CANADIAN AGRICULTURAL PARTNERSHIP

A STANDARDIZED FRAMEWORK FOR Agriculture and Food Processing LMI in Ontario

CANADIAN AGRICULTURAL HUMAN RESOURCE COUNCIL
CONSEIL CANADIEN POUR LES RESSOURCES HUMAINES EN AGRICULTURE
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Contents

1.0 Introduction

For many years, the agri-food sector has been a significant contributor to Ontario's economy. In 2019, primary agriculture and food processing accounted for 2.9 per cent of total GDP in the province, or $21.8 billion (in 2012 dollars).[1] It is also a fast-growing sector as the size has increased by 22.5 per cent since 2008 – slightly higher than the economic aggregate in the province.[2] And despite rapid productivity growth over the past decade, the sector remains a significant employer, with more than 202,000 domestic residents employed by Ontario's agri-food sector in 2018.[3]

Yet despite agri-food sector's contribution to the provincial economy in terms of both output and employment, there are many aspects of the sector which are not well understood. Specifically, since different data sources often yield incomparable results it is difficult to get robust data for key variables. For example, estimates from the Labour Force Survey and the Census of Population (both produced by Statistics Canada) yield different conclusions as to the level of employment in the agri-food sector in the province. The situation becomes more complex when attempting to understand the agri-food sector at a greater level of detail, such as at the 4-digit North American Industry Classification System (NAICS) level. Robust estimates of GDP are not publicly available at this level for provinces, which means an understanding of labour productivity is not possible unless these estimates are created by other means, often by combining multiple data sets.

Labour Market Information (LMI) analysis becomes even more difficult when attempting to assess occupational trends over time since this information is heavily suppressed by Statistics Canada due either to unreliable or confidential estimates tied to an insufficient number of responses to the Labour Force Survey. As a result, stakeholders interested in occupational changes are forced to resort to the Census which is significantly less timely and will therefore lead to less valid policy and business decisions.

Furthermore, assessing the role that Temporary Foreign Workers (TFWs) play in the agri-food sector is particularly difficult. Traditional data sets, such as the Labour Force Survey and Census of Population, do not include this vital source of labour. In the past, data was obtained from Employment and Social Development Canada (ESDC) and Immigration, Refugees, and Citizenship Canada (IRCC). However, since their data is based on the number of TFW requests and work permit holders it is not perfectly comparable to other sources of employment data. Recently, Statistics Canada has published data on total employment and TFW employment in agriculture by

1 Data from Statistics Canada Table: 36-10-0402-01. Agri-food sector composed of NAICS 111, 112, 1151, 1152, 331, and 3121.
2 Growth rate for all industries in Ontario between 2008 and 2019 is 21.7 per cent.
3 Data from Statistics Canada Table: 36-10-0489-01. Agri-food sector composed of NAICS 111, 112, 1151, 1152, 331, and 3121.

Note: Suppression from Statistics Canada

As mandated by law, Statistics Canada must suppress data that would disclose any information deemed confidential. For more information about Statistics Canada's commitment to quality and confidentiality refer to Statistics Canada's Quality Assurance Framework.

industry and province using data from the Agriculture Taxation Data Program and the Labour Force Survey. However, these data also come with limitations including the short time series available, narrow industry scope, and the program's uncertain future funding. Accurate estimates of TFWs by industry and occupation are essential when estimating labour productivity and when considering the balance between labour supply and demand to determine the degree to which labour shortages hinder the sector's ability to expand. The need for reliable and timely data on TFWs have become even more apparent amidst the recent COVID-19 pandemic which has created additional challenges in attaining and accommodating TFWs.

Given the importance of the agri-food sector, stakeholders are interested in obtaining relevant, standardized and timely LMI. The CAHRC is funded through the Canadian Agriculture Partnership (the Partnership), a federal-provincial-territorial initiative. Through the Partnership, the CAHRC is developing a consistent and standard LMI framework for Ontario's agri-food sector. The CAHRC has commissioned The Conference Board of Canada to carry out the following research:

- review existing data describing the agriculture and agri-food sector workforce in Ontario;
- identify existing data sets available to stakeholders that describe the scope of the workforce and its current and future needs;
- propose a framework of common terminology and best practices in generating labour market information in the agriculture and agri-food sector;
- identify gaps in knowledge of agricultural labour markets including information on technology adoption.

This report communicates the results of this research and is intended to act as a "reference manual" for future LMI related research.

Methodology

Defining the agri-food sector

The scope of this report is based on the definition of the agri-food sector. As there are many definitions of what constitutes "agri-food" in Canada, it is vital to have a clear understanding of which industries and occupations are included.

Agriculture and Agri-food Canada (AAFC) defines the agriculture and agri-food sector as crop production (NAICS 111), animal production and aquaculture (NAICS 112), farming not classified elsewhere (NAICS 1100 in LFS), food manufacturing (NAICS 311) and beverage and tobacco product manufacturing (NAICS 312). AAFC defines the "agriculture and agri-food system" more broadly. It includes input and service suppliers (NAICS 1151, 1152, 3253, 4171, 4183, and 33311), food retail and wholesale (NAICS 411, 413, and 445), and food service (NAICS 722 and 4542). OMAFRA's definition also includes farm product merchant wholesalers (NAICS 411), food, beverage, and tobacco merchant wholesalers (NAICS 413), agricultural supplies merchant wholesalers (NAICS 4183), food and beverage stores (NAICS 445), and food services and drinking places (NAICS 722). In this report, the agri-food sector is defined as all the agriculture and food processing industries and occupations shown in Chart 1 and Chart 2.

Since the agri-food sector spans the entire agri-food chain, the occupation coverage is broad – spanning from management and finance occupations to trades and manufacturing occupations. Essentially, any occupation (4-digit NOC) employed along the agri-food supply chain is included.

