

Estimating the Local Economic Impact of Agricultural Production in the City of Hamilton, Ontario

September 28, 2008

by

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1.0 Introduction

In what follows, the economic impact of agricultural production activities in the City of Hamilton will be estimated.

1.1 Agricultural Production in the City of Hamilton

Figure 1 depicts the nature of Hamilton’s agricultural cluster in 2006. Clearly, Hamilton’s agricultural cluster is quite diversified, with poultry and egg, nursery products and sod, and greenhouse products accounting for 52 percent of total GFR in 2006.

Figure 1: Gross Farm Receipts by Select Commodities, Hamilton, 2006

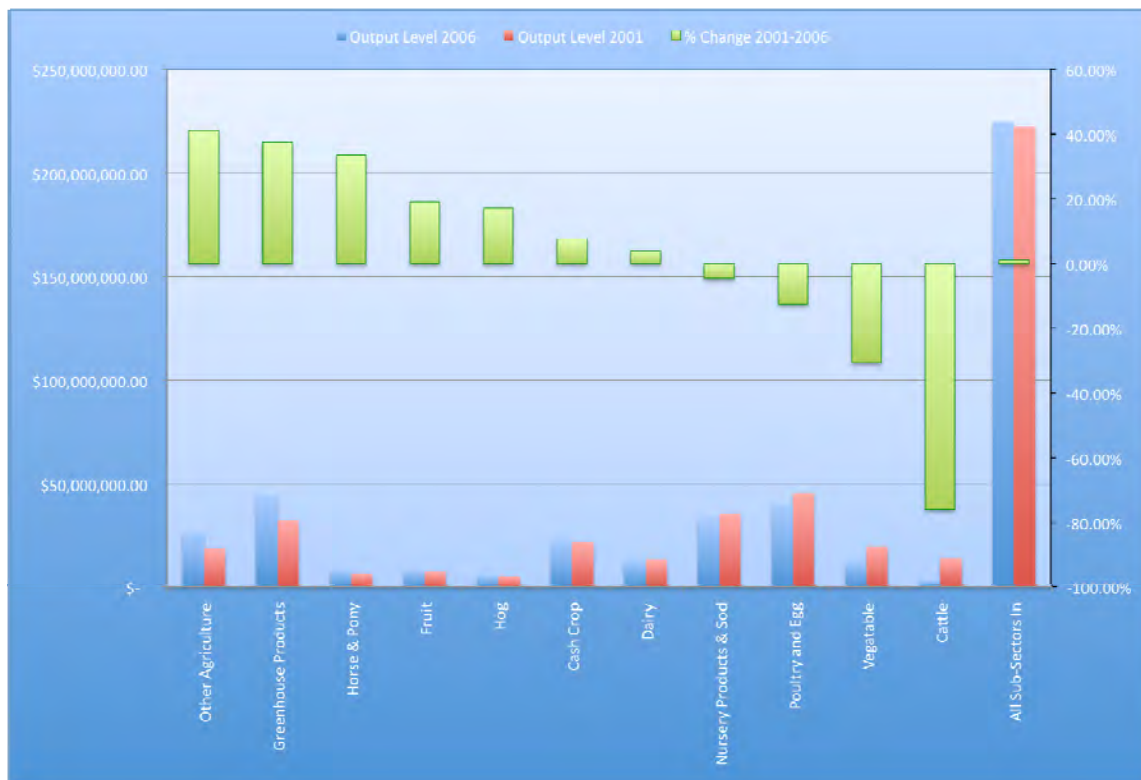


Table 1 and Figure 1 both show that the agricultural cluster in the City of Hamilton reported nearly one-quarter of one billion dollars in Gross Farm Receipts (GFR) in 2006, and that this represents a very modest increase over the total level of activity reported in 2001. Indeed, if we limited ourselves to a comparison of total GFRs reported in 2001 and 2006 in the City, it would appear as if Hamilton’s agricultural production complex enjoyed positive, albeit negligible, growth (i.e., less than 1.2 percent) over the period.

