

# The Economic Impacts of Agriculture on the Economy of Lambton County



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## Executive Summary

Over the last 50 years, rural areas in Ontario and across Canada have experienced a decline in the number of farms and farmers. This has reached the point where, in most rural areas, the number of jobs in the service sector exceeds the number of jobs in agriculture. Many rural policy makers appear to have taken the position that agriculture is dead and strategies for the future must focus on services and other job producing sectors that do not depend on agriculture. People active in the agriculture sector accepted this initially, but more recently began to believe that the decline of agriculture was perhaps being overstated.

Recognizing this problem, a number of counties in Ontario began to look at the broader role of agriculture in their economy. They approached the University of Guelph to assist them in this work. The first study using this approach looked at the largest agricultural county in the province, Huron County (Cummings, Morris, McLennan, 1998). Several other studies have now been completed, including those in Prescott, Russell, Stormont, Dundas and Glengarry Counties (Cummings and Deschamps, 1999) and in Simcoe County (Cummings et al., 1999). As in the other studies of this type which are completed or underway, the basic focus is on sales and jobs related to agriculture, directly or indirectly.

**The jobs and sales data compiled by this study indicates that there are 8,926 jobs (14% of the county's total) and over \$773 million in sales per annum tied to agriculture in Lambton County. The employment and sales expenditure multipliers indicate that for every job in agriculture, there are an additional 1.28 jobs outside agriculture, and for each dollar in sales in agriculture, there are \$1.57 in sales in agriculture-related businesses.**

Further details follow in this report.

The study started with a review of secondary data on the economy of Lambton County in comparison with Ontario. There were 62,540 employees in Lambton County in 1996, a decline of almost 5.4% from 1991. A review of personal income levels in the county showed that income levels were similar to those of Ontario as a whole, albeit with some disparity between higher- and lower- range income categories. The census data show that jobs in manufacturing and retail are large in absolute numbers. Agriculture as well as construction and service industries are also very significant in the county. Direct employment on farms actually declined

by 3.6% between 1991 and 1996 (from 4,065 employees to 3,920). This is a relatively better performance than the Lambton County economy as a whole, which declined 5.4% over the same time period. It also fares better than the 6.3% decline experienced by the agricultural sector in Ontario as a whole.

While farm employment declined, farm gate sales in the county increased by \$43.3 million, or 16.8%, from \$258.1 million to \$301.4 million between 1991 and 1996. The number of farms declined slightly (2.3%, or 60 farms from 1991 to 1996), yet maintained per farm sales equal to 99% of the provincial average. The county had 4.3% of the cultivated land area in the province and produced 3.9% of the value of Ontario's farm gate sales in 1996. The data on farm size suggests that the farms on average are larger in Lambton than in Ontario as a whole.

With respect to the type of farm operations, the county is a concentrated field crop area with 1,667 farms, or 9.4% of field crop farms in Ontario. This concentration on field crops leads to a lower percentage of other farm types.

The second part of the study involved a survey of businesses that buy from and sell to agriculture (hereafter referred to as Ag-related businesses). The purpose of this survey was to estimate the value of sales related to agriculture and the number of jobs created to serve agriculture by ag-related businesses.

We estimate that there are 483 businesses beyond the farm gate related to agriculture in Lambton County and the neighbouring City of Sarnia. The sample survey of 239 businesses, completed in the fall of 1999, produced an estimate of 1,624 jobs in Lambton's ag-related businesses. This refers to the jobs that are supported by farmers and is in addition to the 3,920 jobs (1996) on-farm. In addition, from other secondary sources we estimated that 3,382 jobs in the service sector were supported by the direct and indirect agricultural jobs. With respect to sales, we estimate that the \$301.4 million in farm gate sales produced another \$472.1 million in ag-related sales.

Other selected data indicate that there is a very low level of exports from the county. Only 16.4% of ag-related sales for businesses in the county were to markets outside the county. There appears to be a significant opportunity here which is not currently being exploited. The largest ag-related industrial sector in the county is construction, followed by retail and wholesale. Specialty agricultural services such as veterinary sciences and land drainage were

also well-represented as linked industries. Other typical businesses included in the study were heating and plumbing, raw milk transport, feed and seed stores, accounting firms, truck sales and service and real estate brokers. The average number of employees in the businesses surveyed was 10.5, and about half of the businesses surveyed had less than five employees. The great majority of these businesses (97%), are classified as small.

The results of the study are comparable to those of previous studies. Although fewer total sales and jobs appear to be generated by Agriculture in Lambton County than in any of the previous study areas (Huron, PRSD&G and Simcoe Counties), the sector remains prosperous and stable in Lambton. The study shows that there are significant opportunities for value added processing and manufacturing related to Agriculture in the area and all involved should take action to promote these activities. As on-farm jobs decrease, there is an opportunity for them to be replaced with non-traditional ag-related off-farm jobs. This would include plumbers, electrical workers, manufacturers, welders, abattoir owners, carpenters, and ag-related tourism operators. Planners, policy makers and business people have an important role to play in creating these opportunities.

## Table of Contents

<b>Executive Summary</b> .....	<b>i</b>
<b>Table of Contents</b> .....	<b>iv</b>
<b>1.0 Introduction</b> .....	<b>Page 1</b>
1.1 Background to the Research Report .....	Page 1
1.2 Introduction to the Lambton County Research .....	Page 2
<b>2.0 Profile of the Economy of Lambton County</b> .....	<b>Page 3</b>
2.1 An Introduction to Lambton County .....	Page 3
Table 1. Lambton County Population and Percent Change Over 5 years. ....	Page 3
Table 2. Lambton County Census Sub-division Population and Percent Change, 1991 & 1996. ....	Page 4
Figure 1. Lambton County Map .....	Page 5
2.2 Employment by Industrial Sectors .....	Page 6
Figure 2. Employment by Industrial Sector for Lambton County. .	Page 6
Table 3. Employment by Industrial Sector in Lambton County and Ontario, 1991 & 1996. ....	Page 7
Table 4. Hired Farm Labour Duration. ....	Page 8
2.3 Income in Lambton County .....	Page 8
Table 5. Classes of Personal Income in Lambton County and Ontario in 1996. ....	Page 8
2.4 Farm Gate Sales and Product Types .....	Page 9
Table 6. Farm Gate Sales Comparing Lambton County to Provinces in 1986, 1991 & 1996 (in millions) .....	Page 9
Figure 3. Value of Farm Gate Sales: Lambton County Compared to Provinces 1996. ....	Page 9
Table 7. Counties with Highest Annual Farm Gate Sales in Ontario with Percent Change, 1991 and 1996. ....	Page 10
Table 8. Farm Gate Sales by Townships in Lambton County, and Ontario, 1991 and 1996. ....	Page 11
2.5 Agricultural Land Use, Area, Farm Size and Products in Lambton County .	Page 11
Table 9. Land Area Classified by Use, 1996 (in acres). ....	Page 11
Figure 4. Land Area Classified by Use in Lambton and Ontario, 1996. ....	Page 12
Table 10. Number and Size of Farms in Lambton County. ....	Page 12
Figure 5. Farm Sales in Lambton County and Ontario by Major Product Type, 1996. ....	Page 13
Table 11. Farms Sales in Lambton County and Ontario by Major Product Type, 1996. ....	Page 13
Table 12. Major Field Crops Cultivated in Lambton County. ...	Page 14

<b>3.0 Economic Impact Analysis: An Overview</b> .....	<b>Page 15</b>
3.1 Economic Base Approach .....	Page 15
3.2 Input-Output Analysis .....	Page 16
3.3 Multipliers .....	Page 17
<b>4.0 Lambton County Study Methodology</b> .....	<b>Page 19</b>
4.1 Direct Impact Methodology .....	Page 19
4.2 Indirect Impact Methodology .....	Page 19
4.2.1 Development of the Business Inventory and Survey Sample .....	Page 20
4.2.2 Verification of Sales and Employment Data through Long Interviews	Page 21
4.2.3 Total Gross Sales for the Businesses Surveyed .....	Page 22
Table 13. Total Gross Sales of the Businesses Surveyed .....	Page 23
4.2.4 Agriculture-related Sales for the Businesses Surveyed .....	Page 23
Table 14. Ag-related Sales of the Businesses Surveyed .....	Page 24
4.2.5 Total Gross Sales for Lambton County Ag-related Businesses ....	Page 24
Table 15. Estimated Total Gross Sales for Ag-related Businesses Using Sampling Multiplier for Sales .....	Page 24
4.2.6 Agriculture-related Sales for Ag-related Businesses in Lambton County .....	Page 25
4.2.7 Number of FTE Employees Working at the Businesses Surveyed ..	Page 25
Table 16. FTE Jobs for the Businesses Surveyed .....	Page 26
4.2.8 Number of FTE Employees Working in Ag-related Businesses ...	Page 26
Table 17. Estimated Total and Ag-related FTE Jobs Using Sampling Multiplier for Employment .....	Page 27
4.3 Induced Impact Methodology .....	Page 27
<b>5.0 Results</b> .....	<b>Page 28</b>
5.1 Introduction to the Lambton County Results .....	Page 28
5.2 Direct, Indirect and Induced Impact Results .....	Page 29
5.2.1 Estimated Direct Sales and Jobs .....	Page 29
5.2.2 Estimated Indirect sales and Jobs .....	Page 29
Figure 6. Response Rate by Industrial Sector .....	Page 30
Figure 7. Percentage of Ag-related Sales by Industrial Sector for Businesses Surveyed .....	Page 36
Figure 8. Average Number of Employees by Industrial Sector, for the Businesses Surveyed .....	Page 40
Figure 9. Location of Sales by Industrial Sector, for Businesses Surveyed. ....	Page 41
Table 18. Gross Sales Generated by all Lambton County Agriculture-related Businesses. ....	Page 42
Table 19. Full Time Equivalent Indirect Jobs in Agriculture ....	Page 43
5.2.3 Estimated Induced Jobs .....	Page 43
5.2.4 Total Direct, Indirect and Induced Impacts .....	Page 44
Table 20. Total Sales and Employment Related to Agriculture	

in Lambton County .....	Page 44
5.3 In-depth Analysis of Agriculture-related Businesses: Case Studies .....	Page 45
5.4 Comparison to Previous Studies .....	Page 49
Table 21. Total Sales Related to Agriculture for Huron, PRSD&G, Simcoe and Lambton Counties. ....	Page 49
Table 22. Total Jobs Related to Agriculture for Huron, PRSD&G, Simcoe and Lambton Counties. ....	Page 49
<b>6.0 Results Conclusions .....</b>	<b>Page 51</b>
<b>Bibliography .....</b>	<b>Page 52</b>

## **1.0 Introduction**

This report attempts to identify and measure the economic impacts of agriculture on the Lambton County economy. While providing an analysis of primary agriculture in the county, it focuses on agriculture beyond the farm gate—the feed manufacturers, the veterinarians, the trucking companies and others who deal with the agriculture industry. In the past, many studies of this type have restricted themselves to reports on conditions on the farm. By ignoring the size and importance of agriculture beyond the farm gate, the impact of agriculture on the economy was under-emphasized. This study hopes to set the record straight and present a more complete picture of agriculture’s contribution to the economy.

The basic focus of the report is on dollars and jobs. The main method used is based on input-output analysis. This approach depicts the economy as a series of sectors that buy and sell goods to each other until they reach the point of consumption. The purchases of products by sectors from other sectors are the inputs, and the sales to other sectors by a sector are the outputs.

The research presented in the report relies on data from the Population Census, Agricultural Census, surveys of Agriculture-related businesses, case studies of Agriculture-related businesses and information from local citizens knowledgeable of the area. The report includes a discussion of the role of agriculture in the Lambton County economy, as well as a discussion of related socio-economic conditions in the county.

### **1.1 Background to the Research Report**

Over the past 50 years the number of people living and working on farms in Canada has declined. In many cases, the role of agriculture in the local economy was seen, by local politicians, to decline at the same rate as farm jobs declined. Other sectors were seen to replace agriculture. There was a growing feeling that jobs in the service sector and special sectors like tourism held the jobs of the future. Many people argued for a strong push to develop these sectors and find jobs associated with them. However, most of the evidence for these changes came from direct employment data which ignored the multiplier impact of agriculture in the total economy.

It is also worthwhile noting that, even though there were declines in the number



of direct jobs in agriculture (ie. on the farm jobs), the value of farm gate sales has continued to rise. Between 1986 and 1996, farm gate sales in Ontario rose from \$5,511 million to \$7,778 million (a growth rate of 3.5% per year) while employment on farms declined. Not only did the value of production increase; the volume of production also increased. This implies an increase in the productivity of farm workers and more capital intensive farm operations. With fewer people working on farms, the linkages to industries and sectors supporting agriculture became all the more important.

## **1.2 Introduction to the Lambton County Research**

The Lambton Federation of Agriculture recognizes the importance of Agriculture in the county economy. However, they have not been able to accurately describe its total role on and off the farm. The Federation became aware of the work done to describe the role of Agriculture in Huron County and Eastern Ontario. They approached Harry Cummings to carry out the work using a similar methodology to the Huron, Simcoe and Prescott, Russell, Stormont, Dundas and Glengarry studies. Human Resources Development Canada also expressed an interest in the labour force information the study would provide.

## 2.0 Profile of the Economy of Lambton County

### 2.1 An Introduction to Lambton County

Nestled on the southeastern corner of Lake Huron, Lambton County serves as a primary access route and gateway to southwestern Ontario from the United States (Figure 1). Lambton County's administrative boundaries abut the City of Sarnia, and include the Townships of Bosanquet, Brooke, Dawn, Enniskillen, Euphemia, Moore, Plympton, Sarnia, Sombra and Warwick. Walpole Island and Sarnia 45 are designated Indian Reserves that are included as part of the Lambton County census sub-division; they are administrated by the Ministry of Indian and Northern Affairs. Census and administrative boundaries have changed over the last ten years within the County. Notable cases include the 1989 amalgamation of Clearwater township with the City of Sarnia; the joining of Watford Township with Warwick Township in 1994; and the Dawn-Euphemia amalgamation in 1997. As of January 1<sup>st</sup>, 2001 the villages of Forest, Arkona, Grand Bend, and Thedford will be amalgamated with Bosanquet Township (Colin Millette, personal communication with Lambton County Planning Department, 1999).

For half a century, the population of Lambton County has been steadily growing, although the rate of this growth has slowed over the past 25 years (Table 1). The lowest percentage change in population occurred between 1981 to 1986 and 1991 to 1996, at 0.9% and 0.0% respectively. The 1996 Population Census of Canada determined that 128,975 people were living in the county.

**Table 1. Lambton County Population and Percent Change Over 5 Years**

Lambton County Population								
Year	1941	1951	1961	1971	1981	1986	1991	1996
Population	56,925	74,960	102,131	120,576	123,445	124,592	128,943	128,975
% Change	N/A	24.1%	26.6%	15.3%	2.3%	0.9%	3.4%	0.0%

Source: Statistics Canada 1996, 1991, 1986, 1981, 1971, 1961, 1951 and 1941.

