



## Info Sheet: An Asset Mapping Methodology

Asset mapping is a process that inventories capacities in a given sector within a defined geography. It identifies existing organizations, infrastructure and/or resources in the sector and once asset data is collected, it can be used for many purposes. An asset mapping data set can be used to analyze sector strengths and weaknesses, show networks, identify gaps and profile emerging opportunities. Ultimately, analysis of the collected data can lead to better decision-making for the sector.

Examining assets across a regional geography, and working with multiple participants, allows for a collaborative approach, in which better and more accurate data sets emerge to create a more complete view of the sector assets. This approach can then lead to the creation of a more robust data set to support programming, policy development and decision-making related to the sector.

Asset mapping can be conducted for any sector in a defined geographical area. This Info Sheet uses the agri-food value chain in the Greater Golden Horseshoe (GGH) region of Ontario to illustrate the methodology described. In this project, agri-food asset mapping identified existing food and farming infrastructure, including products grown, harvested and processed, as well as services rendered to the agri-food cluster. More specific information about agri-food asset mapping in the GGH can be found in a separate document, the project profile.

### **Why is Asset Mapping important?**

Once asset data is compiled and collected, and gaps and investment opportunities are analyzed, emerging opportunities can be identified. A collaborative approach to asset mapping can help create a more robust database as various data sources are pooled. It can also provide opportunities to address shared goals. For instance, sub-clusters within the sector can be identified and, when compared over time or across a regional geography, parts of the sector that are gaining, thriving, moderating or diminishing are identified. Gaps in infrastructure that impede a functional value chain can be revealed, showing opportunities for job creation.

## Uses of Asset Mapping:

- Provides a data set that can inform policy and investment decisions, leading to more informed decision making related to a given sector
- Delivers accurate data that can help economic developers, entrepreneurs and decision-makers think more holistically about new approaches that could increase investment, productivity and jobs in the sector
- Leads to increased awareness of the size and scope of the sector and its' economic impact to the defined area and beyond

For example, when asset mapping was undertaken for the GGH agri-food sector, the depth and importance of the sector was clearly documented. Asset mapping is helping urban municipalities in the Greater Golden Horseshoe to realize the strong connection between the food processing jobs located in urban areas and the food and fibre production of the countryside. The information also informs government policy and programming where the value and importance of the food and farming value chain is often overlooked.

As the food and farming cluster grows, there will be more opportunity to increase the capacity of the sector, and to create jobs by better connecting primary producers and processors. This will ultimately lead to more demand for, and access to, Ontario grown food and bio-products, keeping jobs and investment dollars in our communities.

## **What are Assets?**

Assets are defined relative to the sector being studied, and can include businesses, organizations, infrastructure and resources. It is key to define assets to be included at the outset of the project, to determine what is to be included and what is beyond the scope of the exercise. A classification system for assets can also help focus the exercise.

For instance, agri-food asset mapping identifies agri-food value chain assets across the region from production to consumption, which includes farms, food processors, suppliers, distributors, as well as infrastructure, research centres, and the service industry. The North American Industry Classification System (NAICS) was used to define the aspects of the agri-food value chain included in the project and to categorize the assets. The list of NAICS codes used in the project is included in Appendix A.

## **Asset Mapping Approach**

An organized, coordinated approach to asset mapping will ensure objectives are met and resources are used effectively, as mapping assets can quickly become unwieldy without guidance and structure. A consultant skilled in data collection and management can greatly assist in developing and guiding asset mapping by applying facilitation and project management skills. In a collaboration, it is also key to have a governance structure to ensure representation of the parties involved but to also allow for effective decision-making capabilities to oversee the asset mapping exercise.