In general, the industries within the agri-food sector can be split into agriculture and food processing. Agriculture is composed of all farming activities, including crop production (NAICS 111), animal production and aquaculture (NAICS 112), and support activities for crop and animal production (NAICS 1151 & 1152). NAICS 2017 Version 3.0 also includes cannabis grown under cover (NAICS 111412) and cannabis grown in open fields (NAICS 111995) under crop production (NAICS 111).[4]

4 Statistics Canada, "Classifying Cannabis in the Canadian Statistical System."

Food processing is composed of food (NAICS 311) and beverage manufacturing (NAICS 3121) with tobacco manufacturing (NAICS 3122) excluded. Cannabis product manufacturing (NAICS 3123) was added to the NAICS 2017 Version 3.0, however, not all cannabis products captured within this industry fall under food processing. Statistics Canada defines cannabis product manufacturing as an industry comprised of "establishments primarily engaged in manufacturing products made from cannabis plants with a level of tetrahydrocannabinol (THC) greater than 0.3%".[5] This would include manufacturing cannabis cigarettes, oils, edibles, products for medical use, etc. Because NAICS 3123 does not distinguish between food and non-food cannabis products there must be a disclaimer when discussing cannabis product manufacturing in the context of the overall agri-food sector.

The purpose of this report is to assess the availability of LMI for the entire agri-food sector which includes both agriculture and food processing. When considering agriculture and food processing separately, cross-over between industries and occupations can present unique challenges for data collection. For example, some workers in aquaculture would perform both agriculture and food processing activities. Since Statistics Canada classifies businesses by their main activity, it may not be clear where activities are captured. Thus, assessing the entire agri-food sector is beneficial since it provides a more comprehensive understanding of the labour market and the activities involved.

CHART 1: **Industry (NAICS) coverage**

Based off 2017 NAICS Version 3.0

Agriculture	**111 - Crop production**	1111 - Oilseed and grain farming 1112 - Vegetable and melon farming 1113 - Fruit and tree nut farming 1114 - Greenhouse, nursery, and floriculture production 1119 - Other crop farming
	112 - Animal production and aquaculture	1121 - Cattle ranching and farming 1122 - Hog and pig farming 1123 - Poultry and egg production 1124 - Sheep and goat farming 1125 - Aquaculture 1129 - Other animal production
	115 - Support activities	1151 - Support activities for crop production 1152 - Support activities for animal production
Food Processing	**311 - Food manufacturing**	3111 - Animal food manufacturing 3112 - Grain and oilseed milling 3113 - Sugar and confectionery product manufacturing 3114 - Fruit and vegetable preserving and specialty food manufacturing 3115 - Dairy product manufacturing 3116 - Meat product manufacturing 3117 - Seafood product preparation and packaging 3118 - Bakeries and tortilla manufacturing 3119 - Other food manufacturing
	312* - Beverage and tobacco product manufacturing	3121 - Beverage Manufacturing 3123 - Cannabis Product Manufacturing (only oils, edibles, and beverages) *Excluding NAICS 3122 tobacco manufacturing

5 Statistics Canada, "Variant of NAICS 2017 Version 3.0 - Goods and Services Producing Industries - 312310 - Cannabis Product Manufacturing."

DEFINITION OF INDUSTRY

Industry can be broadly defined as the general nature of the business carried out in the establishment where a person works and is most often based on the North American Industry Classification System (NAICS).

Industry refers to a generally homogeneous group of economic producing units, primarily engaged in a specific set of activities. An activity is a method of combining good and service inputs, labour, and capital to produce one or more products. In most cases, the activities that define an industry are homogeneous with respect to the production processes used.

The North American Industry Classification System (NAICS) is an industry classification system covering all economic activity and was developed by the statistical agencies of Canada, Mexico and the United States. It has a hierarchical structure which at the highest level, divides the economy into 20 sectors. At lower levels, it further distinguishes the different economic activities in which businesses are engaged. The NAICS is updated regularly to reflect changes in the economy. The most recent version is NAICS 2017 Version 3.0.[6] More information about NAICS can be found here.

CHART 2: **Occupation (NOC) coverage**

Based off 2016 NOC Version 1.3

Occupational category	Occupation
0 - Management occupations	0016 - Senior managers - construction, transportation, production, and utilities 0821 - Managers in agriculture 0822 - Managers in horticulture 0823 - Managers in aquaculture
1 - Business, finance, and administration occupations	1311 - Accounting technicians and bookkeepers 1312 - Insurance adjusters and claims examiners 1313 - Insurance underwriters 1314 - Assessors, valuators, and appraisers 1315 - Customs, ship, and other brokers
2 - Natural and applied sciences and related occupations	2123 - Agricultural representatives, consultants, and specialists 2221 - Biological technologists and technicians 2222 - Agricultural and fish products inspectors 2225 - Landscape and horticulture technicians and specialists
6 - Sales and service occupations	All 4-digit occupations
7 - Trades, transport and equipment operators and related occupations	7312 - Heavy-duty equipment mechanics 7511 - Transport truck drivers

Continued on the next page

6 Statistics Canada, "Introduction to the North American Industry Classification System (NAICS) Canada 2017 Version 3.0."