Although 1996 census data shows that population increase has not been significant over the last five years, notable pockets of growth are evident. Table 2 illustrates significant population increases have been noted on the Sarnia (25.7%) and Walpole Island (11.3%) Indian reservations. Population growth in non-reserve areas

include in Grand Bend (13.2%), Alvinston (12.7%), and Oil Springs (12.0%). Areas of relative decline include Dawn (-5.5%), Euphemia (-3.4%) and Point Edward (-3.4%).

**Table 2. Lambton County Census Sub-Division Population and Percent Change 1991 - 1996**

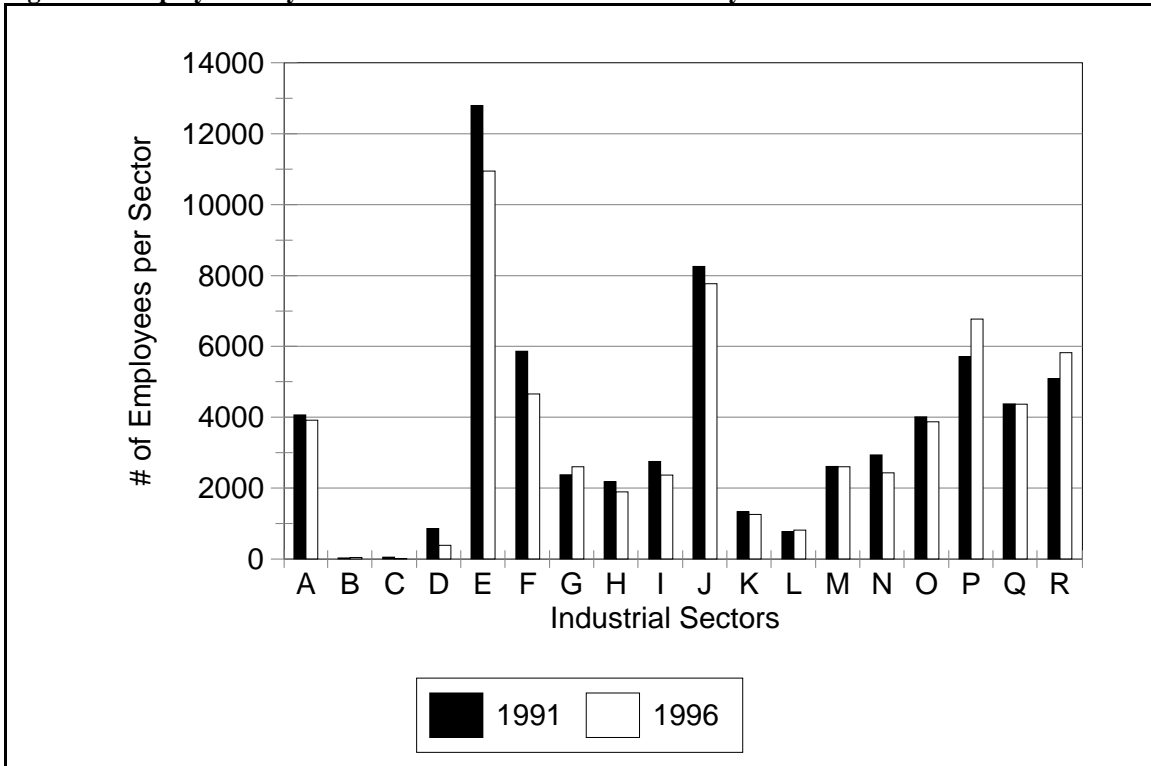
Census Sub-Divisions	Population		
	1991	1996	Percentage change 1991-1996
Alvinston VL	920	1037	12.7
Arkona VL	530	560	5.7
Bosanquet TP	5113	5356	4.8
Brooke TP	1902	1857	-2.4
Dawn TP	1687	1595	-5.5
Enniskillen TP	3167	3288	3.8
Euphemia TP	1017	982	-3.4
Forest T	2818	3020	7.2
Grand Bend VL	907	1027	13.2
Moore TP	10873	10864	-0.1
Oil Springs VL	690	773	12
Petrolia T	4598	4908	6.7
Plympton TP	5275	5247	-0.5
Pt. Edward VL	2336	2257	-3.4
Sarnia C	74167	72738	-1.9
Sarnia 45 R	494	621	25.7
Sombra TP	4179	4217	0.9
Thedford VL	791	831	5.1
Walpole Is. 46 R	1370	1525	11.3
Warwick TP	2519	2481	-1.5
Watford VL	1524	1660	8.9
Wyoming VL	2071	2131	2.9



## 2.2 Employment by Industrial Sectors

From 1991-1996, employment in Lambton County decreased by 3,550 jobs, or by 5.4%, across the industrial sectors (Figure 2 and Table 3). This was significantly more than the province as a whole, which decreased by only 0.6%. Manufacturing remains the leading industrial sector for employment both in Lambton and Ontario. However, the greatest shift of employment in Lambton County from 1991-1996 was seen in the Manufacturing and Construction industries, accounting for a loss of 1,850 (14.5%) and 1,210 jobs (21.6%), respectively. This shift was slightly offset by the addition of 740 jobs (14.5%) in the Other Service industries. During the 1991-1996 period, the Health and Social Services sector increased by 1,050 jobs (18.4%), and was the largest contributor of new jobs in the county during the period. Significant employment in the health and social services sector speaks to recent federal and provincial funding to increase health care and social services in the county as well as the presence of large pharmaceutical firms, such as Nova Chemicals, which provides employment for many Lambton residents.

**Figure 2. Employment by Industrial Sector for Lambton County**



Source: Statistics Canada 1991 and 1996.



**Table 3. Employment by Industrial Sector in Lambton County and Ontario, 1991 & 1996**

Industrial Sectors	Lambton County				Ontario			
	1991	1996	Total Change	% Change	1991	1996	Total Change	% Change
Division A - Agricultural and related service industries	4,065	3,920	-145	-3.6%	139,880	131,060	-8,820	-6.3%
Division B - Fishing and trapping industries	30	45	15	50.0%	1,965	1,915	-50	-2.5%
Division C - Logging and forestry industries	50	10	-40	-80.0%	13,965	11,405	-2,560	-18.3%
Division D - Mining (including milling), quarrying and oil well industries	860	390	-470	-54.7%	34,355	26,050	-8,305	-24.2%
Division E - Manufacturing industries	12,795	10,945	-1,850	-14.5%	942,995	922,565	-20,430	-2.2%
Division F - Construction industries	5,865	4,655	-1,210	-20.6%	358,890	290,430	-68,460	-19.1%
Division G - Transportation and storage industries	2,375	2,605	230	9.7%	187,830	198,555	10,725	5.7%
Division H - Communication and other utility industries	2,180	1,890	-290	-13.3%	188,630	173,040	-15,590	-8.3%
Division I - Wholesale trade industries	2,760	2,370	-390	-14.1%	233,915	278,220	44,305	18.9%
Division J - Retail trade industries	8,250	7,765	-485	-5.9%	700,925	662,815	-38,110	-5.4%
Division K - Finance and insurance industries	1,335	1,260	-75	-5.6%	253,135	228,880	-24,255	-9.6%
Division L - Real estate operator and insurance agent industries	775	815	40	5.2%	100,090	111,890	11,800	11.8%
Division M - Business service industries	2,615	2,600	-15	-0.6%	367,200	411,070	43,870	12.0%
Division N - Government service industries	2,940	2,435	-505	-17.2%	411,450	304,640	-106,810	-26.0%
Division O - Educational service industries	4,010	3,875	-135	-3.4%	365,235	369,320	4,085	1.1%
Division P - Health and social service industries	5,715	6,765	1,050	18.4%	457,115	513,615	56,500	12.4%
Division Q - Accommodation, food and beverage service industries	4,385	4,370	-15	-0.3%	322,955	350,945	27,990	8.7%
Division R - Other service industries	5,085	5,825	740	14.6%	355,310	414,980	59,670	16.8%
<b>TOTAL</b>	<b>66,090</b>	<b>62,540</b>	<b>-3,550</b>	<b>-5.4%</b>	<b>5,435,840</b>	<b>5,401,395</b>	<b>-34,445</b>	<b>-0.6%</b>

Source: Statistics Canada 1991 and 1996.

Sarnia employs the greatest number of people in the Manufacturing industries, comprising 5,945 or 54.3% of jobs in this sector throughout the county. Bosanquet has the most people working in the Agricultural sector at 505, or 12.9% of the sector's total workforce, followed by Warwick at 495 workers, or 12.6%. Farm labour is mostly year-round, while seasonal work represents a little more than half of this amount (Table 4).

**Table 4. Hired Farm Labour Duration**

Hired Farm Labour -weeks-	Lambton	Province	% of Province
Year round	29,212	1,147,368	2.6%
Seasonal	15,895	780,765	2.0%
Total	45,107	1,928,133	2.3%

Source: OMAFRA 1998.

### 2.3 Income in Lambton County

Personal incomes in Lambton County are similar to those of the province as a whole (Table 5). In 1996 the greatest proportion of incomes in a single class in both Lambton County (27.1%) and Ontario (25.9%) were less than \$10,000. More than half of the labour force in Lambton County earned less than \$20,000 in 1996 (50.5%), a figure that surpasses the provincial average of 48.2% for the same category. A smaller proportion of Lambton County incomes were in the mid-range income brackets of \$20,000 - \$49,999 (33.4%) than the provincial average (38.0%) for the same brackets. However, a significant portion of incomes in Lambton County were in the higher income brackets (6.3% between \$50,000 and \$59,999, and 9.8% earned \$60,000 or more); slightly higher than the percentage for the province for the same income brackets.

**Table 5. Classes of Personal Income in Lambton County and Ontario in 1996**

Levels of Income	Lambton	% of Lambton	Ontario	% of Ontario
Under \$10,000	25,365	27.1%	2,024,085	25.9%
\$10,000 - \$19,999	21,890	23.4%	1,741,205	22.3%
\$20,000 - \$29,999	13,705	14.7%	1,264,330	16.2%
\$30,000 - \$39,999	10,445	11.2%	1,029,780	13.2%
\$40,000 - \$49,999	7,055	7.5%	670,415	8.6%
\$50,000 - \$59,999	5,865	6.3%	440,535	5.6%
\$60,000 and over	9,145	9.8%	652,910	8.3%
Totals	93,470	100.0%	7,823,260	100.0%

Source: Statistics Canada 1996.

### 2.4 Farm Gate Sales and Product Types



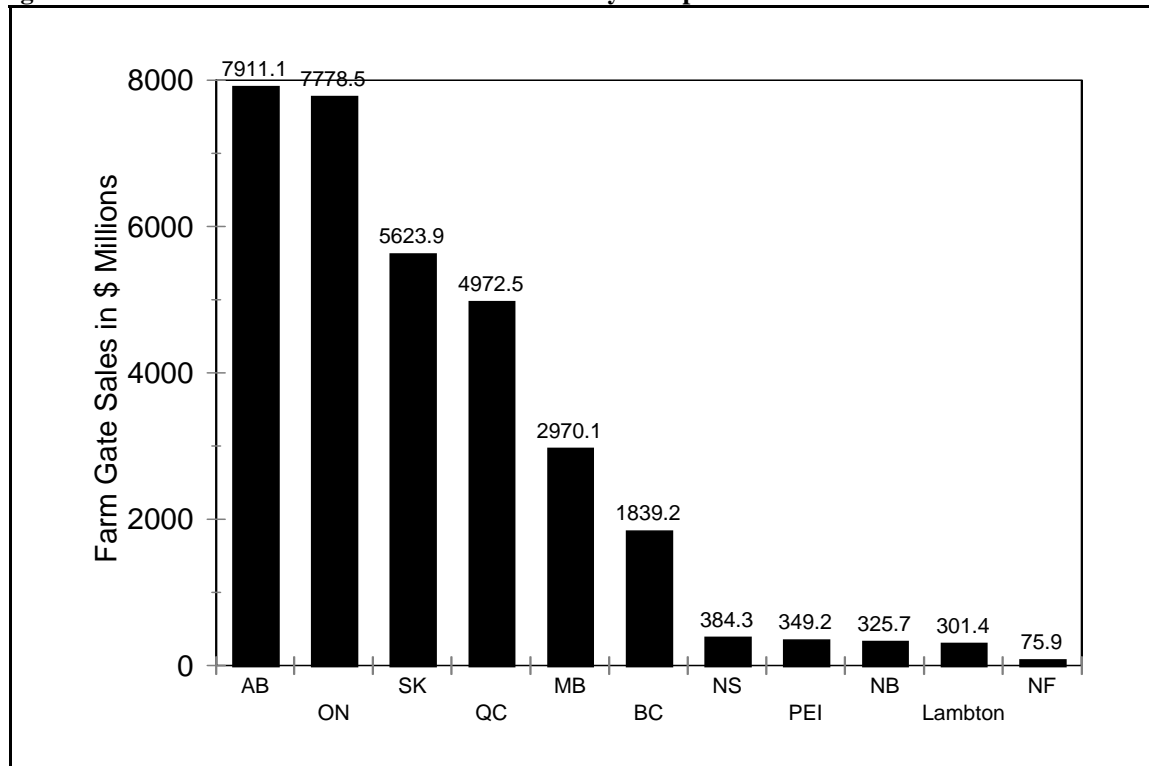
Table 6 details farm gate sales for Lambton County and each of the provinces for 1986, 1991 and 1996. Lambton County farm gate sales in 1996 rose to \$301.4 million from \$258.1 million in 1991; an increase of \$43.3 million or 16.8%. Over the same period, sales in Ontario increased by \$1,107.0 million, or 16.6%. However, rate of growth in farm gate sales in both Lambton County and Ontario declined from the previous 1986-1991 levels of 18.1% and 21.0% respectively. Both Lambton County and Ontario experienced lower rates of farm gate sales growth than the Canadian averages of 19.5% for 1986-1991 and 29.8% from 1991-1996.

**Table 6. Farm gate sales comparing Lambton County to provinces in 1986, 1991 & 1996 (in millions)**

	BC	AB	SK	MB	ON	Lambton	QC	NB	NS	PEI	NF
1986	1,059.0	4,473.9	3,938.2	2,035.2	5,511.7	218.6	3,028.9	222.7	271.4	197.9	46.2
1991	1,321.2	5,541.9	4,174.1	2,238.5	6,671.5	258.1	3,889.6	301.1	354.1	270.0	68.0
1996	1,839.2	7,911.1	5,623.9	2,970.1	7,778.5	301.4	4,972.5	325.7	384.3	349.2	75.9

Source: OMAFRA 1986, 1991 & 1998.

**Figure 3. Value of Farm Gate Sales: Lambton County Compared to Provinces 1996**



Source: OMAFRA 1998.

