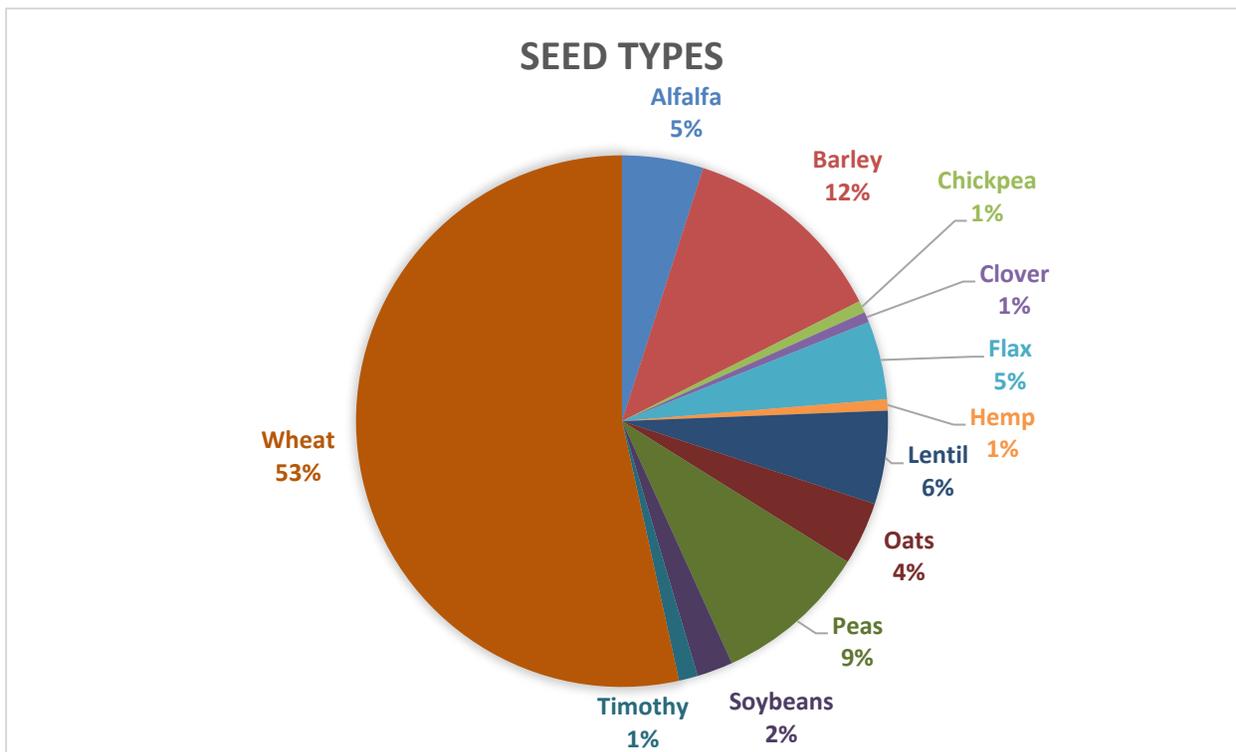
Over the previous three years, pedigree seed production has been dominated by pedigree wheat production, which accounts for more production acres than all of the other leading commodities combined (Table 3). Of the leading commodities, alfalfa is quite stable, with barley having a higher degree of variability and flax having demonstrated that it is recovered from the low level presence of genetically modified flax in flax exports to Europe in 2009, which greatly reduced flax production in Saskatchewan. Lentil production is down by one-third, with oat production increased by 50% and wheat showing continued increases across the three years.

Table 3: Leading pedigree seed production in Saskatchewan

Crop	2011	2012	2013
Alfalfa	16,660	16,650	15,770
Barley	35,460	45,170	40,260
Flax	10,190	8,150	15,210
Lentil	27,430	27,090	18,120
Oats	7,300	8,150	12,250
Peas	23,410	33,080	29,830
Wheat	144,120	151,050	170,650