CHART 2: **Occupation (NOC) coverage**

Based off 2016 NOC Version 1.3

Occupational category	Occupation
8 - Natural resources, agriculture, and related production occupations	8252 - Agricultural service contractors, farm supervisors and specialized livestock workers 8255 - Contractors and supervisors, landscaping, grounds maintenance and horticulture services 8431 - General farm workers 8432 - Nursery and greenhouse workers 8611 - Harvesting labourers 8612 - Landscaping and grounds maintenance labourers 8613 - Aquaculture and marine harvest labourers
9 - Occupations in manufacturing and utilities	9213 - Supervisors, food, beverage, and associated products processing 9461 – Process control and machine operators, food, and beverage processing 9462 – Industrial butchers and meat cutters, poultry preparers 9463 – Fish and seafood plant workers 9465 - Testers and graders, food, and beverage processing 9617 – Labourers in food and beverage processing 9618 – Labourers in fish and seafood processing

DEFINITION OF OCCUPATION

"Occupation broadly refers to the types of professional activities in which a person engages. It can be used to characterize a worker or a job."[7] The term occupation is often used interchangeably with job, but for classification purposes, occupations and jobs are different. An occupation, in this context, is defined as a set of related jobs.[8]

In Canada, Employment and Social Development Canada (ESDC) and Statistics Canada maintain the official National Occupational Classification (NOC) system. The NOC is Canada's national system for identifying, grouping, and describing occupations. The NOC is updated regularly to reflect changes in the Canadian labour market. The most recent version is NOC 2016 Version 1.3.

According to the NOC, an occupation is a collection of jobs sufficiently similar in the work performed to be grouped under a common label. Occupations are generally homogeneous with respect to skill type and skill level. There are ten broad skill types (0 to 9) which reflect the type of work performed (e.g. health occupations or sales and service occupations). There are four broad skill levels (A, B, C, and D) which are associated with the education and training required to enter and perform the duties of an occupation.[9]

According to the NOC, a job is a set of tasks and duties (i.e. work) performed, or meant to be performed, by a single worker.[10] The NOC organizes all job types into five-hundred occupations identified by 4-digit codes. The first two digits of each NOC code are associated with the skill type (first digit) and skill level (second digit). The full structure can be found here.

7 Labour Market Information Council, "Occupation."
8 Ibid.
9 Statistics Canada, "Introduction to the National Occupational Classification (NOC) 2016 Version 1.0."
10 Ibid.

Determining the LMI indicators

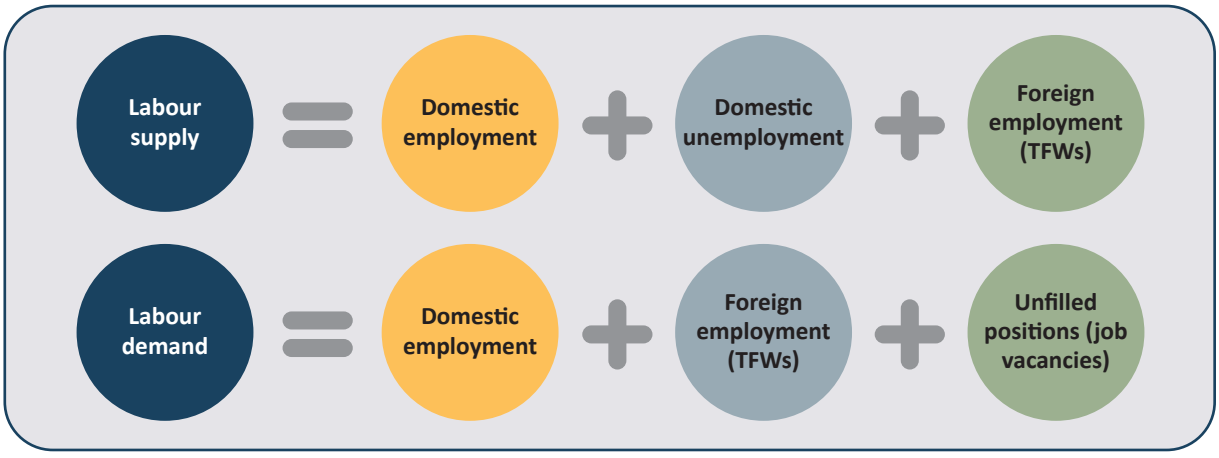
Once the agri-food sector has been defined, the second step was to conduct an environmental scan to determine what information should be considered in a comprehensive LMI framework. This was done by consulting recent studies and reports on the agri-food sector labour market and taking note of the data used and LMI indicators presented. We also made sure the LMI indicators would be comprehensive enough to facilitate in estimating labour supply and labour demand, both historically (see Chart 3) and as forecasts.

The final set of LMI indicators was determined with CAHRC and its partners. The list of LMI indicators includes:

- Employment and labour force by industry and occupation (section 3.1),
- Workforce characteristics, e.g. gender, age, persons with disabilities, recent immigrants, indigenous representation, etc. (section 3.1),
- Temporary foreign workers by industry, occupation, region, country of origin, and TFW program/stream (section 3.2),
- Farm/firm counts employing temporary foreign workers by industry, revenue class, and region (section 3.2),
- Workplace characteristics and working conditions, e.g. job stress, risk, physical demands, social support, etc. (section 2.6),
- Turnover rates (section 2.6),
- Job vacancies and job vacancy rates by industry, occupation, and region (section 3.3),
- GDP by industry (section 3.4),
- Sales by industry (section 3.4),
- Price indexes (section 3.4),
- Farm counts by commodity production, revenue class, employment, and region (section 3.5),
- Business counts (section 3.5),
- Labour productivity (section 3.6),
- Hours of work by industry, occupation, and type of work (full-time or part-time) (section 3.6),
- Wages by industry and occupation (section 3.7),
- Educational attainment by occupation and industry (section 3.8),
- Current and future skills by occupation and industry (section 3.9), and
- Population and migration (section 3.10).

The purpose of this set of LMI indicators is to provide a complete understanding of the agri-food sector labour market. While certain indicators, such as employment and job vacancies, are vital because they are used directly in estimating labour demand (see Chart 3). Other indicators, such as skills and education, are useful for understanding the labour market and the types of workers who are in demand. Indicators on characteristics, such as age and migration, provide information about the demographics of the labour force and are needed when forecasting labour supply.