The asset mapping methodology can be broken out into the following sequence of steps:

**Identification of Asset Datasets**



- Determine data sets available, including those from project participants, third parties and open sources (sample list of data sources is included in Appendix B)
- Determine what data will be retained
- Prioritize data sources, if necessary
- Assess completeness and quality
- Identify gaps in data sets and fill-in where possible
- Define data sharing parameters, to the extent possible at the outset

**Create and Maintain Data Inventory**



- Catalogue data
- Create metadata (data describing the data) for source and quality tracking
- Connect data files with data providers (allows for follow-up or future updates)

**Consensus on Common Attributes**



- Identify the information in the data (i.e. the attributes collected such as business name, address, etc.)
- Use file field-mapping to establish common and non-common attributes (i.e. to compare one dataset to another and identify areas of overlap)
- Determine attributes to retain (this is a key step as this outlines the type of queries that can be made of the data)
- Define mandatory and optional data attributes to be included
- Standardize data attributes to allow for streamlining (see sample list of attributes in Appendix C)
- Set standardization for data attributes (i.e. property or mailing address; Civic or 911 address standard; Street vs. St. vs. Str. Etc)

**Standardize the Data Structure**



- Standardize datasets to enable a data structure that can be used easily and confidently while maintaining data integrity
- Identify key attribute fields for standardization
- Identify where look-up tables and indices can be implemented to increase data searchability
- Determine whether point-source or non-point source data is to be collected, depending upon the type of mapping desired

**Develop the Data Model**

- Create a conceptual data model to determine how data is associated, based on data attributes and planned uses for/queries of the dataset
- Determine where and how the data will be housed
- Determine access, maintenance and upkeep for the data
- Establish data sharing rules or terms and conditions for use
- Determine governance going forward

In the agri-food example, one of the keys to success was the organizational structure of the project. A project Steering Committee directed the project, ensuring consistency with the project goals and objectives, and providing guidance at key projects stages. The Steering Committee consisted of representatives from the collaborating cities and regional municipalities and project staff. At the outset, the Steering Committee established the following guidelines and parameters for the project:

- Data integrity was a key value of the exercise, and was used as a guiding principle;
- The scope would focus on collecting what information was currently available to, or easily accessed by, municipal economic development staff from the partnering municipalities;
- The geographical boundary for data collected would be the Greater Golden Horseshoe;
- A list of NAICS codes relating to agri-food industries would be used to determine the assets to include, resulting in a list of 129 types of businesses by code; and
- As the data would be mapped, point-source data be collected (where available) and would ultimately be georeferenced.

Due to the technical nature of the project, consultants were hired to deliver the data processing and management, and analysis components of the project. The data consultant worked closely with the Steering Committee to develop the process and to guide the work. The guidelines mentioned above were key to building a dataset that met project goals and objectives. The data consultant developed the relational aspect of the data model above. This became the basis of the database.

Below is a sample data model that was created for the agri-food project:

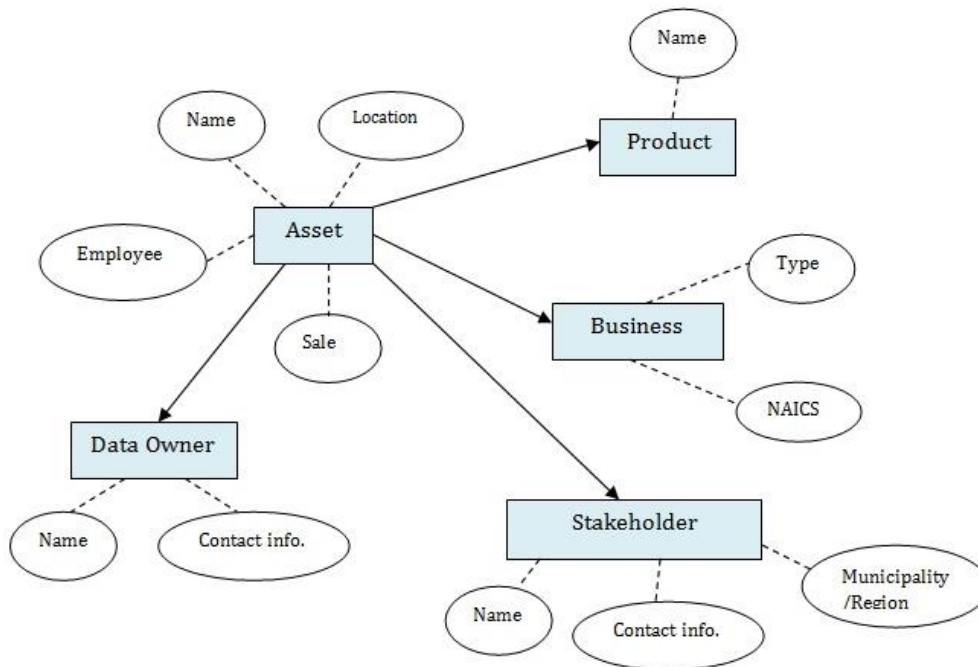


Figure 1: Conceptual Data Model Example

## **Database**

Early in the project planning stages, decisions must be made about the database that will ultimately hold the data and provide access to the dataset. A multitude of options exist, and some key considerations for choosing the appropriate option are:

- Ease of use
- Access for users
- Security
- Size
- Cost

It is important that the database be set up for ease of use, while providing access to the required number of users. However, security of the data is an important consideration, particularly where the resulting tool is based on collaborative datasets and is not intended as a public-facing tool. The option chosen must also allow for the number of data points, and the type of searchability/querying intended in the end use. And, of course, cost is always a consideration.

In the agri-food example, Microsoft Access was initially used to assemble asset information, due to ease of use and searchability, while the geolocation information was housed separately for mapping. Cost was ultimately a deciding factor in the initial project stage. Later, resources became available to migrate to a web-based tool to house the dataset. The web-based tool facilitates searchability and mapping while providing security by controlling access to data as prescribed by the data providers.

## **Data Sharing and Security**

How to securely store and share data is an important part of any project that collects, houses and provides data to users. This is of the utmost importance when working within a collaboration, where data policies for collection and sharing can differ greatly. Developing data sharing rules are key, and should be agreed upon as early in the process as possible.

However, developing data sharing rules can be a bit of a chicken-and-egg scenario, as it's difficult to know how to govern the sharing until you know what will be shared, and how. When data sets are identified and common attributes to be represented in the data model are agreed upon, the data sharing terms and conditions start to come to light. Once it has been determined what can be shared, how and with whom, those various levels of security and access need to be represented in the data housing system.

The following is a list of topics to consider in developing data agreements or terms and conditions for sharing of data:

- How data in the database can be used (i.e. shared directly with others, derivative products created and shared, or no sharing/internal use only)
- Who owns the data, the overall data set and any products created from use of the data
- How data will be accessed and how users will gain access (i.e. upon agreeing to terms and conditions)
- Length of term for the agreement/terms and conditions
- How a partner/participant can enter into or exit the agreement, and what happens to their data
- Who is responsible for governance

- Schedule of data updates
- Statements of warranties and limitations (i.e. usually they are no warranties or guarantees of data accuracy and statements limiting liability are important for the database and data owners)
- Confidentiality expectations for the dataset and any resulting products

The above list is intended as a guide, based upon project experience, and it is not intended to be exhaustive or all-encompassing. Depending upon the group of participants and users, data access and sharing may be best represented in a legally binding agreement, with the aid of legal advice.

Ensuring data is secure, until such time as data rules are established, is key. In a collaboration, participants can enter into a data sharing agreement and can be allowed access to the data upon signing the agreement, acknowledging the governing terms and conditions.

One of the benefits of regional-scale asset mapping is the ability to look beyond local boundaries for opportunities and gaps to grow or develop clusters, and data sharing is key to this approach. However, when collaborating with multiple data providers, it's important to find common ground among the data policies of the individual organizations. As such, the approach for the agri-food project was to honour the data policies of each of the collaborating partners providing data, recognizing that some data will be shared with the partners in the project while some will only be accessible to those providing it. To ensure a fulsome dataset, this is offset by the addition of open source data as part of the project. Ideally, as project partners become more comfortable with the tool, and increasingly move towards open data, data sharing will be enhanced.