Ontario's counties compete well against other Canadian provinces in terms of farm

gate sales. As shown in Figure 3, Lambton County is no exception, at \$301.4 million in 1996 sales, it ranks immediately behind New Brunswick (\$325.7 million) and far ahead of Newfoundland (\$75.9 million).

The 1996 census indicates that Lambton County is among the top ten producers with the largest value of annual farm gate sales relative to other counties in Ontario. Lambton County generated approximately \$301 million in farm gate sales in 1996. Table 7 provides a comparison of farm gate receipts for the leading agriculture producing counties in Ontario.

**Table 7. Counties with Highest Annual Farm Gate Sales in Ontario with Percent Change, 1991&1996**

County / Regional Municipality	1991 (\$ millions)	1996 (\$ millions)	% Change
Huron	436.9	511.9	17
Haldimand-Norfolk Regional Municipality	378.3	453.1	19.8
Middlesex	417.3	450.2	7.9
Kent	295	444.4	51
Perth	366.2	430.2	17
Oxford	341.5	418.6	22.6
Niagara Regional Municipality	318.9	408.3	28
Wellington	320.1	373.1	16.5
Essex	218.5	315.7	44.5
Lambton	<b>258</b>	<b>301.4</b>	<b>16.9</b>
Waterloo Regional Municipality	257.8	301.4	17
<b>Total</b>	3608.5	4408.3	18.1

Statistics Canada, Catalogue No. 95-356, Table 28.1, pp. 229-230; Catalogue No. 95-177-XPB, Table 28.1, pp. 184-185.

The proportion of Ontario sales from Lambton County remained constant at about 3.9% (Table 8). Likewise, the county's sales per farm have been consistent at around 99% of the provincial sales value. This matching value of percentage sales per farm infers economically viable farm operations on par with other farms throughout the province. While Plympton Township recorded the most farms, Bosanquet had the highest farm gate sales and average sales per farm in both 1991 and 1996.

**Table 8. Farm Gate Sales by Townships in Lambton County, and Ontario, 1991 and 1996**

Area	# of Farms 1996	Farm Gate Sales 1996	Sales Per Farm 1996	# of Farms 1991	Farm Gate Sales 1991	Sales Per Farm 1991
Bosanquet	259	\$47,464,902	\$183,262	273	\$38,650,900	\$141,578
Brooke	279	\$32,820,232	\$117,635	290	\$29,649,084	\$102,238
Dawn	232	\$20,696,010	\$89,207	232	\$15,606,138	\$67,268
Enniskillen	361	\$30,734,966	\$85,138	351	\$22,929,518	\$65,326
Euphemia	115	\$15,236,481	\$132,491	119	\$15,179,693	\$127,560
Moore	308	\$21,757,234	\$70,640	281	\$17,366,959	\$61,804
Plympton	367	\$45,995,375	\$125,328	379	\$45,040,602	\$118,841
Sarnia	116	\$14,993,722	\$129,256	151	\$15,841,878	\$104,913
Sombra	287	\$28,746,673	\$100,163	318	\$21,253,429	\$66,835
Warwick	298	\$42,980,886	\$144,231	288	\$36,564,939	\$126,962
<b>Lambton County</b>	<b>2,622</b>	<b>\$301,426,481</b>	<b>\$114,961</b>	<b>2,682</b>	<b>\$258,083,140</b>	<b>\$96,228</b>
<b>Ontario</b>	<b>67,520</b>	<b>\$7,778,476,483</b>	<b>\$115,203</b>	<b>68,633</b>	<b>\$6,671,452,382</b>	<b>\$97,205</b>
<b>% of Ontario</b>	<b>3.9%</b>	<b>3.9%</b>	<b>99.8%</b>	<b>3.9%</b>	<b>3.9%</b>	<b>99.0%</b>

Source: OMAFRA 1991 & 1998.

## 2.5 Agricultural Land Use, Area, Farm Size and Products in Lambton County

Table 9 shows that the majority of farmland in Lambton County is devoted to crops; 490,595 acres or 82.0% of the total farmland. The ratio of improved pasture to unimproved pastureland is almost 1:1. Most of the farmland is owned (422,090 acres or 70.6% of total farm land ); only 29.4% of the farmers rent land for agricultural activities.

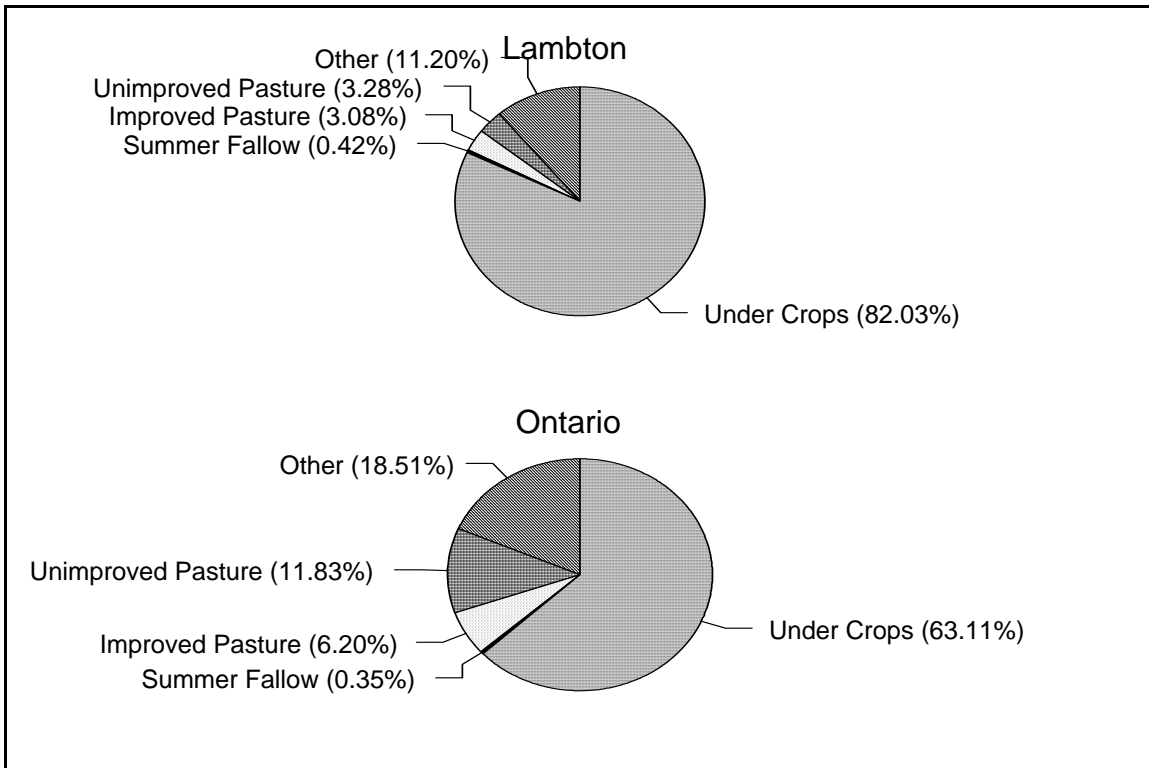
**Table 9. Land Area Classified by Use, 1996 (in acres)**

	Under Crops	Summer Fallow	Improved Pasture	Unimproved Pasture	Other	Total
<b>Lambton</b>	490,595	2,488	18,426	19,611	66,960	598,080
<b>Ontario</b>	8,759,707	48,492	860,786	1,641,692	2,568,888	13,879,565
<b>% Ontario in Lambton</b>	5.6%	5.1%	2.1%	1.2%	2.6%	4.3%

Source: OMAFRA 1998.

Figure 4 provides a comparison of the allocation of agricultural land use in acres for Lambton County and the province. The importance of field crops in Lambton County becomes apparent; representing the greatest proportion of farms with respect to product type throughout the county.

**Figure 4. Land Area Classified by Use in Lambton and Ontario, 1996**



Source: OMAFRA 1998.

Lambton County contains 2,618 farms, representing 3.9% of the total number of farms found in Ontario (Table 10). The majority of these farms (2,211, or 84.4%) are less than 400 acres in size.

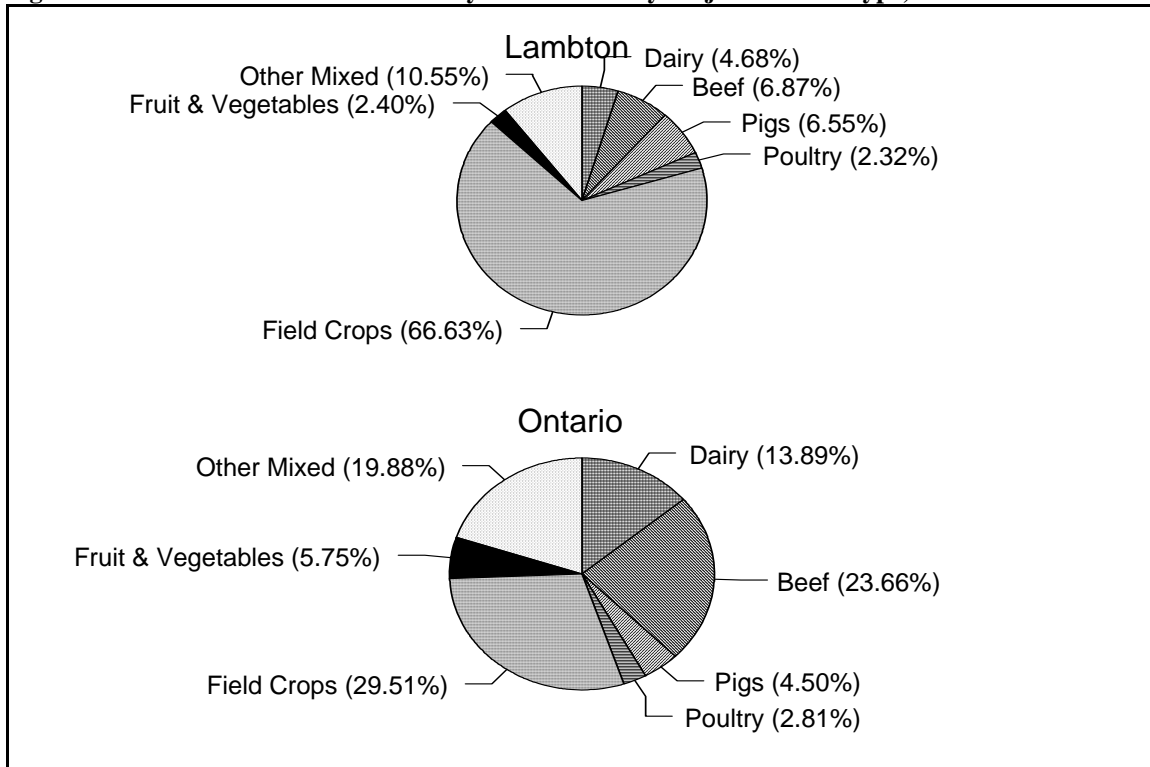
**Table 10. Number and Size of Farms in Lambton County**

	Lambton	Province	% of Province
Reporting under 130 acres	1,186 (45.3%)	34,806 (51.6%)	3.4%
Reporting from 130 to 399 acres	1,025 (39.2%)	24,193 (35.8%)	4.2%
Reporting 400 acres or over	407 (15.5%)	8,521 (12.6%)	4.8%
Total # of Farms	2,618 (100%)	67,520 (100%)	3.9%

Source: OMAFRA 1998.

Figure 5 provides a comparison of the allocation of farm sales by major product type (by farm gate sales) between Lambton County and Ontario.

**Figure 5. Farm Sales in Lambton County and Ontario by Major Product Type, 1996**



Source: OMAFRA 1998.

Again, the importance of field crops in terms of farm gate sales is shown; almost two-thirds of total farm gate sales in the county come from field crops. Field crop sales account for only 29.5% of the total provincial farm gate sales, compared with 66.6% in Lambton. Lambton County farms specializing in Field Crops represented 9.4% of the provincial total farms for this group (Table 11).

**Table 11. Farms Sales in Lambton County and Ontario by Major Product Type, 1996**

Farms with sales over \$2,499 by product type	Lambton	Province	% of Province
Dairy	117	8,320	1.4%
Cattle	172	14,172	1.2%
Pigs	164	2,697	6.1%
Poultry	58	1,686	3.4%
Field Crops	1,667	17,681	9.4%
Fruit and Vegetables	60	3,444	1.7%
Other mixed	264	11,907	2.2%
Total	2,502	59,907	4.2%

Source: OMAFRA 1998.

The major field crops in Lambton County in terms of acreage cultivated include soybean (56.1%), corn for grain (18.5%) and winter wheat (17.3%). Table 12 provides the total number of acres for each of the main field crops for both Lambton County and the province. Note that the totals do not equal the total acreage assigned previously as 'Under Crops' (490,595 acres for Lambton and 8,759,707 acres for Ontario) as Field Crops do not include Fruit and Vegetables or Other Mixed croplands which otherwise may be included in the 'Under Crops' category for land use. Brooke and Enniskillen Townships have the largest land acreage for soybean production with 38,261 and 37,421 acres respectively. Sombra (32,237 acres), Moore (30,828 acres) and Plympton (30,171 acres) also have significant land allocated to growing this crop.

**Table 12. Major Field Crops Cultivated in Lambton County**

<b>Major Field Crops</b>	<b>Lambton (acres)</b>	<b>% of Lambton</b>	<b>Province (acres)</b>	<b>% of Province</b>
Barley	1,347	0.3%	332,821	4.1%
Corn for grain	88,999	18.5%	1,730,000	21.3%
Corn for silage	7,314	1.5%	290,000	3.6%
Dry white beans	1,087	0.2%	115,000	1.4%
Dry coloured beans	0	0.0%	39,076	0.5%
Hay	24,087	5.0%	2,550,000	31.4%
Mixed grains	739	0.2%	330,000	4.1%
Oats	1,595	0.3%	98,357	1.2%
Potatoes	2,808	0.6%	38,100	0.5%
Soybeans	270,482	56.1%	1,820,000	22.4%
Sugar Beets	0	0.0%	210	0.0%
Tobacco	255	0.1%	62,500	0.8%
Winter Wheat	83,314	17.3%	719,498	8.9%
<b>TOTAL</b>	<b>482,027</b>	<b>100.0%</b>	<b>8,125,562</b>	<b>100.0%</b>

Source: OMAFRA 1998.

### **3.0 Economic Impact Analysis: An Overview**

Economic impact is generally a measure of the impact of a sector or a project on all sectors of the economy. Economic Impact Analysis studies are aimed at identifying "...changes in a local economy resulting from a stimulus (positive or negative) to a particular segment of the economy" (Davis, 1990, p 5). These studies are often based on one of the several standard methodologies of regional analysis: the economic base analysis and input-output analysis (Faas, 1980, p. 4).