CHART 3: **Estimating labour supply and demand**



Before evaluating each LMI indicator in detail, the major sources of LMI data in Canada are introduced in Section 2.0. This section discusses the five most used sources of LMI presented in this report: the Canadian System of Macroeconomic Accounts, Census Program, Labour Force Survey, Job Vacancy and Wage Survey, and the Survey of Employment, Payroll and Hours. A discussion of the purpose and methodology are included for each source. The last source mentioned is the custom survey which allows researchers and stakeholders to collect more LMI from employers and employees. Section 2.0 provides a foundation of information about LMI sources which is relevant for the following sections.

The next step was to identify and evaluate all the relevant data sources for each LMI indicator (presented in section 3.0). At a minimum, LMI data should be timely to allow for current analysis, available over time to allow for the assessment of trends, and sufficiently granular to be relevant to a broad set of industry and public-sector stakeholders interested in agriculture. This process leveraged datasets used in prior work carried out by The Conference Board of Canada and CAHRC and custom tabulations from Statistics Canada. The data sources for each LMI indicator were also assessed for their usefulness in conducting statistical analysis, determining how the information is collected, and identifying the misalignments, advantages, and disadvantages of these sources.

Developing an LMI framework required having a standardized definition for key terms, such as employment and job vacancies. Each source will often have their own definition for these key terms which are relevant since differences in definitions can lead to discrepancies in the data. The Labour Market Information Council (LMIC) has developed a platform of definitions, WorkWords, and we aimed to be consistent with their terminology. Key definitions and their relevance are discussed at the beginning of each LMI indicator. A complete set of definitions is in the Glossary (section 5.0).

As part of this project, The Conference Board of Canada worked with CAHRC to develop a set of recommendations which would outline preferred data sources for each LMI indicator. Where existing data is insufficient, the goal was to identify an approach for collecting this information by other means. These recommendations are discussed at the end of each LMI indicator in Section 3.0.

2.0 Key LMI Sources

There are many sources of LMI in Canada and each source will have advantages and disadvantages. Each source has a specific methodology for collecting and processing their data and as a result, data on the same variable from different sources may vary. Specifically, there are several surveys conducted by Statistics Canada which all produce employment estimates for the same occupations and industries however their data collection methods vary (see Chart 4). Thus, it is important to have a general understanding of the purpose and data collection methodology for each main source before discussing the LMI data in more detail.

CHART 4: **Overview of key sources from Statistics Canada**

Source	Frequency	Collection methodology	Industry and occupation coverage	Data coverage
Canadian System of Macroeconomic Accounts	Quarterly (national), annual (provincial)	Data are extracted from administrative files and derived from other Statistics Canada surveys and other sources.	All industries	Accounts cover all aspects of the Canadian economy including labour, production, and income.
Census of Population	Every five years	Questionnaire completed by Canadian households.	All industries and occupations	Wide range of demographic information on Canadian households.
Census of Agriculture	Every five years	Questionnaire completed by farm operators.	Covers industries in agriculture (NAICS 1121, 1122, 1123, 1124, 1129, 1111, 1112, 1113, 1114, and 1119)	Demographic information about farm operators and their businesses.

Continued on the next page

CHART 4: **Overview of key sources from Statistics Canada**

Source	Frequency	Collection methodology	Industry and occupation coverage	Data coverage
Labour Force Survey (LFS)	Monthly, released ten days after collection	Survey around 100,000 household members (aged 15 and over) during a week in the middle of the month.	All industries and occupations.	Detailed data on employment, labour force, wages, and hours.
Job Vacancy and Wage Survey (JVWS)	Quarterly	Survey 100,000 businesses (employers).	All industries except religious organizations, private households, and public administrations, and all occupations.	Job vacancies, average hourly wage offered, number of payroll employees, and the job vacancy rate.
Survey of Employment, Payrolls and Hours (SEPH)	Monthly, released two months after reference period.	Survey 15,000 businesses during the last seven days of the month.	All industries except agriculture, fishing and trapping, private households, religious organizations, international public administration, and military personnel.	Data on earnings, the number of jobs (occupied positions), and hours worked.

2.1 Canadian System of Macroeconomic Accounts

The Canadian System of Macroeconomic Accounts (CSMA) is a set of accounts published by Statistics Canada which give an aggregated portrait of economic activity in Canada during a given period. Each account covers an aspect of the economy, whether it be industrial, financial, or environmental or whether it measures production, the generation and distribution of income, use of income, capital formation, financing activity, wealth positions, or our trade with the rest of the world.[11] National data is generally produced quarterly.

In the context of our LMI research, the Canadian Productivity Accounts (CPA) are of particular interest. This account produces data on jobs, hours worked, labour compensation, and a variety of related variables, such as labour productivity and unit labour cost by province and territory. Data is extracted from a variety of Statistics Canada sources, including the Labour Force Survey, the Survey of Employment, Payrolls and Hours, the Census of Population, and tax file data (T4 slips).[12] LMI data for provinces are produced annually.

Source: Statistics Canada

Link to data tables: https://www150.statcan.gc.ca/n1/en/subjects/economic_accounts

11 Statistics Canada, "User Guide: Canadian System of Macroeconomic Accounts: Chapter 5 Income and Expenditure Accounts."
12 Statistics Canada, "Labour Productivity Measures - Provinces and Territories (Annual)."

2.2 Census Program

The Census Program provides a statistical portrait of the country by collecting detailed information from all Canadian households every five years. The 2016 Census Program includes the Census of Population and the Census of Agriculture.[13]

Through a questionnaire, the Census of Population collects information about population, age, sex, region, type of dwelling, families structures, marital status, language, income, immigration, housing, Aboriginal status, education, labour, journey to work, language of work and mobility and migration.[14] Thus, the Census of Population provides the most detailed demographic statistics in Canada. Unfortunately, the data is only collected every five years, the information collected can vary by census, and it can take a long time after the census is completed for the data to be published. The Census of Population has a long history and earlier census are available going back to 1971 (excluding 1976), however, it is challenging to combine historical datasets since definitions and classifications change overtime.