Table 1: Agricultural Production in the City of Hamilton

<i>Commodity</i>	<i>Output Level</i>	<i>Output Level</i>	<i>% Change</i>
	2006	2001	2001-2006
Greenhouse Products	\$44,636,220.00	\$32,492,895.00	37.37%
Poultry and Egg	\$40,226,653.00	\$45,963,897.00	-12.48%
Nursery Products & Sod	\$33,661,260.00	\$35,306,738.00	-4.66%
Other Agriculture	\$27,023,710.00	\$19,163,088.00	41.02%
Cash Crop	\$23,360,277.00	\$21,696,069.00	7.67%
Dairy	\$14,173,646.00	\$13,645,500.00	3.87%
Vegetable	\$13,790,844.00	\$19,827,136.00	-30.44%
Horse & Pony	\$9,175,521.00	\$6,877,862.00	33.41%
Fruit	\$9,029,025.00	\$7,585,956.00	19.02%
Hog	\$6,222,041.00	\$5,314,820.00	17.07%
Cattle	\$3,477,717.00	\$14,362,635.00	-75.79%
All Sub-Sectors In	\$224,776,914.00	\$222,236,596.00	1.14%

Table 1 and Figure 1 also show however, that while the cluster as a whole in the City of Hamilton appeared to follow a rather quiescent trajectory over the period, the internal structure of the cluster has undergone substantial change over the period. For example, Table 1 and Figure 1 show the following significant changes in the nature of agricultural sales (and presumably production) in the City over the period:

- Cattle farming, - 76%;
- “Other Agriculture” (all agricultural operations not included in the top ten commodity groups. + 41%
- Greenhouse production, + 37%;
- Horse and Pony operations, + 33%;
- Vegetable production, -30%;
- Fruit production, +19%;
- Poultry and Egg operations, -12%; and,
- Hog operations, +17%.

1.2 Measuring the Economic Impact of Agricultural Production in Hamilton

Agricultural operations in the City of Hamilton that generate nearly \$225 Million in GFRs annually are undoubtedly having a significant local (and indeed provincial and national) economic impact. The purpose of what follows is to estimate the magnitude and nature of this impact on the City of Hamilton.

The total economic impact of any industry is defined as the sum of its direct, indirect and induced economic impacts in the host economy. *Direct impacts* are those that stem from the direct input requirements of the industry in question. Direct input purchases also stimulate additional rounds of spending as input providers purchase inputs from their input suppliers to produce their outputs (e.g., a producer of seeds purchases electricity, a diesel fuel wholesaler purchases labour and the services of legal and financial experts etc.) and so on. These additional rounds of spending stimulated by the direct input purchases of the industry under study are referred to as the *indirect effects* (see Figure 2 for a representation of these rounds of spending - the income multiplication process in a regional economy).

Induced impacts refer to those additional rounds of spending that stem from income earned by workers in the various industries in the economy that are impacted directly and indirectly by the initial shock (i.e., by the activities of the industry in question – agricultural production in the City of Hamilton in this instance).¹ An example of an induced effect in an agricultural context would be as follows:

1. The demand for greenhouse vegetables produced in the City of Hamilton is rising steadily;
2. Producers in Hamilton, to meet an anticipated 50 percent increase in demand for their products, begin to use existing greenhouse operations more intensively through the use of fertilizers, specialized consulting services, etc.. Fertilizer manufacturers and pest management consultants, for example, begin to see growing demand for their products and services in the City as greenhouse operators in Hamilton begin to buy more inputs. This is part of the direct impact of agricultural production in Hamilton.
3. Fertilizer distributors and professional consultancies, in supplying more of their products to agricultural operations in Hamilton, will have to purchase more of their own inputs as well. Fertilizer distributors, for example, will have to purchase more product, more transportation services, more fuel, utilities and labour. These purchases would be part of the indirect impact of agricultural production in the City;