Restriction on the use of agri-food data is addressed using a tiered and coded system within the database. Login information is assigned to coordinate with the data restriction, resulting in a secure system where each user can only access the data sources allowed. Use of the web-based system makes this control simpler. Similarly, because the system can only be accessed by users granted login codes, the tool and data contained within are secure. This is not a public-facing tool at this time, but rather one used by project collaborators.

Data sharing agreements were put in place to describe terms and conditions for the use of the data in the agri-food project. For instance, users cannot share access codes or directly share data accessed through the tool. Rather, the intent is to use the tool for informed, internal decision-making by the participants. Partners may create new, derivative products, containing aggregated, non-identifiable information, which can be shared when proper credit is acknowledged. Ultimately, partners who do not comply with the data sharing agreement could have their access to the tool revoked. The Steering Committee will continue to be engaged as needed, to provide guidance and decision-making on data sharing.

### **Data Analysis Results and Products**

Once asset information is collected, processed and housed in a searchable and secure manner, analysis of the data can provide valuable information. Including other available information in the analysis, such as Census data or programs relating to the sector, can validate the collected dataset and provide further value to the overall analysis. Analysis of asset mapping data provides evidence of the value of the sector to the local, regional and the provincial economy. In addition, infrastructure gaps can be identified through synthesis of the information. These gaps create barriers to growth and once identified can be used to develop and implement strategies to strengthen and grow the sector.

For instance, analysis of the agri-food assets the Greater Golden Horseshoe:

- Identified and profiled the region's food and farming infrastructure and products grown, harvested and processed in the region; and services rendered;
- Identified and profiled the business, education, research, development and innovation assets that are part of the food and farming industry; and
- Analyzed the strengths and weaknesses of the existing assets, identified existing gaps and emerging economic opportunities within the food and farming cluster of the region.

In the agri-food project, the analysis consultant was selected to apply their knowledge of agriculture and economics to analyze the Asset Mapping info and draw meaningful conclusions. The consultant used the agri-food asset mapping dataset as well as Statistics Canada data, such as the National Occupational Classification for Statistics (NOC-S) data and NAICS data in the analysis. In addition, the consultant utilized non-spatial datasets on employment trends and industry size from the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) EMSI Analyst tool to understand the trends, such as industries in growth or decline, and structure of the agri-food value chain in the region. The following is an excerpt of their work on the Asset Mapping project that demonstrates the type of use of the asset mapping information:

*"The analysis of the food and farming sector in the Greater Golden Horseshoe (GGH) area has re-confirmed that it is a diverse and dynamic sector that contributes a significant benefit to the region and the overall economy. The agriculture value chain included in the asset mapping database includes the full spectrum, from primary production agriculture and services to agriculture through to food services such as restaurants and institutions.*

*Our analysis has revealed many opportunities for economic development of the agri-food sector in the GGH Region. Each of these opportunities to grow the cluster is based on an overarching theme of trying to increase employment, investment and production value on this high value land base, but doing so in a sustainable manner.*

*On average, the GH Region already produces higher value crops than most Ontario farms due to quality soils, great climate and proximity to market<sup>1</sup>. Similar to the previous GH analysis, our conclusion is that further increasing the average production value per acre should be a key economic development focus for the GGH Region.*

*The increased presence of livestock and poultry production as you move farther from the built up areas offers an additional opportunity that is not as prevalent closer to urban areas of the GTA. Livestock production creates a higher economic value compared to producing field crops on the same land base<sup>2</sup>. Retaining the current livestock production base will be a key factor in achieving agri-food growth in the GGH.*

*Food, beverage and bio-product processing operations also add additional value to the agricultural products produced on farms and create significant economic impact through domestic sales of food ingredients and finished products, bio-products as well as export sales. While the sector has enjoyed a*

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<sup>1</sup> Agriculture By The Numbers, GHFFA information sheet 2014

<sup>2</sup> for example a 100 acre hog farm has a greater economic impact compared to a 100 acre grain farm because of higher sales, more people involved on a daily basis, trucking, veterinary and other services



strong presence in this area, some key sectors like fruit and vegetable processing have a significantly reduced footprint due to competitive pressures. As the North American industry goes through a major restructuring, there is a need to retain existing large processing operations (business retention and expansion) as well as some opportunities for new investment attraction in various sectors. In addition, economic development efforts to support smaller, niche operations (small to medium enterprises and on-farm processing) will greatly benefit the GGH region.”