The Census of Agriculture provides a statistical portrait of Canada's agriculture industries and its farm operators and families every five years. The Census of Agriculture collects detailed information on topics such as crop area, number of livestock, weeks of farm labour, number and value of farm machinery, farm expenses and receipts, and land management practices.[15]

Anyone who operates a farm, ranch or other agricultural operation that produces crops, livestock, poultry, animal products or other agricultural products is required to complete the Census of Agriculture questionnaire. This covers NAICS (2012) industry codes 1121, 1122, 1123, 1124, 1129, 1111, 1112, 1113, 1114, and 1119, and thus excludes 1125 (aquaculture), 1151 and 1152 (support activities). Operators are defined as those responsible for making the management and/or financial decisions about the production of agricultural commodities.[16]

In the Census of Population, NAICS 1111, 1112, 1113, 1119, 1121, 1122, 1123, 1124, and 1129 are grouped together into 1110 "Farms" which makes it difficult to assess individual industries within agriculture.

13 Statistics Canada, "Census Program."
14 Statistics Canada, "2016 Census of Population - Data Products."
15 Statistics Canada, "Census of Agriculture."
16 Statistics Canada, "Taking an Agriculture Census."

However, the Agriculture-Population Linkage program at Statistics Canada links demographic data from the Census of Population to the Census of Agriculture at the national and provincial levels. These products provide an in-depth socioeconomic profile of the farm population at the person, family, household and farm levels and includes variables such as age, sex, marital status, country of birth, mother tongue, educational attainment and income. Agriculture–Population Linkage databases have been created since 1971 expect for in 1976 and 2011. More information about the Agriculture-Population Linkage databases can be found here.

Source: Statistics Canada

Links for Census of Population: 2016, 2011, 2006

Link for Census of Agriculture:
https://www150.statcan.gc.ca/n1/en/type/data?sourcecode=3438#tables

Link for Agriculture-Population Linkage products:
https://www150.statcan.gc.ca/n1/en/type/data?text=agriculture-population%20linkage%20data&subject_levels=32&sourcecode=3438&p=0-All#all

2.3 Labour Force Survey

The Labour Force Survey (LFS) is a key resource for labour market information in Canada, especially since it provides a long time series and is frequently updated. The LFS produces employment and labour force data which is used to calculate labour market measures such as the unemployment rate and the participation rate. The LFS also provides employment estimates by industry, occupation, public and private sector, hours worked and much more, all comparable by a variety of demographic characteristics. Currently, the LFS uses the 2012 NAICS and 2016 NOC system. Statistics Canada is expecting the LFS to switch to the latest 2017 NAICS sometime in 2021. The LFS publishes data for Canada, the provinces, the territories, and sub-provincial economic regions.[17]

The LFS is conducted monthly by Statistics Canada. The LFS sample size is approximately 56,000 households (around 100,000 individuals). The LFS information is collected for civilian household members who are non-institutionalized and aged 15 and over.[18] Data is collected on an individual's main job only during a specific week each month. This reference week usually contains the 15th day of the month and stretches from Sunday to Saturday. The LFS is published ten days after the data is collected.

The LFS does not ask respondents whether they are temporary foreign workers. Therefore, no data on TFWs can be obtained from the LFS. However, some temporary foreign workers could be included in the LFS if they are contacted and identify their selected dwelling as their usual place of residence (not their temporary residence). Unfortunately, there is no way to separate out TFWs from the 'other' category which includes Canadian citizens by descent who were born elsewhere, foreign students with a study permit, claimants of refugee status or family members of immigrants who are not landed immigrants themselves. According to Statistics Canada, in 2014, the 'other' category represented 2% of the employed population and has a negligible impact on the overall employment numbers.[19]

Source: Statistics Canada

Link: https://www150.statcan.gc.ca/n1/daily-quotidien/200605/dq200605a-cansim-eng.htm

17 Statistics Canada, "Labour Force Survey (LFS)."
18 Excluded from the survey's coverage are: persons living on reserves and other Aboriginal settlements in the provinces, full-time members of the Canadian Armed Forces, the institutionalized population, and households in extremely remote areas with very low population density. These groups together represent an exclusion of approximately 2% of the population aged 15 and over.
19 Statistics Canada, "Labour Force Survey (LFS)."

2.4 Job Vacancy and Wage Survey

The Job Vacancy and Wage Survey (JVWS) is an important source of labour market information, especially when estimating labour demand. The JVWS collects data on the number of job vacancies by occupation (at 4-digit NOC codes), industry (at 3-digit NAICS codes), and economic region on a quarterly basis. Other statistics, including average hourly wage offered, number of payroll employees, and the job vacancy rate are available by occupation and industry. Data from the JVWS is used to estimate labour demand (employment plus vacancies) and identify labour market tightness in certain regions, industries, and occupations in Canada.

The JVWS also collects job vacancy characteristics, such as the proportion of job vacancies for full- and part-time positions, the duration of job vacancies, and the levels of education and experience sought by occupation. This additional information provides further insight to the type of jobs and skills for which there are vacancies (i.e. the type of jobs and skills in demand).

The JVWS directly surveys 100,000 businesses every quarter, excluding religious organizations (NAICS 8131), private households (NAICS 814), and federal, provincial, and territorial, as well as international and other extra-territorial public administrations (NAICS 911, 912 and 919). Employers are asked to provide detailed information about their job vacancies based on the situation in effect at their location on the first day of the month (the reference date).[20]

Source: Statistics Canada

Link: https://www150.statcan.gc.ca/n1/pub/75-514-g/75-514-g2019001-eng.htm

2.5 Survey of Employment, Payrolls and Hours

The Survey of Employment, Payrolls and Hours (SEPH) provides data on earnings, the number of jobs (occupied positions), and hours worked by detailed industry (4-digit NAICS codes) at the national, provincial, and territorial level. SEPH covers all industries in Canada, except those primarily involved in agriculture, fishing and trapping, private household services, religious organizations, international and other extraterritorial public administration, and the military personnel of the defense services.