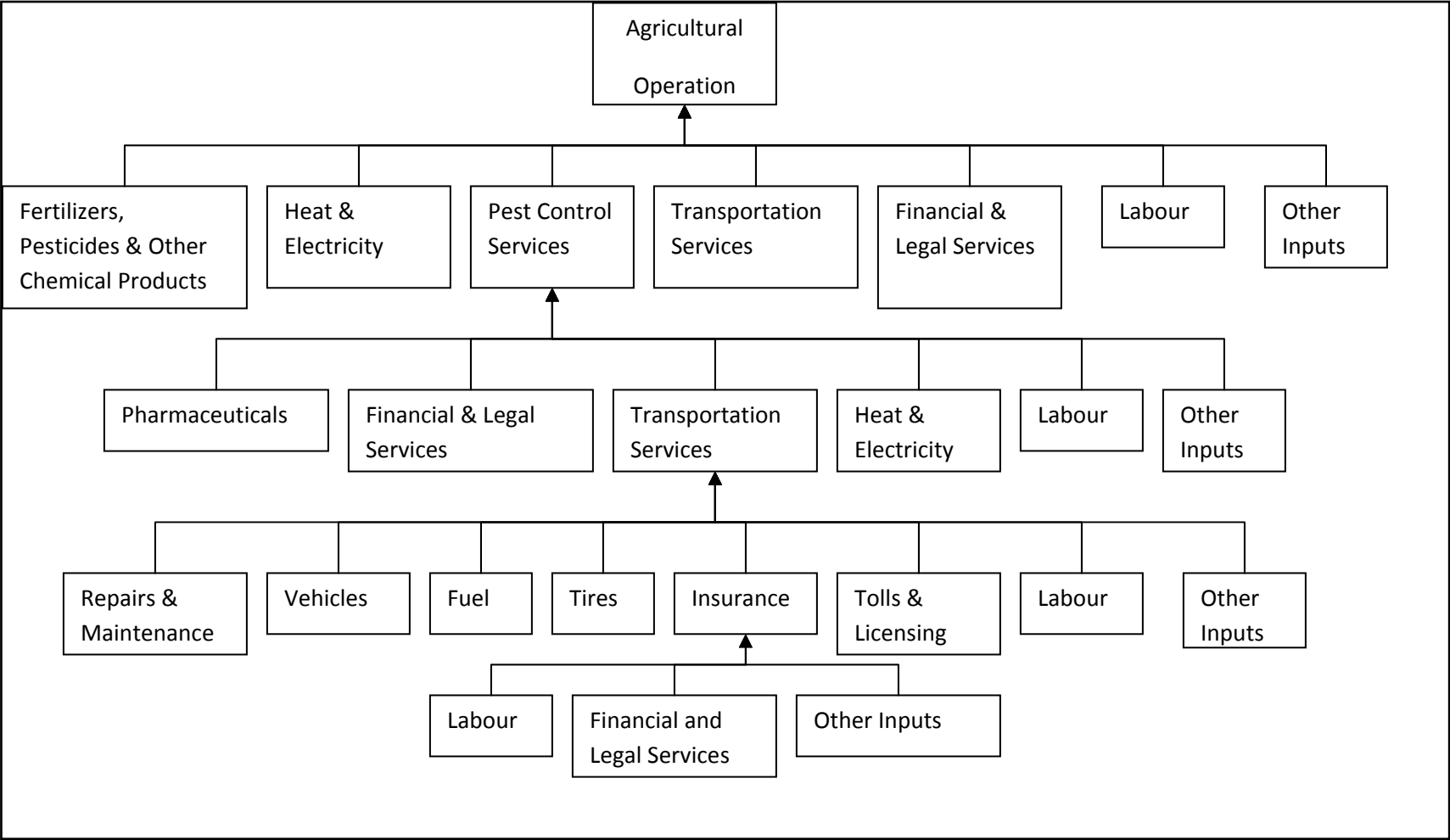
¹ When an industry is called upon to provide inputs to another industry, it too must draw inputs from its suppliers (see Figure 2). All industries buy labour to conduct their business, and a portion of the income earned by labour is spent in the economy (e.g., to buy manufactured items, services, consumables etc.), and this additional consumption demand must be met with additional industrial output. It is this additional industrial output, induced by the consumption behaviour of workers, which constitutes the induced effect of an initial shock.

4. A new employee hired by the fertilizer manufacturer or the consulting firm (in response to the indirect impacts described above), for example, uses part of her/his net income to purchase food products, a variety of goods and services, a new Ford truck, and a new home. These purchases made by the employee in-turn stimulate the municipal (and indeed provincial) economy yet again (i.e., the food stuffs must be produced, the Ford truck must be manufactured and sold², and the home purchase represents a further stimulus to the local home-building and finance, insurance and real-estate industries. These impacts that flow from the original surge in demand for agricultural products via the spending of labour income are examples of induced impacts associated with the original shock to the agricultural producers in the City of Hamilton.

The regional economic impact model developed for this project is designed to compute the total, direct, indirect and induced economic impacts in City of Hamilton associated with agricultural production taking place within the City.

² While the Ford truck would be manufactured in Oakville Ontario, and not in Hamilton, it would be sold by a local Hamilton dealership in all likelihood. As such, retail sales margins would accrue locally even though the manufacturing stimulus would leak out to Oakville.