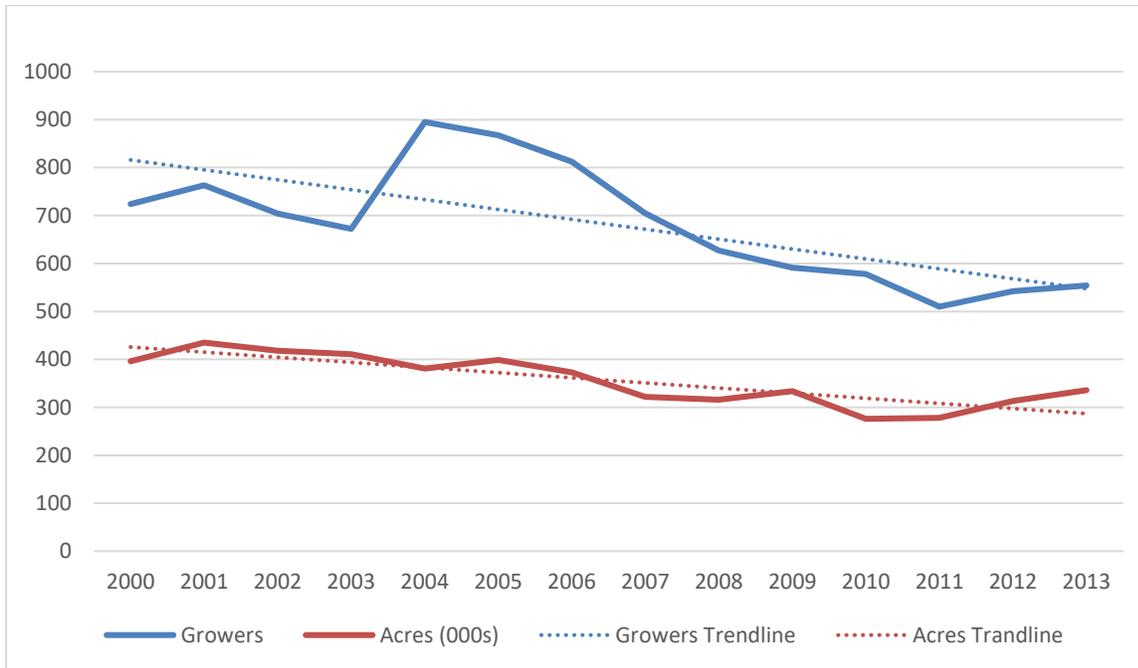
Pedigree seed production of wheat has been the staple of the pedigree seed industry in Saskatchewan for decades and this continues to be the case today. Pedigree production of other commodities have increased and decreased over the past two decades, but pedigree wheat production has remained consistently strong (Figure 5).

Figure 5: Registered acres by seed type



While both producers and acreage has declined, the rate of pedigreed seed producers has declined more rapidly than is the case with acreage (Figure 6).

Figure 6: Historical trends in member and acres



3. The Economic Impact of Saskatchewan Seed Production

3.1 Economic Value of Pedigree Seed Produced in Saskatchewan

In spite of a 24% drop in the number of registered acres of pedigree seed production, the value of pedigree seed production has risen substantially, in fact it has more than doubled in value (Table 4). The direct economic impact (based on sales) of the pedigreed seed industry in Saskatchewan is \$506 million in 2013. This represents an increase of 134% from the 2001 value of \$216 million. The Gross Domestic Product (GDP) value of pedigreed seed is \$710 million, which is up from \$389 million in 2001. At this rate of growth, the GDP value of the pedigreed seed industry in the province of Saskatchewan will be approaching \$1 billion in value by the end of the current decade.

Table 4: Comparison of economic impacts (\$M)

Impact category	2001	2013
Direct Impact (sales)	\$216	\$506
Gross Domestic Product (GDP)	\$389	\$710
Jobs	9,000	16,222
Wages and Salaries	\$100M	\$473
Taxes	NA	\$23

Note: NA - not available

The values presented in Table 4 are based on the Canadian Seed Growers Association's 2013 inspected acreage.¹ Per acre crop yields were obtained from Saskatchewan Agriculture's website,² while forage yield data (and prices) were provided by the Saskatchewan Forage Council. This provided an estimate to the total value of pedigreed seed production in the province. Several private seed retailers were contacted and confidential information was shared regarding the percentage of land seeded using certified seed and seed prices.

Total seeded crop acres were selected based on Saskatchewan Agriculture's data. Using the private seed distributor estimates of certified seed use per crop type, it was possible to estimate the total acres seeded using certified seed. This allowed for the total pedigree seeded acres to be estimated, which was multiplied by the seeding rate for each crop, resulting in an estimate of total pedigreed seed used. Price data from the private seed distributors and the Saskatchewan Forage Council were then used to estimate the total value of certified seed use per crop for 2014. These calculations resulted in an estimated value of \$506 million.