SEPH is a monthly survey produced by the combination of a census of payroll deductions, provided by the Canada Revenue Agency, and the Business Payrolls Survey (BPS) which collects data from a sample of 15,000 businesses. The reference period (week) for SEPH is the last seven days of the month. SEPH data is published two months after the reference period.[21]

Source: Statistics Canada

Link: https://www150.statcan.gc.ca/n1/en/type/data?sourcecode=2612

20 Statistics Canada, "Guide to the Job Vacancy and Wage Survey, 2019."
21 Statistics Canada, "Guide to the Survey of Employment, Payrolls and Hours."

2.6 Custom Survey

Custom surveys are a useful tool for gaining important information about labour markets which is often unobtainable through more traditional sources (like those discussed above). Surveys of employers can provide more qualitative information about challenges farm operators and managers face, especially with regard to obtaining domestic workers and TFWs. Employee surveys can be useful for gaining qualitative information, such as which sectors' workers have transitioned from or plan to transition to in the future. However, it may be difficult to get a large enough sample of employees to be confident in their representativeness of the population of agri-food workers.

Employer and employee surveys could also be a vital source of data on workplace characteristics or conditions, including job stress, riskiness, physical demands, and social support. Workplace conditions may impact labour shortages or turnover rates within an industry. Currently, the only way to gather information on working conditions is through a custom survey.

Employer surveys have been used to estimate turnover rates (voluntary and involuntary) which measures the percentage of employees leaving a business within a time period.[22] Turnover rates are obtained by getting employers to provide the total number of workers in a given period, the number of workers who have left voluntarily (left to take another job), the number of workers who have left involuntarily (laid off by employer), and the number of workers who left for uncontrollable reasons (e.g. death, illness, etc.). Turnover breakdowns by worker characteristics, including sex, age, TFWs, and type of work can also be obtained.

Higher turnover rates are influenced by several factors including workplace characteristics, such as the physical demands of the job, as well as insufficient wages compared to other sectors. However, it is important to also take seasonality into account when interpreting turnover rates since seasonal turnover is prevalent across several industries within the agri-food sector. Overall, high turnover can be costly for businesses since they will need to spend time and resources to find workers to replace the employees who left and positions that are left unfilled for long periods of time can negatively affect a business's ability to produce and grow.

Additionally, employer surveys have been used to estimate the cost of vacancies (loss of sales) which measures the impact (in dollars) of labour shortages on the sector. To estimate the cost of vacancies, employers need to report their labour shortages and their corresponding loss of sales. Stakeholders are often interested in cost of vacancy estimates since it presents the actual cost of labour shortages as a dollar value. In turn, turnover rate and cost of vacancy estimates are meaningful LMI which, at this point, can only be obtained from custom employer surveys.

22 If employer surveys are not available, there may be potential to estimate turnover rates using custom Canadian Employer-Employee Dynamics Database and Labour Force Survey data as was done by Morissette, Ci, and Schellenberg (2016).

3.0 Key LMI Indicators

The following sections outline the key LMI indicators and their relevance for the Ontario agri-food sector. Each section begins with a brief overview of the indicator and discussion of its role in accessing the agri-food sector labour market. Following the overview, the sources for each LMI indicator are listed and examined. Each source description will have the following format and information:

Source: the name of the source and publisher.

Source details: table numbers and web links (often imbedded in the table number).

Variables: a list of variables the source contains.

Frequency: the frequency of the data produced (e.g. monthly or annual).

Time period: the time span of the data (e.g. 2000-2020) which is readily available and states if the data series has been discontinued.

Available breakdowns: a list of additional characteristics and breakdowns that can be collected from the source.

Notes: any relevant information about how the data was collected or how variables are defined.

Coverage: a discussion about the coverage specific to the Ontario agri-food sector, including the NAICS and NOC codes publicly available and the existence of suppression. Ultimately, coverage will outline if the source is sufficient for the Ontario agri-food sector.

Recommendations: a discussion about the usefulness of a particular dataset and offer instruction on ordering custom datasets when relevant.

3.1 Domestic employment and labour force (and other workforce characteristics)

Employment is the backbone of any industry. The industry needs both year-round and seasonal workers to meet demand. As such, a healthy labour market is vital for an industry to grow. In turn, having accurate and timely data on employment and other labour force characteristics helps stakeholders, policy analysts, and researchers assess and monitor the health of the labour market for a specific industry or occupation. Furthermore, employment and labour force statistics are required to assess labour market imbalances (i.e. the under- or over-supply of workers relative to labour demand).

Employment generally refers to the number of persons working for pay in an economy. Employment is often broken down by industry, occupation, and region to gain information about specific labour

markets. In general, employment is measured in two ways; by surveying individuals as done by the LFS and Census of Population or surveying businesses as is done by the SEPH (see Text Box 3). Each approach will yield different employment estimates. Furthermore, the LFS and Census of Population define employment more broadly by including individuals performing unpaid family work.[23] It is important to be aware of the employment definition when discussing the various data sources.

The Labour Force Survey provides the most frequent employment data for all industries, occupations, and provinces. However, publicly available LFS data does not have the level of detail necessary to assess the agri-food sector. As such, custom requests must be obtained (often at a cost). Also, the breakdown for employment by occupation for each industry is highly suppressed to preserve confidentiality. The Survey of Employment, Payroll, and Hours publishes the detailed (4-digit NAICS) industry breakdown for employment monthly, however, it does not cover agriculture and there is data suppression for some industries within food processing. Overall, the LFS and SEPH both provide monthly employment data, however the LFS covers more industries and demographic characteristics. The LFS also accounts for unpaid family work in their employment estimates which is valuable to include, especially when assessing employment in agriculture industries.