Also of significance are the maps and visuals that can be created to convey messages and demonstrate conclusions. The power of the visuals should not be underestimated, and are only limited by the skills of the users. Again, the use of the info, including creation of visuals, should be considered when structuring the data model and in determining how the data will be housed and accessed.

The following map (Figure 2) illustrates the agri-food asset map from the Greater Golden Horseshoe database, showing all of the business locations data points separated into the four main steps in the value chain by three digit NAICS code. This provides an example of the types of maps that can be created using Asset Mapping work.

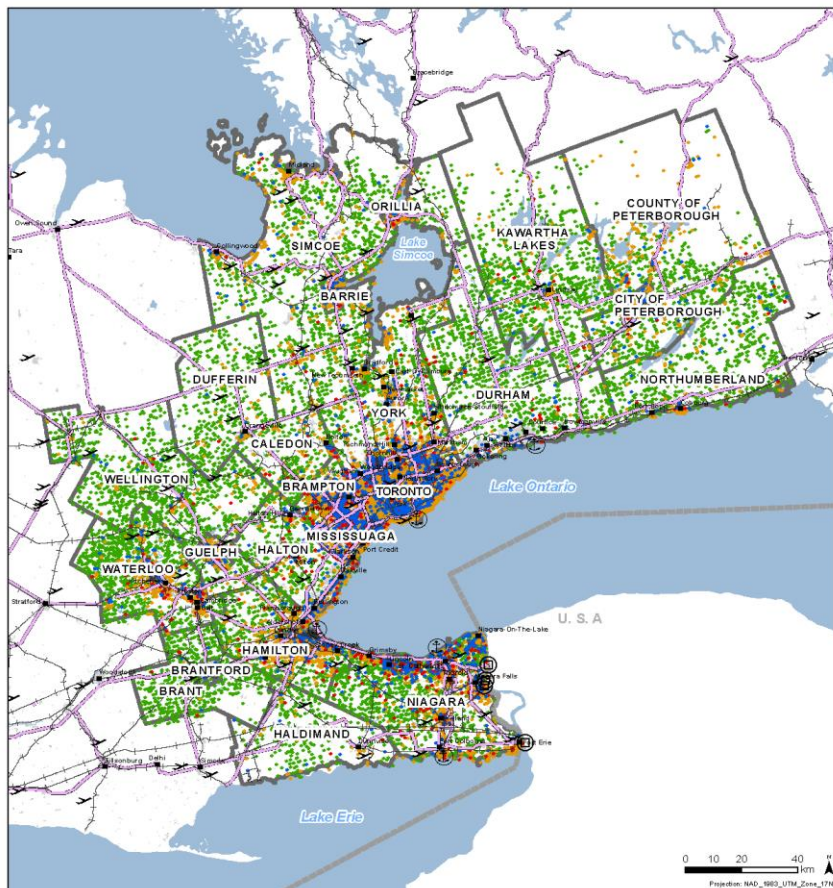


Figure 2: Agri-food asset by industry type within the Golden Horseshoe

<b>Farming (Green)</b>	Primary production
<b>Processing (Red)</b>	Food processing
<b>Distribution (Blue)</b>	Food wholesaling and distribution
<b>Access (Orange)</b>	Grocery stores and restaurants



The full report can be accessed here [http://www.foodandfarming.ca/custom/uploads/2016/08/GGH-Analysis-of-Food-and-Farming-Assets-March-31\\_2016.pdf](http://www.foodandfarming.ca/custom/uploads/2016/08/GGH-Analysis-of-Food-and-Farming-Assets-March-31_2016.pdf).