Figure 2: Schematic Representation of a Hypothetical (and truncated) Pattern of Linkages Emanating from an Agricultural Operation



1.3 Total Economic Impact

Figure 3 presents Total Output Multipliers (TOMs) for all industries (i.e., Small Level NAICS industry groups) in the City of Hamilton including the various components of the City's agricultural cluster. Total Output Multipliers (TOMs) measure the stimulatory effect of each component of the cluster in the City on all industries producing goods and services in the City of Hamilton inclusive of direct, indirect and induced effects. Generally speaking, the larger the multiplier for a given industry, the more connected that industry is to other industries in the economy, and hence the greater is its stimulatory effect on these linked industries if shocked. Figure 3 shows that all industries in the City of Hamilton, with three exceptions, possess TOMs which are in excess of 2.0. This means that for most industries in Hamilton (including all components of the agricultural cluster), a one dollar increase in the demand for their output will translate into more than two dollars in output response across all linked industries in the economy (i.e., the total economic impact of a \$1.00 increase in demand for the output of one industry is in excess of \$2.00).³ Every dollar of output from Hamilton's agricultural cluster therefore stimulates a total impact in excess of \$2.00 in the Hamilton economy.

Table 2 presents a summary of the total, direct, indirect and induced impacts of agricultural production that could be experienced in the City of Hamilton as a result of agricultural activity levels as reported in 2006. The impacts in Table 2 are presented in terms of gross industrial output and Gross Domestic Product (GDP). Table 2 shows that sales by the agricultural cluster in the City of Hamilton in 2006 of nearly \$225 Million is having a substantial annual economic impact in the regional economy including:

- More than \$823 Million in gross industry output across all industries in the City;
- More than \$265 Million in GDP or value-added; and,
- More than \$171 Million in labour income.

Figure 4 shows that of the total gross industry output impact of more than \$823 Million annually, nearly 50 percent of this is the result of the recirculation of income earned by workers in all sectors of the economy as a result of the activities of the agricultural cluster in the City of Hamilton (i.e., the induced effect).

³ It is important to note that the structure of the Hamilton economy used to compute these multipliers was based on a regionalized provincial Input-Output model pertaining to the year 1998.