#### **3.1 Economic Base Approach**

Economic Base Theory maintains that economic growth is only possible if the economy's exports grow (Bradfield, 1988, p.38). The theory is based on the belief that as exporting industries expand their sales, there will be an increasing demand for inputs locally which will consequently drive local economic growth (Bradfield, 1988, p.39). In economic base theory, the economy is classified into two sectors of basic and non-basic. The basic sector includes industries that ultimately export their product out of the region. The non-basic sector is the economic activity with final sales remaining inside the region (Davis, 1990, p. 10). These are support industries that provide everything from industrial inputs to houses for basic sector employees (Higgins and Savoie, 1995, p. 66). The exporting industries are identified as basic sectors while all other industries are classified as non-basic.

According to economic base theory, exports are the engine of the local economy. It follows then that the export of goods supports all other needs of the economy (Bendavid-Val, 1991, p. 77). Economic base theory and its supporters carry the separation of basic and non-basic sectors to the point where they attempt to predict the relative impact of the basic sector on the non-basic sector. The prediction of economic impact is assessed through two economic indicators known as the economic base ratio and economic base multiplier. Economic base theory has been refined to the point where it can be questioned: "[W]hat is the overall gain in employment or income in the region associated with each gain in export sales?" (Bendavid-Val, 1991, p. 78).

The question is answered through the economic base ratio indicator and the base multiplier indicator (Bendavid-Val, 1991, p. 780). The economic base ratio calculates

jobs that are theoretically created from one additional job in the basic sector. The economic base ratio is the ratio between employment in the basic and non-basic sectors and is supported by the idea of basic and non-basic employment combined equalling total employment (Bendavid-Val, 1991, p. 78). The economic base multiplier is the ratio of total employment to basic employment and indicates how many jobs in total are provided for each basic job. Thus, the economic base multiplier is the total sum of the jobs created in both sectors from one job in the basic sector (Bendavid-Val, 1991, p. 78). The economic base method is used in this study to estimate jobs in the service sector related to the basic sector of agriculture.

### **3.2 Input-Output Analysis**

Input-Output (IO) analysis is used to measure the inter-relationships between economic activities at the sectoral, national and regional levels. Linkages are expressed by estimating the sales (outputs) from a given sector to all other sectors in the economy, and by estimating inputs from all other sectors to a specific sector. What makes the IO model so useful is the comprehensiveness of the model which disaggregates the economy into individual sectors (Josling, 1996, p. 5). Disaggregation permits analysis at the sectoral level, providing researchers with a close-up view of the economy. This analysis allows the researcher to assess where each sector purchases its inputs and where it sells its outputs. Such analysis is invaluable in identifying what investment will provide the greatest impact on an economy (Poole et al., 1994, p. 30).

The IO model estimates the movement of expenditures through the economy. This is traced through four different levels of expenditure: intermediate and primary suppliers, and intermediate and primary purchasers (Bendavid-Val, 1991, p. 88). Suppliers - intermediate and primary - purchase inputs for processing into inputs. Purchasers - intermediate and primary - buy outputs from suppliers and either use them to manufacture a product, or sell them as a final product (Bendavid-Val, 1991, p.88).

Input-output analysis has two main approaches. The Open Model allows the estimation of only the direct and indirect effects of a sector. The Closed Model estimates these, as well as the induced effects of a sector. The open model is used to trace the flow of variables between sectors of the economy (ie. direct and indirect expenditures). The



open model does not measure induced spending in the economy; expenditures on food, services and other household expenses would not be included (Davis, 1990, p. 59). The closed model is used to measure all aspects of the economy, including the direct, indirect and induced effects. Treating the household sector as a producer that sells labour to other purchasing sectors assesses induced effects (Davis, 1990, p. 59). As this study aims to measure all of the effects of agriculture on the Lambton County economy, it is based on the Closed Model approach.

There are several problems associated with the IO model. The first is that it is time-specific; it takes a snapshot of the economy at a specific point in time. This model cannot account for changes in product demand or input costs, or for the introduction of new technology into the industrial sector (Davis, 1990, p. 62). Thus, the IO model does not adjust for the changing nature of the economy. A second problem of the IO model is the cost and time needed for the construction of the tables associated with this analysis. For this reason, the analysis for this study has been carried out using a survey-based “input-output-like” approach.

### **3.3 Multipliers**

Given the previous discussion of economic base analysis and input-output analysis, the reader may question where the application of the two models leads. One of the best uses is that they allow the analyst to identify the impacts of economic changes or shocks to a system. Essentially, what these models do is measure the multiplier effects that result from a change in the economic system. In basic terms, multiplier effects are the relationship between direct jobs produced by a project or sector and indirect and/or induced jobs caused by the direct jobs, presented in a single number (Lewis et al., 1979, p. 1). Therefore, an economic multiplier can be used to estimate the impact of change in one variable (for example, the value of agricultural production) on another variable (for example, the value of non-agricultural production). Direct employment and production in the agriculture sector will affect the rest of the economy by supporting employment in related industries as well as in the retail sector. In this way, “...a multiplication of transactions occurs in the economy by people re-spending money” (Van Hove, 1995, p. 66). The multipliers calculated for this research include a sales expenditure multiplier and

an employment multiplier.

#### **4.0 Lambton County Study Methodology**

Initial research for the Lambton County study was carried out from July to November 1999. The economic impact of agriculture in the county was measured through an accounting of the total sales and employment of Agriculture and Agriculture-related (Ag-related) businesses in the study area. This work involved a review of the primary data from Statistics Canada's 1996 Population Census of Canada and 1996 Agriculture Census to study the direct economic impacts of agriculture on the Lambton County economy. A survey-based 'input-output-like' approach was used to measure the indirect impacts. The survey was aimed at businesses that sell products to, or buy products from, the agricultural sector. The induced economic and employment impacts of the Agriculture sector were also studied using primary data derived from the Statistics Canada census data.

Further work was carried out to verify the data collected during the July-November period. This resulted in a more in-depth look at the linkages between agriculture and the rest of the Lambton County economy.

#### **4.1 Direct Impact Methodology**

Data were taken from the 1996 Population Census of Canada and the 1996 Agricultural Census and yielded information on the economy of Lambton County, including general labour trends and population data. Where appropriate, data from earlier censuses were incorporated to examine long-term trends in employment and sales in the county. This information has been presented in Section 1.2 of this report: Introduction to the Economy of Lambton County. For the purposes of this study, Direct Impacts are the jobs and sales generated 'on the farm': farm gate sales and farm jobs.

#### **4.2 Indirect Impact Methodology**

For the purposes of this study, Indirect Impacts are jobs and sales generated 'off the farm' by businesses which interact with farm operations through buying and selling products and services. It should be noted that 'related to agriculture' includes only those businesses that buy from or sell to the farm business; sales to farm families for personal consumption are excluded from the indirect impact assessment, but are included later as

induced impacts.

The research method used to measure the indirect impacts was a survey-based 'input-output-like' approach. This was completed through a telephone survey conducted from July to November 1999. The method and survey format was originally developed for use in a similar survey in Huron County in 1996 (Cummings, Morris and McLennan, 1998), and used again with some modifications (primarily translation into French) in Prescott, Russell, Stormont, Dundas and Glengarry Counties in eastern Ontario in 1998 (Cummings and Deschamps, 1999), and Simcoe County in 1999. The method was designed to identify the value of gross sales and the jobs produced by a sample of businesses related to agriculture. From this sample, an estimate was produced for the total population of agriculture-related businesses in the Lambton County area. This in turn provided an estimate of the economic impact of these Ag-related businesses in the county through indirect employment and sales.

#### ***4.2.1 Development of the Business Inventory and Survey Sample***

The survey was based on a random sample of local Ag-related businesses. A list of Ag-related businesses was developed by collecting lists from a number of sources in the area: Ontario Federation of Agriculture Representatives, Municipal Offices, Chambers of Commerce, Economic Development Offices and the Yellow Pages. The original list of 635 businesses was pared down to 590 by eliminating businesses that were either out of business, double-listed or had moved out of the county.

In order to attain a 95% confidence level for the 590 businesses in the inventory, an original sample size of 240 businesses was selected at random from the adjusted inventory. As 69 of the first 379 contacts were businesses with no ties to agriculture, it was determined that 18.2% of the businesses in the adjusted inventory had no ties. The inventory was adjusted accordingly, to a final estimate of 483 total Ag-related Businesses in Lambton County, with a sample size of 220 required for a 95% confidence level. In total, 239 businesses were surveyed; all of them provided data regarding employment. A total of 220 provided sales data.

During the course of the telephone survey, respondents were asked to provide information regarding the total value of sales and employment figures for their business.

They were also asked to estimate the percentage of sales related to the agriculture sector. Data were entered directly onto a spreadsheet; paper copies of the surveys were not kept.

#### ***4.2.2 Verification of Sales and Employment Data through Long Interviews***

A total of 220 businesses provided sales data during the Ag-business survey. Twenty businesses were randomly selected from these respondents, and were invited to participate in case studies. The owners of these businesses were sent letters of introduction and were contacted via phone to enlist their cooperation. Thirteen of these businesses agreed to participate as case studies.

Case studies were conducted for two reasons. The first was to check the accuracy of the responses to the survey conducted via telephone. The researchers wished to ensure that the responses provided during the telephone interview were accurate compared with responses provided during one-on-one interviews. It was assumed that business owners might take more time to refer to their accounts during face-to-face interviews compared with a survey over the phone. Researchers also wished to check that the respondents understood the survey questions correctly. Several of the questions asked during the survey were repeated during the one-on-one interview, including the gross sales of the business, the percentage of sales related to agriculture and the number of employees at the business, including the owner, family members and regular workers. These responses were later compared with the responses provided during the phone survey to check accuracy.

The second reason for conducting the case studies was to gain more in-depth knowledge regarding the nature of ag-related businesses in the county. Several questions asked during the interview were not asked during the phone survey. These include (i) the changes experienced by the business in response to changes in the agricultural sector over the last ten years, (ii) the present and future training needs of the business, and (iii) predicted changes and prospects for their business related to the agriculture industry in the future.

A researcher from Harry Cummings and Associates was joined by a researcher from the Ontario Federation of Agriculture to conduct the case studies. They visited thirteen work sites and were provided with tours of these operations, followed by

interviews with the business owners and representatives, as well as the human resources people and accountants where necessary and appropriate.

Results of the case studies indicate that the responses provided during the phone interviews did not differ significantly from the responses provided during the one-to-one interviews. This was the case when it came to gross sales, as well as agriculturally-related sales. In most cases, respondents in the phone survey provided similar if not identical data during the face-to-face interviews. Differences in the reported percentages of sales related to agriculture differed minimally. Major differences reported in the numbers of employees during the survey compared with the interview related to staffing changes (i.e. the hiring and firing of people) subsequent to conducting the survey.

#### ***4.2.3 Total Gross Sales for the Businesses Surveyed***

Total gross sales for the businesses surveyed include sales related and unrelated to the Agriculture sector. For example, a plumbing business may have sales to farmers for their farm business, sales to farmers for their house, and sales to non-farmers.

Agriculture-related sales include only those sales to farmers for operating the farm. Sales unrelated to agriculture include those of farmers for their personal use, as well as sales to non-farmers.

The sample included Ag-related businesses that buy or sell products or services to agriculture, but may also buy or sell to other sectors of the economy. Total gross sales are divided by the location of these sales; 16.4% of total gross sales for the businesses surveyed were made outside of Lambton County. The businesses in the sample generate sales: i) inside Lambton County, ii) outside Lambton County but in Ontario, iii) outside Ontario but in Canada, and iv) outside Canada. Table 13 illustrates the total gross sales for the businesses surveyed, by the location of these sales.

**Table 13. Total Gross Sales of the Businesses Surveyed**

# Businesses n = 220	i. Sales in Lambton	ii. Sales in Ontario	iii. Sales in Canada	iv. Sales Worldwide	Total Sales
Sales in \$'s	\$391,409,674	\$72,978,668	\$1,312,108	\$2,350,044	\$468,050,494
% total sales	83.6%	15.6%	0.3%	0.5%	100.0%

Source: 1999 Ag-business Survey.

The survey determined that total gross sales was \$468,050,494 for the 220 businesses that provided sales data. The initial estimate for total gross sales generated inside Lambton County is \$391,409,674, or 83.6% of the total gross sales for these businesses. Total gross sales for these businesses outside of Lambton but in Ontario was \$72,978,668, or 15.6% of total gross sales. Total gross sales outside of Ontario but in Canada accounted for \$1,312,108 or 0.3% of total gross sales. Sales made outside of Canada accounted for \$2,350,044 or 0.5% of total gross sales. It is interesting to note that sales outside of Canada exceeded Canadian sales outside of the province; this is likely due to the close proximity of the United States and ease of access to the state of Michigan via Highway 402.

#### ***4.2.4 Agriculture-related Sales for the Businesses Surveyed***

Part of the telephone survey asked respondents to estimate the percentage of their sales that were related to agriculture, either by providing products and/or services to farm businesses, or by purchasing products of agricultural origin. The survey determined that \$215,227,702, or 46.0% of total gross sales from the businesses surveyed were related to agriculture. Ag-related businesses in Lambton County have sales both related and unrelated to agriculture. By separating the Ag-related sales from sales unrelated to agriculture, and using the same percentages for location of sales as in section 4.2.3, we are able to estimate both the type and location of sales for the businesses surveyed. These figures are illustrated in Table 14.

**Table 14. Ag-related Sales of the Businesses Surveyed**

<b># Businesses n = 220</b>	<b>i. Sales in Lambton</b>	<b>ii. Sales in Ontario</b>	<b>iii. Sales in Canada</b>	<b>iv. Sales Worldwide</b>	<b>Total Sales</b>
Total Sales	\$391,409,674	\$72,978,668	\$1,312,108	\$2,350,044	\$468,050,494
Ag-related (46.0%)	\$179,985,292	\$33,558,411	\$603,358	\$1,080,641	\$215,227,702
Unrelated to Agriculture (54.0%)	\$211,424,382	\$39,420,257	\$708,750	\$1,269,403	\$252,822,792

Source: 1999 Ag-business Survey.

#### ***4.2.5 Total Gross Sales for Lambton County Ag-related Businesses***

From the sample, we can estimate the total gross sales of all Ag-related businesses in Lambton County. This includes sales both related and unrelated to agriculture. We have already established that there are approximately 483 Ag-related businesses in the county; a total of 220 of these provided sales data. This represents 45.5% of the total number of businesses (e.g.  $220/483 * 100 = 45.5\%$ ). By dividing the total estimated number of businesses (483) by the total number of businesses surveyed (220), a sampling multiplier of 2.195 (e.g.  $483/220 = 2.195$ ) can be used to calculate the total gross sales for Ag-related businesses in the county as a whole. Table 15 illustrates the estimated total gross sales for all Ag-related businesses in Lambton County. This estimate was derived by applying the sampling multiplier to the total gross sales of the 220 businesses which provided sales data. Once again, the table presents the sales according to location.