### **Summary**

Asset mapping is a process that inventories capacities in a given sector within a defined geography, and can be used for many purposes. An asset mapping data set can be used to analyze sector strengths and weaknesses, show networks, identify gaps and profile emerging opportunities, making it foundational economic development tool. Ultimately, analysis of the collected data can lead to better decision-making, implementation of best practices, and provide access to new and emerging markets while retaining and expanding existing markets through risk management and targeted investment strategies.

For more information about the agri-food asset mapping project for the Greater Golden Horseshoe, visit the project profile here: <http://www.foodandfarming.ca/custom/uploads/2016/08/Asset-Mapping-Project-Profile-1.pdf>

## Appendix A: Agri-food NAICS Codes

NAICS Code	Description
111110	Soybean Farming
111120	Oilseed (except Soybean) Farming
111130	Dry Pea and Bean Farming
111140	Wheat Farming
111150	Corn Farming
111190	Other Grain Farming
111211	Potato Farming
111219	Other Vegetable (except Potato) and Melon Farming
111320	Citrus (except Orange) Groves
111330	Non-Citrus Fruit and Tree Nut Farming
111411	Mushroom Production
111419	Other Food Crops Grown Under Cover
111421	Nursery and Tree Production
111422	Floriculture Production
111910	Tobacco Farming
111930	Sugar Cane Farming
111940	Hay Farming
111993	Fruit and Vegetable Combination Farming
111994	Maple Syrup and Products Production
111999	All Other Miscellaneous Crop Farming
112110	Beef Cattle Ranching and Farming, including Feedlots
112120	Dairy Cattle and Milk Production
112210	Hog and Pig Farming
112310	Chicken Egg Production
112320	Broiler and Other Meat-Type Chicken Production
112330	Turkey Production
112340	Poultry Hatcheries
112391	Combination Poultry and Egg Production
112399	All Other Poultry Production
112410	Sheep Farming
112420	Goat Farming
112510	Aquaculture
112910	Apiculture
112920	Horse and Other Equine Production
112930	Fur-Bearing Animal and Rabbit Production
112991	Animal Combination Farming
112999	All Other Miscellaneous Animal Production
113210	Forest Nurseries and Gathering of Forest Products
115110	Support Activities for Crop Production
115210	Support Activities for Animal Production
115310	Support Activities for Forestry
311111	Dog and Cat Food Manufacturing
311119	Other Animal Food Manufacturing
311211	Flour Milling
311214	Rice Milling and Malt Manufacturing
311221	Wet Corn Milling
311224	Oilseed Processing

NAICS Code	Description
311225	Fat and Oil Refining and Blending
311230	Breakfast Cereal Manufacturing
311310	Sugar Manufacturing
311320	Chocolate and Confectionery Manufacturing from Cacao Beans
311330	Confectionery Manufacturing from Purchased Chocolate
311340	Non-Chocolate Confectionery Manufacturing
311410	Frozen Food Manufacturing
311420	Fruit and Vegetable Canning, Pickling and Drying
311511	Fluid Milk Manufacturing
311515	Butter, Cheese, and Dry and Condensed Dairy Product Manufacturing
311520	Ice Cream and Frozen Dessert Manufacturing
311611	Animal (except Poultry) Slaughtering
311614	Rendering and Meat Processing from Carcasses
311615	Poultry Processing
311710	Seafood Product Preparation and Packaging
311811	Retail Bakeries
311814	Commercial Bakeries and Frozen Bakery Product Manufacturing
311821	Cookie and Cracker Manufacturing
311822	Flour Mixes and Dough Manufacturing from Purchased Flour
311823	Dry Pasta Manufacturing
311911	Roasted Nut and Peanut Butter Manufacturing
311919	Other Snack Food Manufacturing
311920	Coffee and Tea Manufacturing
311930	Flavouring Syrup and Concentrate Manufacturing
311940	Seasoning and Dressing Manufacturing
311990	All Other Food Manufacturing
312110	Soft Drink and Ice Manufacturing
312120	Breweries
312130	Wineries
312140	Distilleries
312210	Tobacco Stemming and Redrying
312220	Tobacco Product Manufacturing
325313	Chemical Fertilizer (except Potash) Manufacturing
325314	Mixed Fertilizer Manufacturing
325320	Pesticide and Other Agricultural Chemical Manufacturing
325410	Pharmaceutical and Medicine Manufacturing
333110	Agricultural Implement Manufacturing
411110	Live Animal Wholesaler-Distributors
411120	Oilseed and Grain Wholesaler-Distributors
411130	Nursery Stock and Plant Wholesaler-Distributors
411190	Other Farm Product Wholesaler-Distributors
413110	General-Line Food Wholesaler-Distributors
413120	Dairy and Milk Products Wholesaler-Distributors
413130	Poultry and Egg Wholesaler-Distributors
413140	Fish and Seafood Product Wholesaler-Distributors
413150	Fresh Fruit and Vegetable Wholesaler-Distributors
413160	Red Meat and Meat Product Wholesaler-Distributors
413190	Other Specialty-Line Food Wholesaler-Distributors
413210	Non-Alcoholic Beverage Wholesaler-Distributors