Economic multipliers were applied to this value to derive the figures for GDP, jobs, wages and salaries and taxes. The multiplier values that were used, were the same values as those applied by the George Morris Centre for their 2013 report on the economic impact study of the Ontario pedigreed seed industry. The same multiplier values were applied to this study to allow the SSGA to be able to make direct comparison with the Ontario pedigreed seed industry.³

The per acre value of the direct economic impact in 2001 was \$500, which has now risen to \$1530. This value has more than tripled over the past decade and indicates how the industry has, in part, shifted away from low margin crop varieties, to high margin crop varieties, but also indicates the substantial increase in the value of using certified seed as part of improved land management practices of the broader farming population.

As shown in Figure 6, the number of inspected certified seed acres in Saskatchewan has dropped from a peak of 435,000 acres in 2001, to 336,000 acres in 2013. This is a drop of nearly 100,000 acres, while in three of the past five years, certified acres have been below 280,000. While some of the per acre value increase from \$500 to \$1530 can be explained as price increases over the 12 year period, price does not account for the full change in value. Crop diversity in Saskatchewan between 2001 and 2013 has resulted in increased demand for certified seed to new crop varieties. An example of this is evident by the number of certified soybean acres and that some private seed developers have hired soybean breeders to develop varieties for sale in Saskatchewan. In 2013, there were 7,000 acres of certified soybean production, while as recently as 2011, only 500 certified soybean acres were recorded by the CSGA.

The number of people employed directly and indirectly through the pedigreed seed industry has demonstrated strong growth. As a percentage, the total number of jobs has increased 80% over

¹ CSGA inspected acreages are available by province and by crop type. The CSGA inspected acreage was treated as the base acres for this report.

² This analysis is based on 2013 data. Yields can be found at: <http://publications.gov.sk.ca/documents/20/83778-d46e4194-19b6-4f46-848c-8f2d1992a18b.pdf>.

³ Multiplier values applied are as follows. For GDP, a multiplier of 1.4026 was used. A multiplier of 32.06 per million of direct impact was applied to determine the number of jobs. A wage and salary multiplier of 0.9336 was applied and a tax multiplier of 0.04573 was applied to estimate the tax contribution.

2001, but more importantly, these employment figures demonstrate strong, steady growth in this sector of the agricultural economy. Annual job growth has averaged 6.7% per year using 2001 as a based-line.

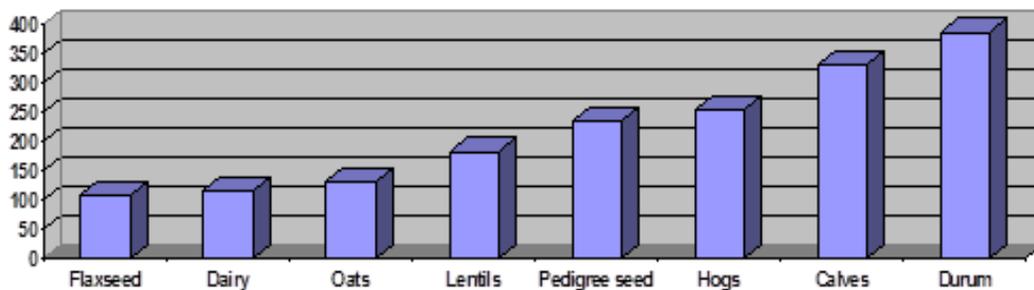
As is demonstrated by the economic impacts from wages and salaries, these jobs are becoming increasingly skilled positions as while the total employment increased by 80%, the value of wages and salaries increased by 370%. In part, the higher wages are due to the tightening of the skilled labour pools and need to pay higher rates of compensation to those employed, but it more importantly reflects the transition in agriculture to that of a highly skilled sector of the economy.

While the calculation of taxes paid to both provincial and federal governments was not calculated in the previous economic impact assessment, it is estimated that \$23 million in taxes were paid in 2013.