**Table 15. Estimated Total Gross Sales for Ag-related Businesses Using Sampling Multiplier for Sales**

<b># Businesses n = 483</b>	<b>i. Sales in Lambton</b>	<b>ii. Sales in Ontario</b>	<b>iii. Sales in Canada</b>	<b>iv. Sales Worldwide</b>	<b>Total Sales</b>
Total Sales	\$858,585,145	\$160,083,934	\$2,878,203	\$5,154,990	\$1,026,702,272
Ag-related	\$394,810,624	\$73,612,778	\$1,323,509	\$2,370,464	\$472,117,375
Unrelated to Agriculture	\$463,774,521	\$86,471,156	\$1,554,694	\$2,784,526	\$554,584,897

Source: 1999 Ag-business Survey.

It should be noted that sales data from financial institutions, such as banks and credit unions, were collected somewhat differently. Typically their sales would be based on profits generated from loans and services provided to farm businesses. However, this



information is difficult to obtain. Therefore, for the purposes of this study, 'sales' by financial institutions are based on the number of employees at the institution multiplied by an average salary of \$40,000.

By using the figures from the businesses surveyed and applying the multiplier of 2.195, we can estimate that Lambton County's Ag-related businesses generated \$1,026,702,272 in total gross sales. Of this, \$858,585,145 in total gross sales were generated within Lambton County. Total gross sales generated outside of Lambton county but inside Ontario were \$160,083,934. The total gross sales generated outside of Ontario but still in Canada were \$2,878,203, and the total gross sales outside of Canada were \$5,154,990.

#### ***4.2.6 Agriculture-related Sales for Ag-related Businesses in Lambton County***

Total Ag-related sales for all Lambton County Ag-related businesses can also be derived using estimates of the Ag-related sales generated by the businesses surveyed. These sales data are also illustrated in Table 15. Using the same 2.195 multiplier, we can estimate that the total Ag-related sales for businesses in Lambton County were \$472,117,375. Of this, \$394,810,624 were Ag-related sales generated in Lambton County. Ag-related sales outside of Lambton but inside Ontario were \$73,612,778. Ag-related sales generated outside of Ontario but in Canada were \$1,323,509 and sales generated outside of Canada were \$2,370,464.

#### ***4.2.7 Number of FTE Employees Working at the Businesses Surveyed***

The survey separated employees at the Ag-related businesses into two categories. The first are employees who work on activities related to the agriculture sector. The second includes employees who work at Ag-related businesses, but do not serve the agriculture sector. For example, a veterinary office may have four veterinarians specializing in large mammals (Ag-related employees) and one veterinarian specializing in house pets (unrelated to the agriculture sector). Data on both types of employees were collected in the survey, and organized to reflect the total Full Time Equivalent (FTE) number of jobs at that business based on a 1,875 hours per year workload (7.5 hours a day X 5 days a week X 50 weeks a year).

Altogether, 239 businesses surveyed provided employment data. The initial estimate for the total number of FTE jobs at the businesses surveyed is 2,515.8. This includes all employees (full-time, part-time and seasonal employees) for the businesses surveyed, regardless of whether or not they perform activities related to the agriculture sector. For the businesses surveyed, 804.5, or 32.0% FTE jobs were related to agriculture. Table 16 summarizes the total and Ag-related FTE jobs at the businesses surveyed.

**Table 16. FTE Jobs for the Businesses Surveyed**

<b># of Businesses Surveyed n = 239</b>	<b>Total FTE Jobs</b>	<b>% Ag-related Jobs</b>	<b>Ag-related FTE Jobs</b>
Lambton County	2,516	32.0%	805

Source: 1999 Ag-business Survey.

The survey also illustrated that there are jobs generated outside of the study area by Lambton County Ag-related businesses. This is calculated by multiplying the total FTE jobs by the percentage of sales generated outside of the county (16.4%). Therefore, the total number of FTE jobs generated by sales outside of Lambton County by the businesses surveyed is 412.0. Of these, 131.8 service the agriculture sector (412 X 32%).

#### ***4.2.8 Number of FTE Employees Working in Ag-related Businesses***

The total number of FTE jobs for all Ag-related businesses in the county, as well as the total FTE jobs that serve the agriculture sector can be derived from the sample. A sampling multiplier for employment can be calculated by dividing the total number of Ag-related businesses in the inventory (483) by the number of respondents who provided employment data (239). This results in a sampling multiplier of 2.02. From these values, the total number of FTE jobs for all Ag-related businesses in Lambton County can be estimated at 5,079.8 (2,515.8 X 2.02). Of these, an estimated 1,624.4 FTE jobs serve the agriculture sector. Table 17 illustrates the estimated total and Ag-related jobs using the sampling multiplier for employment. Note that figures may not add up exactly due to rounding.

**Table 17. Estimated Total and Ag-related FTE Jobs Using Sampling Multiplier for Employment**

<b># of Businesses n = 483</b>	<b>Total FTE Jobs for</b>	<b>% Ag-related Jobs</b>	<b>Ag-related FTE Jobs</b>
Lambton County	5,080	32.0%	1,624

Source: 1999 Ag-business Survey.

Using the sampling multiplier, total FTE jobs created by sales generated outside of Lambton County can also be calculated. The total number of FTE jobs generated by the out-of-county sales is 831.8. Of these, 266.1 work on activities related to the agriculture sector.

### **4.3 Induced Impact Methodology**

An examination of the induced effects of agriculture was conducted. Induced employment refers to jobs in the Education, Health and Government Service sectors which are supported by agriculture and agriculture-related employees. Population Census (1996) employment data from the agriculture and manufacturing sectors were compared to service sector jobs in education, health and government services to estimate the number of induced jobs and sales for the Lambton County area. More details and results on this are provided in section 5.2.3.

## **5.0 Results**

### **5.1 Introduction to the Lambton County Results**

The aim of this chapter is to present the results of the study, including findings concerning the direct, indirect and induced impacts of agriculture and agriculture-related businesses on the economy of Lambton County. This chapter includes findings of an in-depth examination of the backward and forward linkages of agriculture-related businesses.

This research focuses on the economic impact of the agriculture sector. More specifically, it focusses on agriculture-related businesses in Lambton County. Both primary and secondary data collection were undertaken; the primary research collection was an ‘input-output-like’ survey approach of Ag-related businesses in the county. This survey has been verified and supported by in-depth case studies with selected businesses who participated in the survey. Further calculations of the induced and direct impacts were completed, based on Population Census of Canada data and, to some extent, on multipliers from previous studies (Cummings et al., 1998). The final analysis of the data illustrates that the agriculture sector continues to be very important to the economy of Lambton County.

The study aimed to identify the total economic impact of the agriculture sector in Lambton County. While published data present significant farm gate sales for the county, there was no evidence to prove the actual impact of the agriculture sector. Similarly, published data showed that direct employment in agriculture in 1996 continued on a downward trend. From this information, it was predicted that this decline would continue while employment in other sectors would grow. Given this trend and subsequent predictions, estimates of some aspects of the employment patterns in Lambton County were made. Through a profile of Lambton County, the direct impact of the agriculture sector was illustrated through the employment data for the area’s economy, which illustrated growth and decline industries (Section 2 of this report). However, this did not provide the full story of the economic impact of agriculture to Lambton County. To provide a clearer picture of the indirect impact of Lambton County’s agriculture sector, the input-output-like methodology was applied.

### **5.2 Direct, Indirect and Induced Impact Results**

### ***5.2.1 Estimated Direct Sales and Jobs***

Direct impacts refer to the value of sales and number of jobs created by the agriculture sector in the county. Direct sales are equivalent to the value of farm gate sales. In 1991, the value of farm gate sales in Lambton County was \$258.1 million. This figure increased 16.8% to \$301.4 million in 1996. Farm gate sales from Lambton County represent 3.9% of Ontario's total farm gate sales. When the value of Lambton County's direct sales is compared to Canada's ten provinces, it ranks tenth behind New Brunswick and ahead of Newfoundland in value of gate sales produced. In 1991 Lambton County's agriculture sector contained 4,065 employees. This number includes farm owners, operators and labourers. In 1996, this number fell 3.6% to 3,920 employees.

### ***5.2.2 Estimated Indirect Sales and Jobs***

The indirect impacts of agriculture refer to the value of sales and number of jobs created by Ag-related businesses in the Lambton County area. An Ag-related business is defined here as any business which sells to, or buys from, the agriculture sector. This study found that the value of indirect impacts created by these businesses is substantial.

#### ***5.2.2.1 Location of Agriculture-related Businesses in the Survey***

Agriculture-related businesses are located in rural areas, villages, towns and cities in every township across the county. Greater representation is found in and around Forest, Petrolia, Sarnia, Thedford, Watford and Wyoming. A smaller number of Ag-related businesses were also found in Arkona, Alvinston, Brigden and Oil Springs.

#### ***5.2.2.2 Characteristics of the Businesses Surveyed***

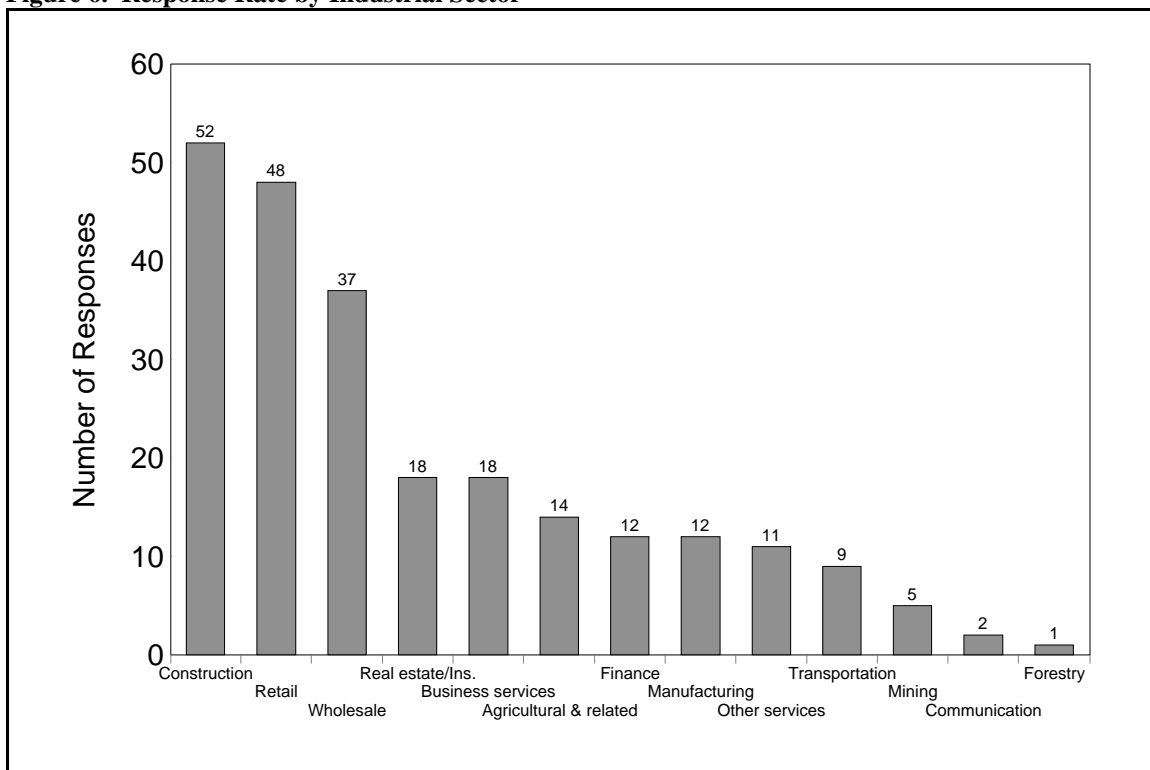
The common characteristic of all the businesses surveyed is that they deal in some way with the agriculture sector. More specifically, all of the businesses surveyed either sell products or services to, and/or buy products or services from agricultural producers. It is important to note that these Ag-related businesses may also conduct trade with other sectors of the economy.

For the purposes of this study, the surveyed businesses were categorized according to their primary activity, using the Standard Industrial Code (SIC) categorization method

developed by Statistics Canada. This system separates Canadian businesses into eighteen divisions, or sectors, such as Manufacturing, Retail Trade and Agriculture and Related Service Industries. Employment data for all eighteen sectors in Lambton County for 1991 and 1996 were presented earlier in this report (Table 3).

During the agriculture-related business survey, businesses from three industrial sectors (Education, Health and Government Services) were deliberately omitted from the survey as their impacts are being considered under Induced impacts. This leaves fifteen possible sectors with which Lambton County Ag-related businesses could form links. As illustrated in Figure 6, the study surveyed businesses in thirteen of these fifteen sectors.

**Figure 6. Response Rate by Industrial Sector**



Source: 1999 Ag-business Survey.

This suggests that the agriculture sector has links with almost every sector of the Lambton County economy. Connections were found with the following sectors: Construction, Retail Trade, Wholesale Trade, Finance, Business Services, Manufacturing, Transportation, Other Services, Real Estate and Insurance, Mining, Communication and Forestry. Linkages were also found among businesses classified as Agriculture and

Related Service Industries.

The survey did not include businesses from the following sectors: Fishing and Trapping Industries or Accommodation, Food and Beverage Industries. This does not mean that these industries do not exist in Lambton County; they may not be directly linked to agriculture, or may not have had enough local representation to be picked up by the survey sample.

Some of the industries analyzed in the study have comparatively stronger linkages with the agricultural sector. Of the total 239 businesses surveyed, high representation of Ag-related businesses are found in Construction (52 of the business surveyed), Retail Trade (48), Wholesale Trade (37), Real Estate (18) and Business Services (18). Businesses within the Agriculture and Related Services sector are also making strong linkages with other businesses within that sector (14 of the businesses surveyed). Characteristics of the businesses surveyed in various sectors of the Lambton County economy are discussed below.

*i) Agriculture and Related Service Industries*

The study found that strong linkages exist between businesses within the agriculture sector in Lambton County. Most often, backward linkages are developed via services provided to farms by these businesses such as veterinary services, land drainage services and soil preparation. More specialized services include pollination, seed cleaning and custom planting. Forward linkages are also provided by farms to these businesses through the sale of grain and seeds. In total, 14 businesses from the agriculture and related industries sector were surveyed. A typical example is Watford Veterinary Clinic, which specializes in veterinary services.

*ii) Logging and Forestry Industries*

Only one forestry-based business was surveyed, which has backward linkages to agriculture through the provision of specialized services in fertilizing, pruning and removal of trees, including diagnostic and cabling services.

*iii) Mining, quarrying and oil well industries*

The study found links between businesses within the agriculture sector and two types of businesses in this sector. The first type of business is gravel pits, which provide a

backward link by providing fill and materials for roads and drainage systems on farms. The second, a forward linkage, revolves around petroleum and natural gas businesses which lease sub-surface mineral rights from farms. In total, 5 businesses from the sector were surveyed.