DEFINITIONS OF EMPLOYMENT

LABOUR FORCE SURVEY AND CENSUS OF POPULATION:

Employment is the number of persons who, during the reference week/period:

- **worked for pay or profit,**
- **performed unpaid family work, or**
- **had a job but were not at work due to own illness or disability, personal or family responsibilities, labour dispute, vacation, or other reason.**

Each person is only counted once, and data is collected about their main job even if they are working at more than one job during the reference period. Persons not at work because they were on layoff or between casual jobs, and those who did not have a job (even if they had a job to start at a future date) are not considered employed.[24, 25]

SURVEY OF EMPLOYMENT, PAYROLL, AND HOURS:

Employment is the number of persons who, during the reference week:

- **received pay for services performed or for absences, and for whom the employer must complete a Canada Revenue Agency T4 form.**

This excludes owners or partners of unincorporated businesses and professional practices, the self-employed, unpaid family workers, persons working outside Canada, military personnel, and casual workers for whom a T4 form is not required. It also excludes persons who did not receive any pay from the employer for the entire survey reference period.[26] Since employment is the number of payroll jobs (with a T4 form), multiple jobholders are counted for each payroll job and workers who were not paid are not counted.

23 Unpaid family work is defined as unpaid work contributing directly to the operation of a farm, business or professional practice owned and operated by a related member of the same household.
24 Statistics Canada, "Guide to the Labour Force Survey, 2020."
25 Statistics Canada, "Dictionary, Census of Population, 2016 - Employed Person."
26 Statistics Canada, "Guide to the Survey of Employment, Payrolls and Hours."

The Census of Population contains the most detailed demographic breakdowns for employment (including unpaid family work) with little suppression. However, the Census of Population is only conducted every five years and can take a long time for the data to be published after the census is completed. Yet, the Census of Population is the most reliable source for demographic information about the labour force. Similarly, the Census of Agriculture contains more detailed data about farm operations but it is only published every five years and does not cover the entire agri-food sector since it does not include NAICS 1125 (aquaculture), 1151 and 1152 (support activities) or any food processing industries (NAICS 311, 312).

Data on workforce demographics, including gender, age, immigrant status, indigenous representation, and persons with disabilities, are important when assessing any labour market. In turn, the LFS and Census of Population are the most reliable sources for this type of information. It is valuable to know the demographic makeup of the workforce to assess where there are opportunities to expand the labour supply. For example, if there is a lack of representation of females in a specific industry or occupation, this could indicate an opportunity for programs or policies to help attract more female workers. Furthermore, data on employment by age group can provide insight into the number of younger workers entering the workforce and the number of workers retiring. This information is important when forecasting labour supply since an imbalance of younger to older workers can signify labour declines in the future as older workers retire and not enough younger workers join the work force.

Chart 5 outlines the key sources of domestic employment for the agri-food sector in Ontario, including the industry and occupation coverage of each source.

CHART 5: **Overview of sources of domestic employment in Ontario**

Source	Frequency	NAICS available	NOC available
Labour Force Survey (LFS)	Monthly	4-digit NAICS for agri-food (need to custom order)	4-digit NOC for agri-food (need to custom order)
Survey of Employment, Payroll, and Hours (SEPH)	Monthly	4-digit NAICS for food processing	N/A
Census of Population	Every five years	4-digit NAICS for agri-food (1111, 1112, 1113, 1119, 1121, 1122, 1123, 1124, and 1129 are combined)	4-digit NOC for agri-food
Census of Agriculture	Every five years	4-digit NAICS for agriculture (excluding 1125, 1151, and 1152)	N/A
Canadian System of Macroeconomic Accounts (CSMA)	Annual	4-digit NAICS for agri-food (1110, 1112, 1113, and 1119 are combined)	N/A
Agriculture Taxation Data Program (ATDP)	Annual (2016 – 2018)	4-digit NAICS for agriculture (excluding 1125, 1151, and 1152) (need to custom order)	N/A

3.1.1 Labour Force Survey

Source: Statistics Canada – Labour Force Survey (LFS)

Source details: Employment and labour force by industry – Table: 14-10-0022-01

Employment by worker class – Table: 14-10-0026-01

Employment and labour force by occupation – Table: 14-10-0296-01

List of all LFS tables found here

Variables: Labour force, employment, full-time employment, part-time employment, unemployment, and unemployment rate

Frequency: Monthly

Time period: January 1987 – August 2020

Available breakdowns: By province, sex, age group, industry, and occupation. There is a breakdown by class of worker, including public or private sector employees, and self-employed (incorporated and unincorporated, and with paid help and no paid help, and unpaid family worker) in Table: 14-10-0026-01. There is also a breakdown for permanent employees and temporary employees (including breakdown for seasonal job, term or contract job, causal job, and other temporary job) found in Table: 14-10-0071-01.

Notes: LFS's definition of employment includes individuals who worked for pay or profit, performed unpaid family work, or had a job but were not at work due to own illness or disability, personal or family responsibilities, labour dispute, vacation, or other reason.

Coverage: Publicly available data do not sufficiently cover all the 4-digit NAICS or 4-digit NOC codes in the Ontario agri-food sector. Ontario data are publicly available for the agriculture industry (defined as NAICS 111-112, 1100, 1151-1152) and manufacturing industry (defined as NAICS 31-33). Ontario data are also publicly available for the non-durables manufacturing (defined as NAICS 311-316, 322-326) starting in January 1987. Industries are defined using NAICS (2012) classification and do not include NAICS 3123 (cannabis product manufacturing). Ontario data are publicly available at the 2-digit NOC (2016) level with no suppression.

Recommendations: To obtain data sufficient for the agri-food sector in Ontario, data must be custom ordered from Statistics Canada. It is possible to custom order the employment breakdown by 4-digit NOC and 4-digit NAICS. However, data for occupation by industry for Ontario will be 98% suppressed before further breakdowns by age or sex (according to Statistics Canada). It is also possible to get breakdown by Aboriginal and immigrant status for industries and occupations.