Figure 3: Total Output Multipliers by Industry

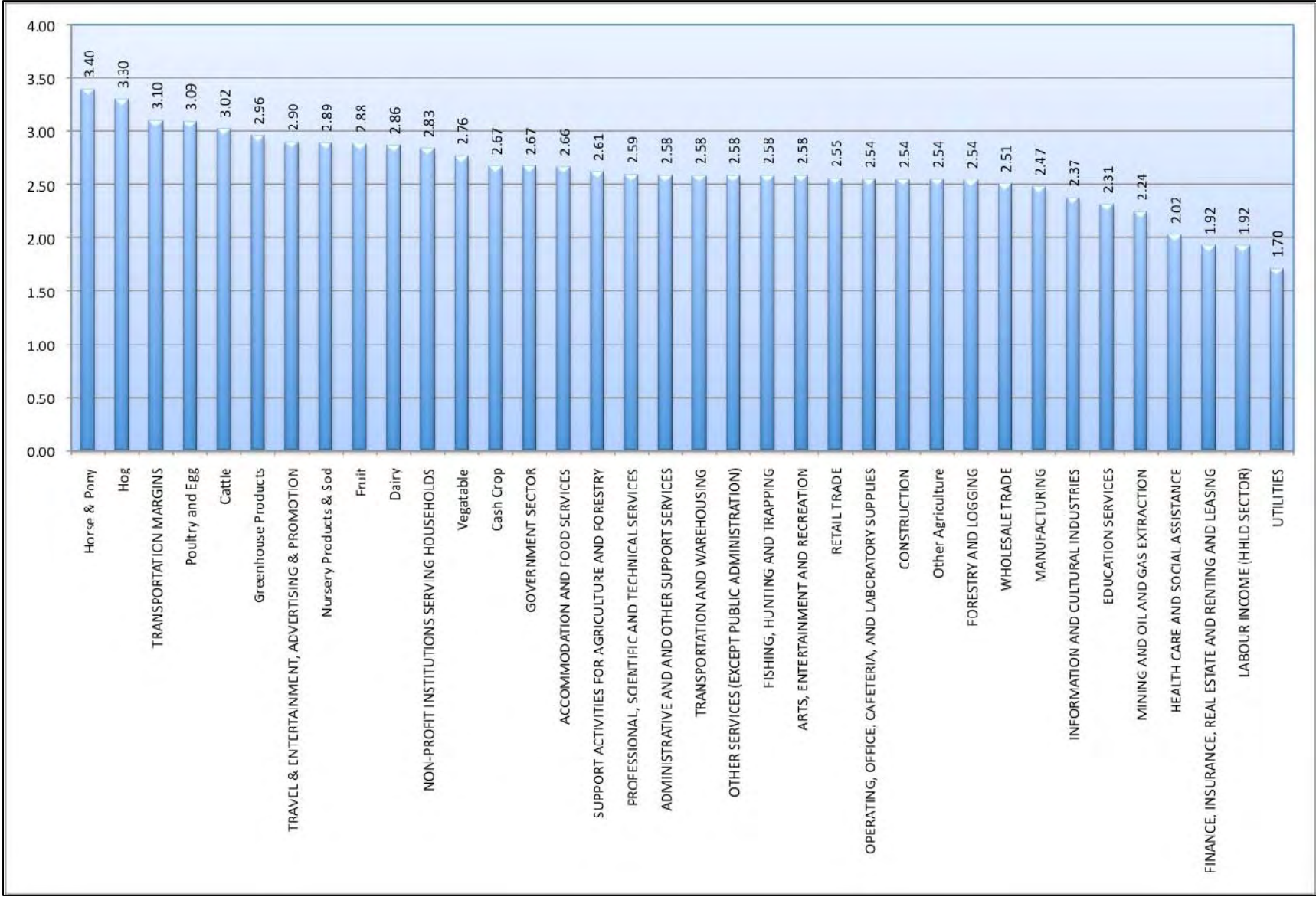


Table 2: Annual Provincial Economic Impact of Agricultural Production in the City of Hamilton

	Commodity	Output Level	Total Output Impact	Total Output Impact	Total Direct Impact	Total Indirect Impact	Total Induced Impact	Total Labour Income Impact	Total GDP Impact
		2006	Closed Model	Open Model	Impact	Impact	Impact	Impact	Impact
1	Poultry and Egg	\$40,226,653.00	\$152,975,689.28	\$87,902,239.11	\$34,949,730.93	\$52,952,508.18	\$65,073,450.16	\$28,637,098.08	\$48,981,626.04
2	Nursery Products & Sod	\$33,661,260.00	\$134,497,651.86	\$50,077,089.12	\$30,178,977.68	\$19,898,111.43	\$84,420,562.74	\$37,151,248.77	\$41,966,672.16
3	Greenhouse Products	\$44,636,220.00	\$174,298,478.83	\$78,114,908.10	\$39,844,146.33	\$38,270,761.77	\$96,183,570.73	\$42,327,836.35	\$54,232,490.57
4	Vegatable	\$13,790,844.00	\$47,698,787.79	\$25,949,802.06	\$10,657,343.01	\$15,292,459.05	\$21,748,985.73	\$9,571,151.31	\$15,593,147.83
5	Cattle	\$3,477,717.00	\$12,019,119.70	\$8,600,463.12	\$2,713,762.09	\$5,886,701.03	\$3,418,656.58	\$1,504,460.02	\$3,807,216.93
6	Dairy	\$14,173,646.00	\$50,025,128.20	\$28,510,815.55	\$11,568,358.46	\$16,942,457.09	\$21,514,312.64	\$9,467,877.91	\$16,827,140.17
7	Fruit	\$9,029,025.00	\$36,348,106.74	\$12,913,080.47	\$8,178,315.88	\$4,734,764.59	\$23,435,026.27	\$10,313,132.99	\$11,058,107.50
8	Cash Crop	\$23,360,277.00	\$73,619,021.79	\$48,145,775.74	\$17,808,672.60	\$30,337,103.13	\$25,473,246.05	\$11,210,099.42	\$26,915,680.18
9	Horse & Pony	\$9,175,521.00	\$36,159,591.59	\$24,779,812.55	\$7,933,441.75	\$16,846,370.80	\$11,379,779.04	\$5,007,938.69	\$11,955,727.41
10	Hog	\$6,222,041.00	\$23,723,446.01	\$16,511,267.13	\$5,244,955.91	\$11,266,311.23	\$7,212,178.87	\$3,173,888.48	\$7,863,349.61
11	Other Agriculture	\$27,023,710.00	\$81,636,030.48	\$52,277,652.80	\$16,943,792.74	\$35,333,860.06	\$29,358,377.68	\$12,919,842.72	\$26,615,175.09
12	All Sub-Sectors In	\$224,776,914.00	\$823,001,052.26	\$433,782,905.75	\$186,021,497.38	\$247,761,408.37	\$389,218,146.51	\$171,284,574.73	\$265,507,249.32

Figure 4: Provincial Output and GDP Impacts by Industry Associated with Agricultural Production in Hamilton