*iv) Manufacturing Industries*

A variety of products linked to the agriculture sector are produced by businesses in Lambton County. In total 12 businesses from the manufacturing sector were surveyed as part of the study. Backward linkages to agriculture exist through the sales of such products as electrical wire, wood products, concrete and concrete products. An example of a manufacturing business is Murphy Bros. Concrete, which provides concrete forming for pig barns. A significant forward linkage involves manufacturing of food products from agricultural goods, most notably meat processing. An example of such a business is Alvinston Custom Butchering, which provides custom butchering and curing services.

*v) Construction Industries*

Businesses from the construction industries represented the greatest proportion of respondents; 52 businesses from this sector were surveyed. These businesses have strong backward linkages to agriculture through building construction, septic systems, fence installation, electrical contracting, plumbing and heating. One example of a construction business in Lambton County is Jim's Plumbing and Heating, which provides plumbing and heating, pump work and air-conditioning services.

*vi) Transportation and Storage Industries*

A total of 9 businesses from the transportation and storage sector were included in the survey. These businesses have backward linkages to agriculture through the transport of livestock, fill and raw milk, as well as grain handling and elevators. Forward linkages are also present through the purchase of grain and milk (through a central agent) from farms. An example of a transport industry is Mel Gordon Trucking, which provides livestock transport services.

*vii) Communication and Other Utility Services*

Two businesses from this sector were included in the survey; both have established backward linkages with agriculture through the provision of telephone and internet services to farm operators.



*viii) Wholesale Trade Industries*

A number of wholesale dealers have backward linkages to agriculture through the sales of building materials, lumber, farm machinery, feed and seeds. Forward linkages are also present, primarily the purchase of seed, grain and soy beans for resale. A total of 37 businesses from the sector were surveyed, an example of which is Sebo Farm Equipment, which sells farm machinery.

*ix) Retail Trade Industries*

Businesses in the retail trade sector are primarily selling products to the general public for personal or household consumption, and in providing related services such as installation and repair. However, they also have backward linkages to agriculture through the sale of products to farmers for use in the farm business, such as tire, truck and auto sales and service, hardware sales and computer sales and service. Some forward linkages also exist in the food retail sector, where goods are purchased from farms for resale. In total, 48 businesses from the retail sector were surveyed; an example is Watson Homecare Building Centre, which sells hardware.

*x) Finance Industries*

A total of 11 financial service and insurance businesses were surveyed. These include banks and credit unions, which have backward linkages to agriculture through the provision of loans and banking services to farm operations. In many cases, local branches have a department responsible for servicing farm operations. An example of a finance industry in Lambton County is Southwestern Regional Credit Union.

*xi) Real Estate and Insurance Industries*

Real estate and insurance agencies have strong backward linkages to the agriculture sector. The main service provided to agriculture is the selling of agricultural property. These businesses are also involved in land appraisals and leasing farm properties. The survey included 18 real estate and insurance businesses, an example of which is Earl McKinnon Real Estate, a provider of general real estate services.

*xii) Business Service Industries*

Business service industries surveyed include accountants and lawyers that provide, respectively, financial services in the forms of general accounting and taxes, and legal services in the forms of real estate transactions and negotiations of oil and mineral rights

to farm operations. It also included one land surveyor company. The survey included 18 of these businesses, which included BDO Don Woody Chartered Accountant.

### *xiii) Other Service Industries*

Other Service Industries can be broken down into four major groups (Statistics Canada, 1980). These are: Amusement and Recreational service industries such as theatres, sporting events, casinos and amusement parks; Personal and Household service industries such as beauty salons, laundry facilities and funeral services; Membership Organization industries such as religious organizations, business organizations and professional membership associations; and Other Service industries, which are the most relevant to agriculture as they include machinery and equipment rental and leasing, welding shops that repair farm machinery and equipment and auctioneers providing services for livestock owners. In total, 11 of these businesses were included in the survey, an example of which is Proof-Line Rental, which rents equipment and provides small engine repair.

### *5.2.2.3 Importance of the Agriculture-related Businesses Survey*

This study measures the importance of a business through its total gross sales per year and through the number of full-time equivalent (FTE) employees at the business. This provides an assessment of all the economic activities of the business, both related and unrelated to agriculture. For example, if a plumbing and heating business serves both residential and agriculture-producing (ie. farm-business) customers, the total gross sales of this business would include both Ag-related and unrelated sales.

#### *a) Sales for the Ag-related Businesses Surveyed*

All of the businesses surveyed had some sales related to the agriculture sector. During the survey, the owner (or manager) of the business was asked to estimate the total gross sales for their business as well as the percentage of those sales that could be attributed to the agriculture sector. For example, if the example plumbing and heating business has \$500,000 in total gross sales per year, and the owner estimates that 50 percent of these sales are agriculture-related, then the total agriculture-related sales for that business would be \$250,000 ( $\$500,000 \times 50\%$ ).

Ninety-two percent of the businesses surveyed provided sales data (220 of 239).

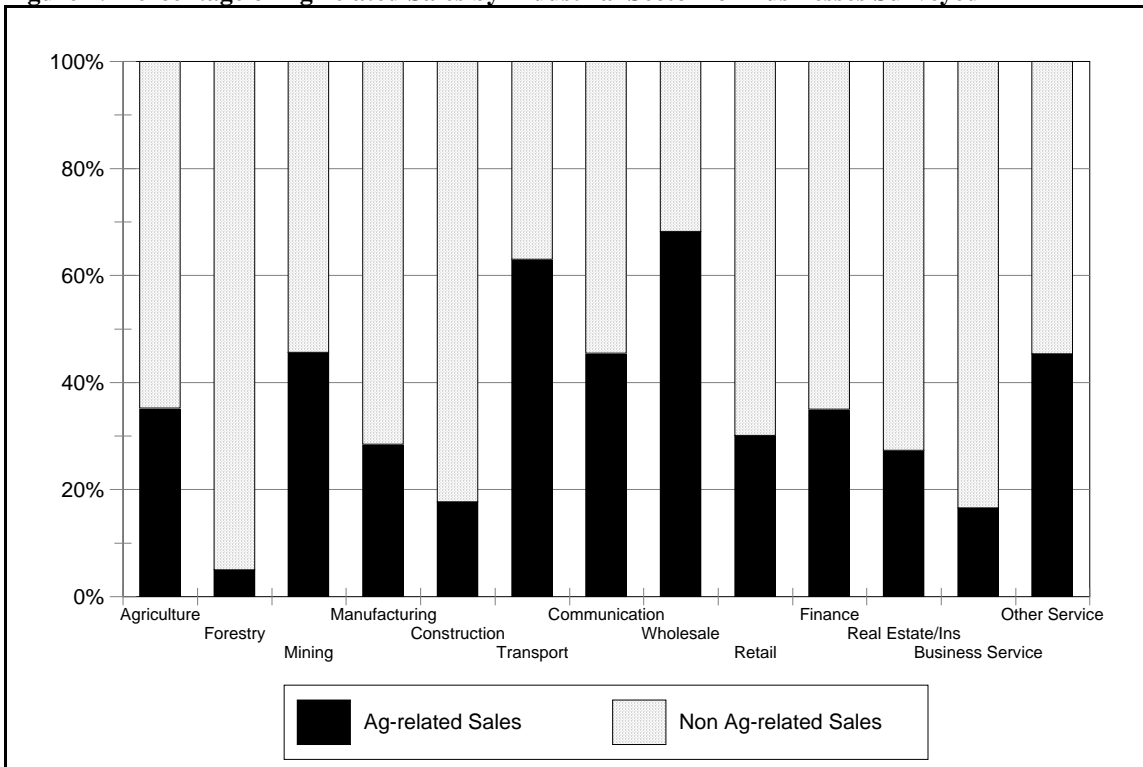
Statistics Canada classifies an industry with less than \$5 million in annual sales as a small business. A medium-size business has sales between \$5 million and \$25 million per year. Businesses with sales above \$25 million are considered large.

By this classification, businesses related to agriculture in Lambton County are generally small. Eighty-seven percent of the business surveyed had sales under 5 million (191 of 220); 47 percent of businesses have sales below \$500,000 (104 of 220). This number is very close to the median gross sales of \$500,000 for the businesses surveyed (the mid-point sales for the businesses surveyed; 110 businesses with sales above and 110 businesses with sales below). In this instance the median value provides additional insight into the types of businesses in the county as it is not influenced by extremely high or extremely low values.

This study found that agriculture-related businesses have a wide range of sales, and some with very high sales. Sales for the businesses surveyed ranged from \$4 thousand to \$28 million. The average total gross sales for the businesses that provided sales data was \$2,127,502. This number is substantially lower than the average gross sales of \$4,240,865 for the 154 businesses surveyed in Huron County in 1996 (Cummings et al., 1998), but is somewhat higher than the \$1,605,329 in average total gross sales for the 295 businesses surveyed in Prescott-Russell, Stormont, Dundas and Glengarry Counties in 1998 (Cummings & Deschamps, 1999). Only one business in Lambton County had sales in excess of \$25 million; the top quarter (54 businesses) had sales over \$2 million. This number is higher than the top quarter in both Huron County (\$1.7 million) and PRSD&G Counties (\$1.5 million). Overall the total gross sales for the 220 businesses that provided sales data in Lambton County, including sales related and unrelated to agriculture, was \$468,050,495.

On average, the businesses in the study attributed 46.0 percent of their sales to the agriculture sector. As a result, the total agriculture-related sales for these businesses was \$215,227,702. The average agriculture-related sales for the 220 businesses that provided sales data was \$978,308. There were a number of businesses with high agriculture-related sales figures. Nineteen percent of the businesses surveyed (42 of 220) had agriculture-related sales in excess of \$1 million. Forty-eight percent of the businesses surveyed had agriculture-related sales below \$100,000 (106 of 220).

**Figure 7. Percentage of Ag-related Sales by Industrial Sector for Businesses Surveyed**



Source: 1999 Ag-business Survey.

*i) Agriculture-related Business in the Agriculture and Related Service Industry*

Figure 7 illustrates the percentage of agriculture-related and unrelated sales according to business types, for the businesses surveyed. Average gross sales for the 13 agriculture and related businesses that provided sales data were just over \$4.1 million. This high average is a result of the several large businesses which were included in the survey. Thirty-five percent of sales from these businesses are attributed to the agriculture sector, for an average total agriculture-related sales of \$1.5 million.

*ii) Agriculture-related Business in the Logging and Forestry Industries*

As only one forestry-based business was surveyed, it is not fair to calculate an average for the industry based on a single entry. However, for this business, gross sales was estimated to be \$107,000. Of this, 5 percent, or \$5,350 can be attributed to sales related to agriculture.

*iii) Agriculture-related sales in the Mining, Quarrying and Oil Well Industries*

Average gross sales for business surveyed in the mining industry in Lambton County is about \$5.4 million. Of this total, about \$2.5 million, or 46 percent can be attributed to sales related to agriculture through the sale of gravel and fill, and sub-surface leases for natural gas.

*iv) Agriculture-related Business in the Manufacturing Industry*

The study found that manufacturing businesses surveyed had average total gross sales of just over \$1.5 million. Of this, about 28 percent, or just over \$430,000 are sales attributable to agriculture.

*v) Agriculture-related Business in the Construction Industry*

Average gross sales for businesses surveyed in the construction industry in Lambton County is just over \$630,000. Of this, 18 percent, or about \$111,000 can be attributed to sales related to agriculture. Building construction, trade contracting and plumbing and heating were especially linked to agriculture.

*vi) Agriculture-related Business in the Transportation and Storage Industry*

Transportation and storage businesses surveyed in Lambton County had average gross sales of just over \$2 million. Almost \$1.3 million, or 63 percent, can be attributed to sales related to agriculture. This seems to indicate that these businesses are dependent on the agriculture sector for making their sales. This includes transportation and storage of agricultural chemicals, livestock, raw milk and other agricultural products.

*vii) Agriculture-related sales in the Communication Industry*

Communication industries surveyed in Lambton County had average gross sales of \$2.75 million. Of this, \$1.25 million, or almost 46 percent came from sales attributable to agriculture, primarily telephone service and internet access.

*viii) Agriculture-related Business in the Wholesale Trade Industry*

The study found that wholesale trade businesses surveyed providing goods and services to farm operations are dependent on the agriculture sector for their sales. The average total gross sales for these businesses surveyed is just over \$5.5 million. Of this, about 68 percent, or about \$3.8 million are sales attributable to agriculture.

*ix) Agriculture-related Sales in the Retail Trade Industry*

Retail stores typically sell products for personal or household use. However, many

also sell products to the agriculture sector, notably truck dealers and hardware stores. Average gross sales for the retail businesses surveyed was almost \$1.9 million, with 30 percent, or about \$563,000 being attributable to sales related to agriculture.

*x) Agriculture-related sales in the Finance Industry*

As mentioned earlier in this report, sales data for finance institutions were calculated by multiplying the number of employees at the branch surveyed by an annual average salary of \$40,000. By using this method, the total average gross sales for finance businesses surveyed in Lambton County was approximately \$227,000, with 35 percent, or \$79,000 being attributable to serving the agriculture sector.

*xi) Agriculture-related Business in the Real Estate and Insurance Industries*

Average gross sales for real estate and insurance businesses surveyed in Lambton County were over \$2.6 million, with just over 27 percent, or about \$727,000 of these sales being related to agriculture.

*xii) Agriculture-related Business in the Business Service Industry*

The business service industry is dominated by legal and accounting firms. Average total gross sales for the business service businesses surveyed were just over \$685,000, with almost 17 percent, or just over \$113,000 being attributed to sales related to agriculture.

*xiii) Agriculture-related Business in the Other Service Industries.*

Average total gross sales for businesses surveyed in the Other Service industries were just over \$471,000. Of this total, almost \$214,000, or 45 percent were attributed to sales related to agriculture.