3.2 Context of Pedigree Seed Economic Impact

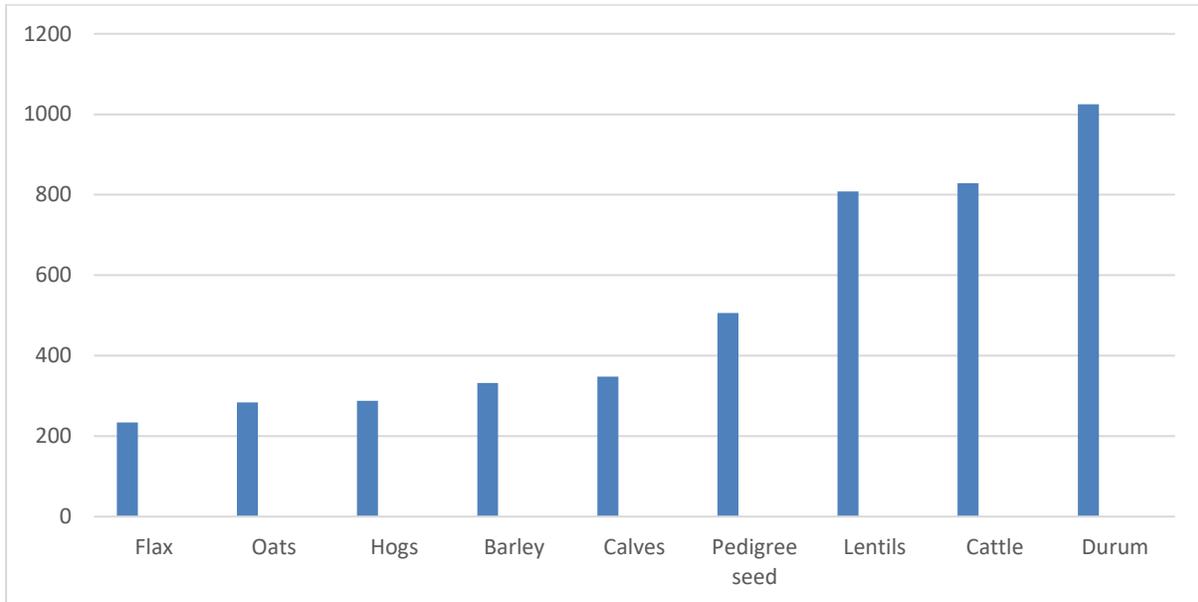
To provide a bit of context as to where the pedigree seed industry fits within the agricultural and provincial economy, comparisons can be made to other sectors. In the previous economic impact assessment (Figure 7) seed production was slightly lagging that of the hog industry, but was noticeably larger than the lentil industry.

Figure 7: Saskatchewan agriculture industry comparison (2001)



As can be seen in Figure 8, there has been considerable change. The pedigree seed industry has overtaken both hogs and calves in terms of economic impact. Lentils, cattle and durum are the other sectors of the economy that provide impacts of up to \$1 billion. These values are determined from cash receipts.

Figure 8: Saskatchewan agriculture industry comparison (2013)



It is also possible to compare the pedigree seed sector with other non-agricultural sectors of the economy. Figure 9 illustrates this context from the 2001 impact assessment. This shows that at the time, pedigree seed production was worth slightly more than metal fabrication.

Figure 9: Comparison of pedigreed seed industry with other economic activities (2001)