NAICS Code	Description
413220	Alcoholic Beverage Wholesaler-Distributors
413310	Cigarette and Tobacco Product Wholesaler-Distributors
417110	Farm, Lawn and Garden Machinery and Equipment Wholesaler-Distributors
418310	Agricultural Feed Wholesaler-Distributors
418320	Seed Wholesaler-Distributors
418390	Agricultural Chemical and Other Farm Supplies Wholesaler-Distributors
418910	Log and Wood Chip Wholesaler-Distributors
444220	Nursery Stores and Garden Centres
445110	Supermarkets and Other Grocery (except Convenience) Stores
445210	Meat Markets
445220	Fish and Seafood Markets
445230	Fruit and Vegetable Markets
445291	Baked Goods Stores
445292	Confectionery and Nut Stores
445299	All Other Specialty Food Stores
445310	Beer, Wine and Liquor Stores
493120	Refrigerated Warehousing and Storage
493130	Farm Product Warehousing and Storage
541380	Testing Laboratories
541710	Research and Development in the Physical, Engineering and Life Sciences
541940	Veterinary Services
611210	Community Colleges and C.E.G.E.P.s
611310	Universities
611620	Athletic Instruction
711213	Horse Race Tracks
713990	All Other Amusement and Recreation Industries
721191	Bed and Breakfast
721213	Recreational (except Hunting and Fishing) and Vacation Camps
722110	Full-Service Restaurants
722210	Limited-Service Eating Places
722310	Food Service Contractors
722320	Caterers
722330	Mobile Food Services

## Appendix B: Sample Agri-Food Data Sources in the GGH

Ontario Government Open Data website:

- Farmers' Markets
- farm equipment dealerships

OMAFRA data:

- licensed meat processors
- food and beverage manufacturers (Analyst)
- Farm Business Registration Number dataset

Municipal data (from business counts, industrial directories, salesforce data, employment surveys, farm fresh/local food directories)

- food and beverage manufacturing & processing
- distributors & food service companies
- services rendered to agriculture (e.g. equipment dealers, grain handling facilities, feed/seed sales, fertilizer/spray services)
- agri-food education and research facilities
- farming assets - some farms, where included in local mapping exercises (e.g. "Grown in Peel") or where list existed (e.g. Durham), farmers' markets, agri-tourism destinations, some vineyards/wineries

Commodity groups/associations (open data):

- Members, product or services

Private Business Directories:

- Scott's food manufacturing list
- Hoover's Business Directory

## **Appendix C: Sample Data Attributes**

- Business name
- Business status i.e. Active or Inactive
- Business Contact Name and Information
- Business Phone/Fax/Website
- Business Description
- Business Property and Mailing Address(es)
- Geolocation
- Sales/Workforce Information (where available/applicable)
- NAICS Code or other asset classification system