*b) Employment for the Ag-related Businesses Surveyed*

The importance of a business is also measured by the number of FTE jobs it supports. This information was gathered for the business location surveyed, as well as for any other outlets of that business in other locations. An assumption of this study is that the percentage of sales related to agriculture is equivalent to the percentage of employees serving the agriculture sector for their business. For example, if the plumbing and heating business mentioned in section a) employed 20 people, it would be assumed that 50% of

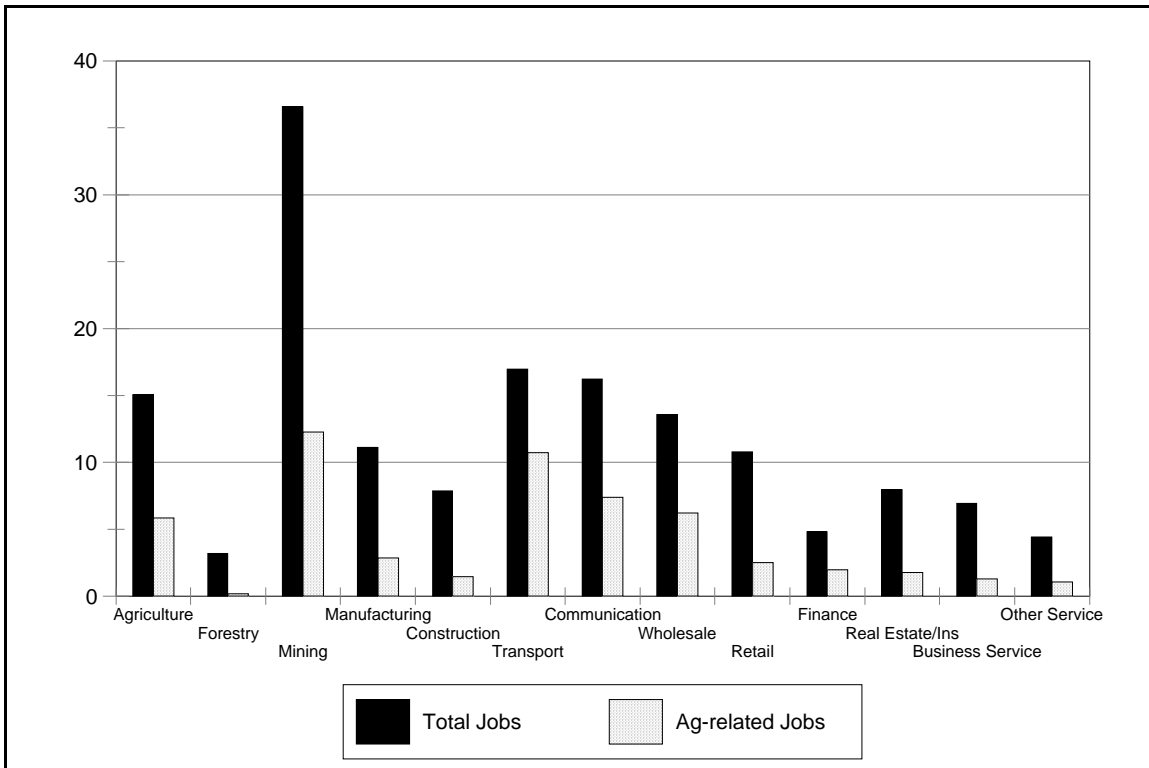
these jobs (10) are supported by sales generated to the agriculture sector. However, in the final analysis the percentage of FTE jobs may not equal the percentage of sales as some sectors/businesses report more working hours per job than others.

The number of employees in a business is another indicator of the importance of that business in the economy. According to Statistics Canada, a small business employs one to 50 people; a medium business employs 51 to 250 people and a large business employs over 250 people.

By this standard, 97 percent of the agriculture-related businesses in the study are small (233 of 239 that provided employment data). The remaining 3 percent, 6 businesses, were in the medium-business range. The average number of employees (as calculated by FTE jobs) for the businesses surveyed is 10.5. However, about half of the businesses surveyed have less than five employees (119 out of 239), and 71 percent of the businesses surveyed have less than 10 employees (169 out of 239). Figure 8 shows the average number of employees by industrial sector for the businesses surveyed.

All of the businesses in the study exchange goods and/or services with the agriculture sector. As such, it can be assumed that each of these businesses must have employees dedicating some or all of their work-time on activities to serve these exchanges. The average number of employees working on activities related to serving the agriculture sector for the businesses surveyed was 3.4. Of the businesses surveyed, 38 percent had at least two employees working strictly on agriculture-related activities (91 out of 239).

**Figure 8. Average Number of Employees by Industrial Sector, for the Businesses Surveyed**



Source: 1999 Ag-business Survey.

#### 5.2.2.4 Exports of the Agriculture-related Businesses Surveyed

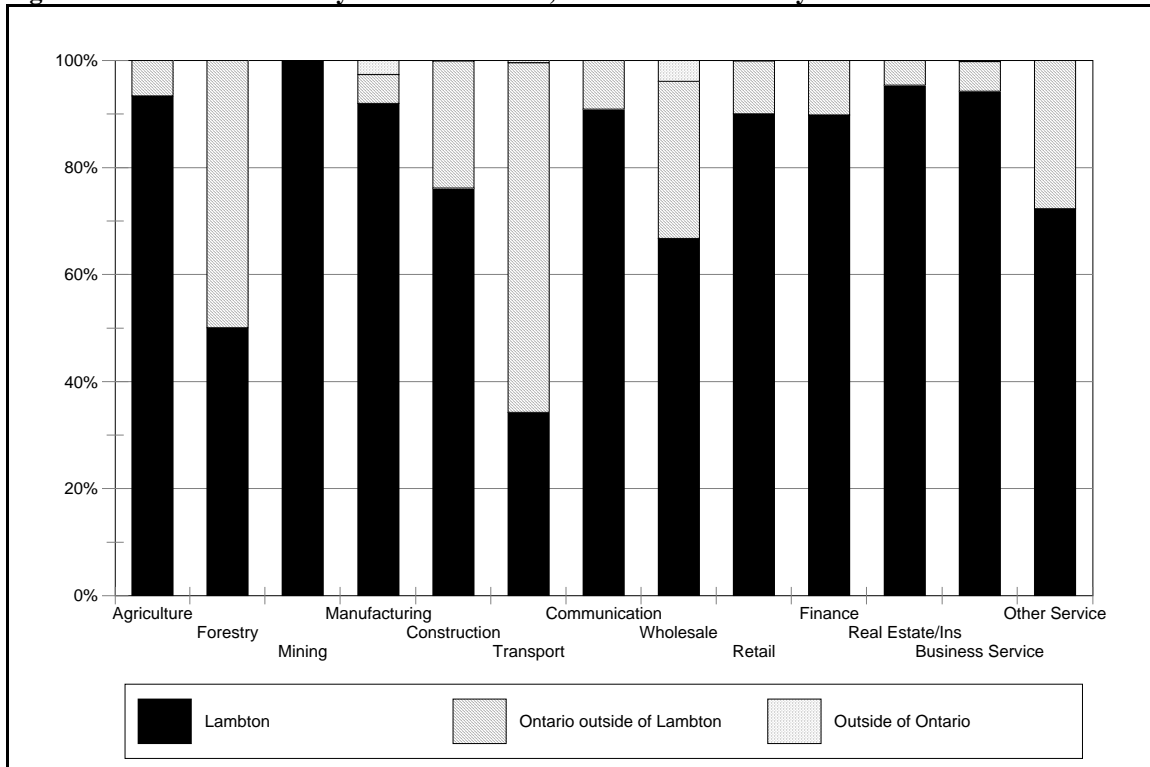
According to the 220 businesses that provided sales data for the study, 83.6% of their sales are made within Lambton County. This remaining 16.4% of their sales are exports to other locations in Ontario (15.6%), and outside of Ontario (0.8%). These sales represent the total sales for all the Agriculture-related businesses surveyed, including sales related to and unrelated to agriculture.

As shown in Figure 9, Transport Service businesses have the greatest percentage of exports with 65.4 percent of their sales being made outside of Lambton but inside of Ontario, and a further 0.4% being made outside of Ontario. Wholesale industries export 29.4 percent of their sales outside of Lambton, but inside Ontario, and 3.9 percent of their sales outside of Ontario. Other Services export 27.7 percent of their sales to locations outside of Lambton, but have no sales outside of Ontario. Construction industries export 23.8 percent of their sales outside of Lambton, and another 0.1 percent outside of Ontario (mostly to the state of Michigan). Finance Industries exported 10.2% of their sales out of Lambton, but had no sales outside of Ontario.



Of the thirteen Industrial Sectors which are represented by the agriculture-related businesses surveyed in this study, only seven retain 90 percent or more of their sales in Lambton County. These include: Agriculture and Related Services (93.4%), Mining, Quarrying and Oil Well Industries (100%), Manufacturing Industries (92%), Communication and Other Utility Industries (90.9%), Retail Trade Industries (90%), Real Estate and Insurance Agent Industries (95.4%), and Business Service Industries (94.2%).

**Figure 9. Location of Sales by Industrial Sector, for Businesses Surveyed**



Source: 1999 Ag-business Survey.

#### 5.2.2.5 Summary: Agriculture-related Businesses in Lambton County

The analysis shows that businesses that buy from or sell to the agriculture sector in Lambton County generate a sizeable amount of money and jobs inside the county. Furthermore, these companies generate flows of income and expenditure outside the county in terms of both employment and income. It is estimated that \$394.8 million in agriculture-related sales are generated in Lambton County by agriculture-related businesses. These businesses generated over \$73.6 million in agriculture-related sales in other parts of Ontario and a further \$3.7 million outside of Ontario. This income is

exchanged among the three regions which benefits local businesses. The total amount of agriculture-related sales for all three regions is \$472.1 million.

Businesses supported by agriculture generate additional sales in other sectors of the economy. Total sales of agriculture-related businesses in Lambton County reach more than \$1.02 billion, including sales related and unrelated to agriculture. This is shown in Table 18.

**Table 18. Gross Sales Generated by all Lambton County Agriculture-related Businesses**

<b>Location of Sales</b>	<b>Ag-related Sales (in \$ millions)</b>	<b>Total Sales: Related and Unrelated to Agriculture (in \$ millions)</b>
<b>Sales in Lambton County</b>	\$394,810,624	\$858,585,145
<b>Sales in Ontario (other than Lambton)</b>	\$73,612,778	\$160,083,934
<b>Sales Outside Ontario</b>	\$3,693,973	\$8,033,193
<b>Total Sales</b>	<b>\$472,117,375</b>	<b>\$1,026,702,272</b>

Source: 1999 Ag-business Survey.

Indirect employment is a further impact of the agriculture sector. Table 19 shows that the total Full Time Equivalent Jobs created by agriculture-related businesses is approximately 5,080, including jobs related and unrelated to agriculture. Of this, approximately 1,624 are indirect agriculture jobs created by agriculture-related businesses in Lambton County. In addition, there are jobs supported outside Lambton County by both Lambton County residents purchasing outside the county and by jobs in subsidiary locations of Lambton County businesses. There are 832 jobs maintained by Lambton agriculture-related businesses which are supported by sales located outside of the county. Of these, 266 are positions related to the agriculture sector. These jobs are supported through sales inside and outside of the county, and are important linkages for the Lambton County economy.

**Table 19. Full Time Equivalent Indirect Jobs in Agriculture**

	<b>Agriculture-related Jobs</b>	<b>Total Jobs Related and Unrelated to Agriculture</b>
<b>Jobs in Lambton</b>	1,358	4,248
<b>Jobs outside Lambton</b>	266	832
<b>Total FTE Jobs</b>	1,624	5,080

Source: 1999 Ag-business Survey.

### ***5.2.3 Estimated Induced Jobs***

Induced agricultural impacts are impacts on businesses that benefit from the expenditure of wages and salaries of workers in the Agriculture and Agriculture-related sectors. For the purposes of the current study, we have not calculated Induced Sales, but this would definitely add a significant figure to the overall ag-related sales total of agriculture-related businesses in Lambton County through the salaries of employees in the Education, Health and Government Service sectors.

Induced jobs in Lambton County refer to service sector jobs that are supported by services purchased by agriculture employees. These represent jobs in the education, health and government service sectors. To make estimates of the induced jobs in Lambton County, Bosanquet Township was selected to represent the county as it has the greatest total direct agricultural (ie. farm gate) sales. The total direct employment figure for Bosanquet Townships two primary production industries, Agriculture and Manufacturing, (505 and 220 respectively for a total of 725 jobs) was divided into the total number of jobs in the Education, Health and Government Service Sectors (175, 185 and 85 respectively, for a total of 445 jobs). This calculation indicates that for every job created in the two primary production industries, 0.61 induced jobs were supported by them.

When this number is applied to the total number of direct and indirect jobs related to agriculture in Lambton County as a whole (3,920 direct jobs and 1,624 indirect jobs for a total of 5,544 jobs), it indicates that 3,382 induced jobs are supported by agriculture in the county.

### 5.2.4 Total Direct, Indirect and Induced Impacts

As shown in Table 20, there are 3,920 direct, 1,624 indirect and 3,382 induced jobs created as a result of the agriculture sector in Lambton County. Thus, farm operations, businesses they buy from and sell to, and services that support farmers and farm businesses are estimated to support an estimated 8,926 jobs. When these three figures are added together to estimate the total number of jobs related to agriculture in Lambton County (3,920 direct, 1,624 indirect and 3,382 induced for a total of 8,926) and divided by the total number of direct agriculture jobs, an employment multiplier of 2.28 is the result. This calculation allows us to estimate that for every job in the agriculture sector, an additional 1.28 jobs related to agriculture are supported.

**Table 20. Total Sales and Employment Related to Agriculture in Lambton County**

	<b>Sales</b>	<b>Jobs</b>
<b>Direct</b>	\$301,426,481	3,920
<b>Indirect</b>	\$472,117,375	1,624
<b>Induced</b>		3,382
<b>Total</b>	<b>\$773,543,856</b>	<b>8,926</b>

In addition, there are \$301,426,481 in direct sales and \$472,117,375 in indirect sales associated with agriculture in Lambton County. Therefore, approximately \$773,543,856 in agriculture-related sales are generated in the Lambton County economy. In order to estimate the sales expenditure multiplier in Lambton County, the total amount of agriculture-related sales for the area (\$773,543,856, made up of \$301,426,481 direct sales and \$472,117,375 indirect sales) was divided by the total amount of direct sales for the area (\$301,426,481) to calculate a sales expenditure multiplier of 2.57. In short, we can use this calculation to estimate that for every dollar generated by direct agricultural sales (farm gate sales), an additional \$1.57 in sales related to agriculture is also produced.

### **5.3 In-depth Analysis of Agriculture-related Businesses: Case Studies**

Thirteen businesses were interviewed as case studies. These businesses were randomly selected from the 220 businesses that provided sales data. It should be noted that the case study results reported here are only based on thirteen businesses. This information should be viewed as providing additional, but not representative, information regarding agriculture-related businesses in the county.

The most important result of the case studies emphasizes the variety of activities and products linked to agriculture in the county economy. Products and services related to the farming industry vary greatly. They include regular veterinary services, such as acute illness treatment and c-sections (referred to as “fire engine” services), to more progressive veterinary services such as herd health management and preventative care. Other products and services normally associated with the agricultural industry include the sale and repair of farm machinery and feed storage and sales. Case studies were also conducted with financial institutions, including an insurance company, which provides property insurance on livestock, machinery, standing grains, vehicles and bulk liquid fertilizer. The case studies also included a local bank that provides services to farmers such as farm mortgages, loans, leases, securities and - becoming increasingly important with an aging farm population - will planning. The number of linkages between agriculture and the rest of the county is illustrated by the breadth of services and products exchanged between the agricultural sector and other sectors of the economy.