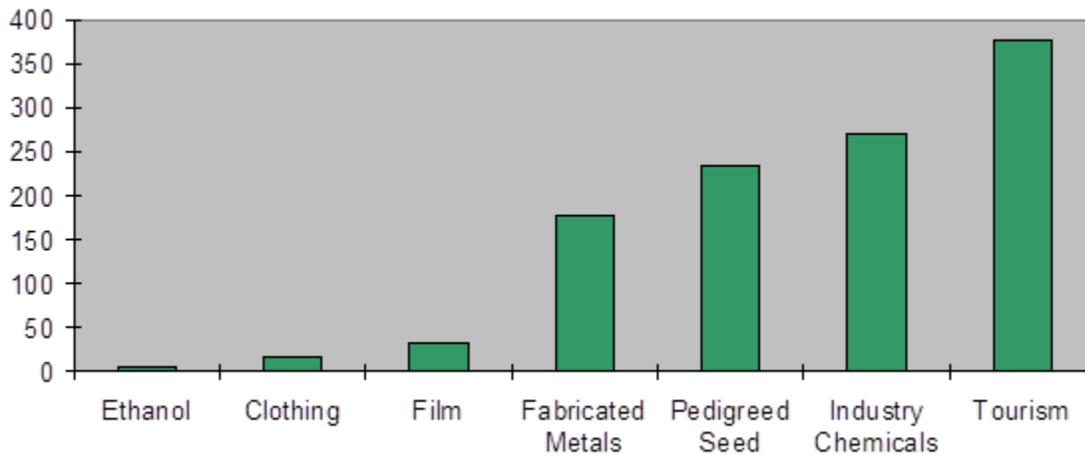
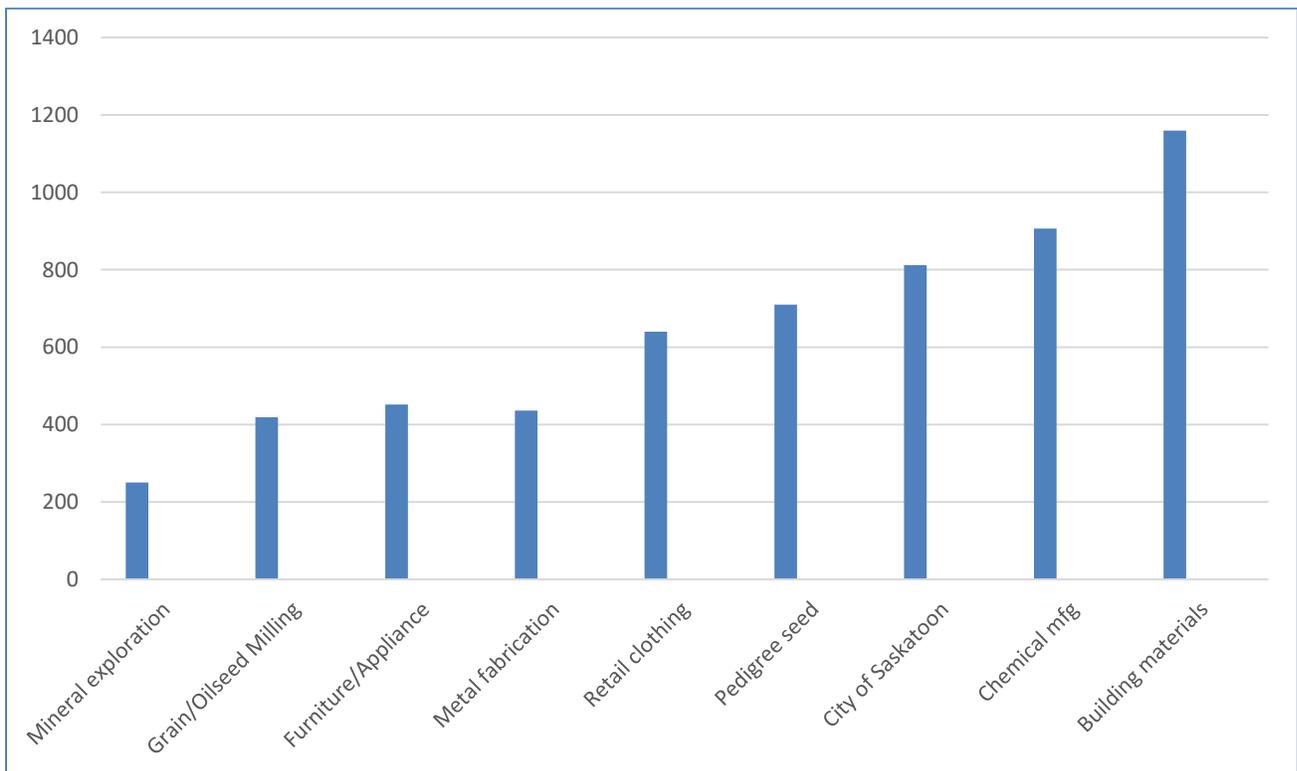


Figure 10 provides the context for the 2013 assessment, showing that the pedigree seed sector is an important component of the provincial economy, with just over \$700 million in activity. The value of seed production has more than doubled, while metal fabrication, for example, has experienced a slower rate of growth. In 2013, the value of pedigree seed was more than the combined budgets of the cities of Prince Albert (\$61 million), Moose Jaw (\$66 million) and

Regina (\$442 million) and only \$100 million less than the operating and capital budget for the city of Saskatoon (\$812 million). The value of the pedigreed seed industry is larger than the Saskatchewan Ministry of Agriculture budget as the department budget in 2012-13 was \$431 million and in \$407 million in 2013-14 (Government of Saskatchewan, 2012 and 2013). By way of a national comparison, in 2012 Canada invested nearly \$700 million directed to agri-food bioscience research and development (R&D), almost 80% of this financed by governments (AAFC, 2012). Investment in agri-food bioscience research includes everything from new variety development to biofuels research to new food products.

Figure 10: Comparison of pedigreed seed industry with other economic activities (2013)



4. Summary

The consolidation of producers and the increased profit per acre are both consistent with general farming trends. Crop production is slowly shifting towards increased use of the best possible technologies available, which includes the use of certified seed at planting. This trend is expected to continue as the diversity of crop types in prairie agriculture increases. Increases in the production of pulses, lentils, soybeans and even corn will continue to drive increased demands for certified seed.

This economic impact assessment demonstrates the importance of a high quality pedigreed seed industry to both Saskatchewan and Canadian agriculture. Demand for the products of the pedigree seed industry continue to increase, highlighting how essential this sector of the agriculture industry is to increasing farmer profitability.

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