Ag-related businesses involved in the case studies indicated that the most important changes experienced in their businesses in the last ten years are related to the computer. There has been an increased computerization of their operations, as well as the farm operations with which they do business. For example, an insurance company has increasingly used email to communicate with their customers. The impetus for computerization includes the need to better serve clients and to remain competitive in the market. One small-business owner noted that “we had to become computerized since our larger competitors certainly are”.

It should be noted that not all thirteen businesses interviewed have moved toward increased computerization. In several cases, there was a hesitance to do so due to the costs of purchasing computers, as well as the training needed to utilize them effectively.

One business owner noted that “we just don’t have the time to set that kind of thing up.” Others noted some hesitance to computerization; an insurance company noted that their older farm customers prefer personal contact rather than the benefits of the computerized services offered. The interviewee noted “you can computerize your business to the point that people are turned off – people still want that personal touch”.

Alongside increased computerization in most of the businesses interviewed is an increase in the technological level of their business, as well as technological knowledge of farm operators with which they do business. Many of the interviewees noted that farmers are becoming increasingly knowledgeable regarding products and services related to their business. This includes everything from banking and insurance, to trucks and farm equipment, to veterinary products and services. As one auto shop owner stated: “It used to be that a farmer would walk into my shop and say ‘I need a truck to do so and so job’. Now, that same farmer walks into my shop and says ‘this is what I need’. My customers are highly educated when it comes to what they want.”

A veterinarian stated that the most dramatic change in his practice over the last ten years has been an increase in the technological level of his practice. Farmers are now doing their own routine veterinary services, and are depending on the veterinarian for more technological services (i.e. herd health management).

A further change noted by ag-related business owners is increased competition and, at the same time, decreased loyalty from customers. Most interviewees reported higher operating costs alongside lower returns. One owner of an automotive parts business stated that “it seems we are working harder for less profit.” Another respondent noted that the increased pressure might be due to a decrease in the customer base of ag-related businesses; the number of farms is decreasing. Some of the business owners interviewed fear that this will lead to an inevitable decrease in the number of dealers of agricultural products and services.

Fortunately, almost all of the businesses interviewed have had an increase in sales over the last ten years. Most, including the banking representative, noted the increased financial viability of farming today compared to 10 years ago. Along with the growth in sales, there has been an expansion of markets for some ag-related businesses interviewed. Four of the thirteen businesses interviewed have recently expanded or are looking to

expand their operations. Business growth has also resulted in mergers – three of the businesses have had mergers in the last five years. Business growth has resulted in larger work forces; almost all of the businesses interviewed reported an increase in workforce in the last decade.

A number of the agriculture-related businesses interviewed also reported an expansion in the type of business activities undertaken. This expansion is meant to meet the changing needs of agriculture. For example, the veterinarian interviewed had been in the business for several decades and reported a decreased demand for “fire engine” services such as milk fever treatment and c-sections, with an increased demand for advanced veterinary services such as preventative care for farm animals. The insurance representative also noted changes to his business resulting from the changing demand of farmers. These have necessitating an expansion of the services his business offers, including the provision of insurance for niche market farms such as hemp, sugar beets and exotic animals.

A significant change that the ag-related business representatives noted in the agricultural industry has been the move from small to large farms. This change has meant changes in their own industries, such as the insurance industry. The interviewee noted that policy sizes are increasing, but the number of farmers is decreasing. This has resulted in a change in the make up of their customers. Thirty years ago, the business customer was typically a farmer – up to 80% of their business was farm-related. Today, their policy counts have remained more or less constant, but there has been an increase in the number of non-farm customers.

As noted, most of the interviewees feel pressure to continually keep up with technological advances in their field. The pressure derives from both from a more technological aware clientele, as well as from their competitors. Increased demand for more complex and sophisticated products and services has entailed a more skilled and diverse labour force for the agriculture-related businesses interviewed. More than half of the businesses interviewed noted the importance of training to keep up with these changes. Presently, almost all of the businesses interviewed provide in-house training related to their business. Most have access to training provided by their main suppliers. The majority of these are on-site training provided by their supplier companies, while others

are offered at the manufacturing facility. While in-house training make up the majority of training opportunities for employees, other training focuses on apprenticeship programs (such as mechanics offered by Fanshawe College in London), and computer training (such as computer courses offered at Lambton College in Sarnia).

Future training reported by the interviewees will focus on training related to new equipment and technological changes in their respective industries. Most respondents felt some pressure to continually provide training in order to keep up with the demands created by technological changes. Future computer training was seen as important as businesses upgrade their systems.

While most businesses surveyed agreed that training of employees is important, they also stressed the importance of having employees knowledgeable about the farming industry. For example, the banking representative interviewed stated that the most important criteria when hiring an agricultural representative is farm experience. This emphasis was more the case with businesses greatly linked to agriculture (more than 50% of their sales being related to agriculture).

The ag-related business representatives were asked to relay the challenges they face. Most suggested the rapid change in technology, as discussed above. Related to this is the cost to keep abreast of these changes, and the general escalating cost of doing business. A number of respondents also recognized the need to involve younger farmers in the agricultural industry. The challenge will be to build relationships with the next generation of farmers in order to maintain their clientele base.

Most of the business people interviewed feel that farmers are their best customers. Their impression is that farmers are more loyal and spend more money in the local economy. They recognize that their business depends on a thriving agricultural industry. They see their greatest challenge as having to answer the changing needs of the farmer in the future.



## 5.4 Comparison to Previous Studies

As mentioned previously, this type of study (using the same methodology) has been completed in three other locations in Ontario: Huron County (1998); Prescott, Russell, Stormont, Dundas and Glengarry Counties (1999); and Simcoe County (1999). Table 21 compares sales data from those studies with the current Lambton County study.

**Table 21. Total Sales Related to Agriculture for Huron, PRSD&G, Simcoe and Lambton Counties**

	Huron	PRSD&G	Simcoe	Lambton
<b>Direct</b>	\$511,918,855	\$363,496,609	\$264,884,681	\$301,426,481
<b>Indirect</b>	\$1,489,000,000	\$756,453,565	\$518,691,957	\$472,117,375
<b>Total Sales</b>	\$2,000,918,855	\$1,119,950,174	\$783,576,638	\$773,543,856
<b>Sales Expenditure Multiplier</b>	3.91	3.08	2.96	2.57

Source: Cummings et al., 1998 & 1999.

Table 22 compares the employment data from the four studies.

**Table 22. Total Jobs Related to Agriculture for Huron, PRSD&G, Simcoe and Lambton Counties**

	Huron	PRSD&G	Simcoe	Lambton
<b>Direct</b>	5,025	5,955	4,770	3,920
<b>Indirect</b>	14,186	4,516	2,237	1,624
<b>Induced</b>	3,528	7,007	7,414	3,382
<b>Total Jobs</b>	22,739	17,478	14,421	8,926
<b>Employment Multiplier</b>	4.53	2.94	3.02	2.28

Source: Cummings et al., 1998 & 1999.

The results of this study compare well to the previous studies. Yet, as the tables indicate, Lambton County ranks behind the other three locales in most categories. This is not to say that the Agriculture sector in Lambton County is any less important; the relative small size of the labour force and the diversity of the Lambton economy (not to mention the nature and diversity of the Agriculture sector itself) play roles in determining the importance of any industrial sector. What is important to note is that the stable number of farms, sales per farm, and consistent contribution to the provincial total indicate that,

although the Agriculture sector in Lambton is not as large as some of the other counties in the province, it is both prosperous and stable.

## **6.0 Results Conclusions**

Agriculture is clearly an important player in the Lambton County economy, providing approximately 14% of employment in the county and generating over \$773 million in annual sales. The sector touches an estimated 483 businesses selling to agriculture as well as the vital public service sector.

Estimated expenditures of \$773 million are generated by agriculture producers and agriculture-related businesses within Lambton County. This is the estimated flow of sales and expenditures generated by farm operations as well as sales related to the agriculture sector. While previous estimates indicate that 3,920 jobs existed in the agriculture sector in 1996 (Statistics Canada, 1996 census), a further 1,624 jobs were tied indirectly to the agriculture sector in Lambton through expenditures by agriculture-related businesses, and an additional 3,382 jobs were supported by agriculture in education, health and government service. Clearly, this has a significant impact on the economy of Lambton County, where the total estimated number of jobs in 1996 is 62,540. Multipliers associated with the sales and employment data suggest 1.28 jobs off the farm for every 1 on the farm, and \$1.57 off the farm sales for every \$1 generated by farm gate sales.

## **Bibliography**

- Bendavid-Val, Avrom. 1991. Regional and Local Analysis for Practitioners, 4<sup>th</sup> ed. Westport, Connecticut: Praeger.
- Bradfield, Michael. 1988. Regional Economics: An Analysis and Policies in Canada. Toronto: McGraw-Hill Ryerson Limited.
- Butterfield, David and Atif A. Kubursi. 1993. "Regional Economic Effects of Recycling in Ontario". Canadian Journal of Regional Science. Vol. 16, (3) pp. 413-431.
- Cloutier, Sylvain. 1996. "Employment in Agriculture and Closely Related Industries in Rural Areas: Structure and Changes, 1981-1991." Paper presented at the International Symposium: Perspectives on Rural Employment held October 11 to 14, 1995, in Coaticook, Quebec.
- Cummings, Harry and Vince Deschamps. 1999. Economic Impact of Agriculture on the Economy of Prescott, Russell, Stormont, Dundas and Glengarry Counties. University School of Rural Planning and Development unpublished report. University of Guelph. Guelph, Ontario.
- Cummings, Harry, Karen Morris and Dan McLennan. 1998. Economic Impact of Agriculture on the Economy of Huron County. University School of Rural Planning and Development unpublished report. University of Guelph. Guelph, Ontario.
- Cummings, Harry, Karen Morris and Don Murray. 1999. Economic Impact of Agriculture on the Regional Economy: Case Studies from Ontario. University School of Rural Planning and Development unpublished report. University of Guelph. Guelph, Ontario.
- Davis, H. Craig. 1990. Regional Economic Impact Analysis and Project Evaluation. Vancouver: University of British Columbia Press.
- Dahms, Fred. 1982. "The Changing Functions of Rural Settlements in Huron and Southern Bruce Counties: Historical Background and Major Trends 1951-1981." University School of Rural Planning and Development Publication 110. University of Guelph. Guelph, Ontario.
- Damus, Sylvester. 1993. "On Input-Output Analysis with Incomplete Data." Canadian Journal of Regional Science. Vol. 16 (1), 115-122.
- Drugge, Sten E. 1988. "A Theoretical Critique of Shift Share Analysis: A General Equilibrium Approach". Canadian Journal of Regional Science. Vol. 11 (2), 303-311.

- Faas, Ronald C. 1980. "Coping with Growth: What Does the Impact Statement Say About Economic Impacts." Corvallis, Oregon: Western Rural Development Centre.
- Higgins, Benjamin and Donald J. Savoie. 1995. Regional Development Theories and Their Application. New Brunswick, New Jersey: Transaction Publishers.
- Huron County Planning and Development Department. 1991. Huron County Study - The Background Report. Goderich, Ontario.
- Josling, L.T. 1996. An Empirical Study of the Interdependence Among Agriculture and Other Sectors of the Canadian Economy - An Input-Output Model. Agriculture Economics Research Council of Canada.
- Kulshreshtha, Surendra N. 1988. "Estimation of Contributions of a Resource Sector to Provincial Economy: The Case of Saskatchewan Potash." Canadian Journal of Regional Science. Vol. 11 (3), pp. 431-444.
- Lee, Chinook. 1991. "Recent Developments in Construction of Input-Output Tables with Use and Make Matrices: An Application to U.S. Agriculture." Canadian Journal of Agriculture Economics. Vol. 39, 795-803.
- Lewis, Eugene, Russell Youmans, George Goldman and Garnet Premer. 1979. Economic Multipliers: Can a Rural Community Use Them? Corvallis, Oregon: Western Rural Development Centre.
- Ontario Ministry of Agriculture Food and Rural Affairs. 1995. Publication 20. 1994 Agriculture Statistics for Ontario. Statistical Services Unit, Policy Analysis Branch. Queen's Park. Toronto, Ontario.
- Otto, C.M. and T.G. Johnson. 1993. Microcomputer-Based Input-Output Modeling: Applications to Economic Development. Boulder, Colorado: Westview Press.
- Poole, Erik, Ronald Rioux and Claude Simard. 1994. "The Input-Output Model and Economic Policy". Policy Options. Vol. 15 (10), 28-31.
- Rioux, J.J.M. and J.A. Schofield. 1990. "Economic Impact of a Military Base on its Surrounding Economy: The Case of CFB Esquimalt, Victoria, British Columbia". Canadian Journal of Regional Science. Vol. 13 (1), 47-61.
- The Rural Voice. "The Bang of the Bucks." August 1996.
- Semple, Hugh and R.G. Ironside. 1992. "The Impacts of New Resource Industry on Recipient and Adjacent Municipalities". Canadian Journal of Regional Science. Vol. 15 (1), 59-80.

- Schaffer, William A. 1979. "Testing Regional Input Analysis in Nova Scotia". Canadian Journal of Regional Science. Vol. 2 (1), 1-10.
- Schaffer, William A. 1978. "Constructing the Nova Scotia Input-Output System". Canadian Journal of Regional Science. Vol. 1 (1), 1-12.
- Stabler, Jack C. 1988. "Saskatchewan Steel: A Regional Industrial Impact Analysis". Canadian Journal of Regional Science. Vol. 11 (1), 133-145.
- Statistics Canada. 1986a. Population Profile of Canada - Part A. Supply Services. Ottawa, Ontario.
- Statistics Canada. 1986b. Population Profile of Canada - Part B. Supply Services. Ottawa, Ontario.
- Statistics Canada. 1991a. Population Profile of Canada - Part A. Supply Services. Ottawa, Ontario.
- Statistics Canada. 1991b. Population Profile of Canada - Part B. Supply Services. Ottawa, Ontario.
- Statistics Canada. 1996a. Population Profile of Canada - Part A. Supply Services. Ottawa, Ontario.
- Statistics Canada. 1996b. Population Profile of Canada - Part B. Supply Services. Ottawa, Ontario.
- Troughton, Michael. 1992. "The Restructuring of Agriculture: The Canadian Example." Bowler, I.R., C.R. Bryant and M.D. Nellis (Eds.). Contemporary Rural Systems in Transition: Volume 1, Agriculture and Environment. Wallingford, UK: CAB International, pp. 29-42.
- Van Hove, Frank, P.S. 1995. "The Eastern Ontario Dairy Industry: Regional and Provincial Economic Impacts and Linkages." Unpublished M.Sc. Thesis, University School of Rural Planning and Development, University of Guelph. Guelph, Ontario.