Example tables that could be ordered:

Table A: Labour force characteristics by selected industries (4-digit NAICS) showing age, sex, immigrant status, Aboriginal status and educational attainment, Ontario, monthly.

Table B: Labour force characteristics by selected occupations (4-digit NOC) showing age, sex, Aboriginal status, immigrant status and educational attainment, Ontario, monthly.

3.1.2 Survey of Employment, Payrolls and Hours

Source: Statistics Canada – Survey of Employment, Payrolls and Hours (SEPH)

Source details: Employment by industry – Table 14-10-0201-01

Variables: Employment

Frequency: Monthly

Time period: January 2001 to June 2020

Available breakdowns: By province, type of employee (salaried employees paid a fixed salary or paid by the hour) and industry.

Notes: SEPH's definition of employment includes only individuals who received pay for services performed or for absences. This excludes owners or partners of unincorporated businesses and professional practices, the self-employed, unpaid family workers, persons working outside Canada, military personnel, and casual workers for whom a T4 form is not required. Since employment is the number of payroll jobs (with a T4 form), multiple jobholders are counted for each payroll job and workers who were not paid are not counted.

Coverage: SEPH coverage is not sufficient for the Ontario agri-food sector since it excludes NAICS 111, 112, and 115. Ontario data are publicly available at 4-digit NAICS (2017) breakdown for industries within food processing. However, data for NAICS 3123 is blank since data are not available, or the data has been suppressed to meet the confidentiality requirements of the *Statistics Act*.

Recommendations: The SEPH is a useful source if one is only looking for employment data on the food processing industry since SEPH provides a detailed (4-digit NAICS) breakdown of the subsectors within food processing without needing to pay for a custom order.

3.1.3 Census of Population

Source: Statistics Canada – Census of Population

Source details:

Employment by industry (4-digit NAICS) – Catalogue number: 98-400-X2016290 and 98-400-X2016292

Employment by occupation (4-digit NOC) and industry (2-digit NAICS) – Catalogue number: 98-400-X2016298

Other tables with labour related data from 2016 Census found here

Variables: Employed and unemployed

Frequency: Every five years

Time period: 2016 (earlier censuses are available going back to 1971, excluding 1976, however, it is challenging to combine census datasets since definitions and classifications change over time)

Available breakdowns: By province, census sub regions,[27] age, sex, class of worker (i.e. employee, self-employed, and unpaid family worker) and industry. The Census of Population includes breakdowns by mobility status (internal migrants, intraprovincial migrants, interprovincial migrants, external migrants), highest certificate, diploma or degree, major field of study, immigrant status, immigration time period, Aboriginal status, and other family characteristics.

Notes: The version of NAICS and NOC system used changes between surveys.

Notes: Census of Population's definition of employment includes individuals who worked for pay or profit, performed unpaid family work, or had a job but were not at work due to own illness or disability, personal or family responsibilities, labour dispute, vacation, or other reason.

Coverage: Publicly available data are not completely sufficient for Ontario agriculture since NAICS 1111, 1112, 1113, 1119, 1121, 1122, 1123, 1124, and 1129 are grouped together into 1110 "Farms" (data for NAICS 1114 and 1125 are available). Data are

27 Including census metropolitan areas (CMAs), census agglomerations (Cas), census divisions (CDs), and census subdivisions (CSDs), and economic regions (ERs).

sufficient for Ontario food processing since all 4-digit NAICS (2012) industries are available except NAICS 3123 (cannabis manufacturing). Ontario employment and labour force data are publicly available for 4-digit NOC (2016) with no suppression.

Recommendations: The Census of Population is the recommended source for detailed demographic data. Custom data tables can be ordered with the provincial breakdown of occupation at 4-digit NOC by industry at 4-digit NAICS, but Statistics Canada is unable to separate '1110' into NAICS 1111 to 1113, 1119 to 1124 and 1129. Unfortunately, census data are only updated every five years which makes it less useful for time series analysis. Also, exercise caution when comparing Census surveys over time since the version of NAICS and NOC system used changes between surveys.

3.1.4 Census of Agriculture

Source: Statistics Canada – Census of Agriculture

Source details: Paid agricultural work – Table: 32-10-0439-01

Historical data on the number of weeks of paid agriculture work from 1976 to 2006 found here.

Variables: Number of farms reporting and number of employees (for paid work on a year-round basis (full-time and part-time) and paid work on a seasonal or temporary basis), total number of employees, and total number of employees that were family members.

Frequency: Every five years

Time period: 2011, 2016

Available breakdowns: By province, census sub-regions,[28] and by type of paid work (full-time, part-time, and seasonal).

Notes: Breakdown by full-time, part-time, and family members not available for 2011.

Coverage: Data from the Census of Agriculture does not sufficiently cover the Ontario agri-food sector since only NAICS 1111, 1112, 1113, 1114, 1119, 1121, 1122, 1123, 1124, and 1129 are covered. Breakdowns at the 4-digit NAICS are not publicly available.

Recommendations: This data can be used to estimate seasonal or temporary employment as a percentage of total employment.

3.1.5 Canadian System of Macroeconomic Accounts

Source: Statistics Canada – Canadian System of Macroeconomic Accounts (Canadian Productivity Accounts)

Source details: Labour statistics – Table: 36-10-0489-01

Variables: Total number of jobs, number of employee jobs, number of self-employed jobs, hours worked for all jobs, hours worked for employee jobs, hours worked for self-employed jobs, annual average number of hours worked for all jobs, annual average number of hours worked for employee jobs, annual average number of hours worked for self-employed jobs, total compensation for all jobs, compensation of employees, self-employed income, total compensation per job, total compensation per hour worked, employee's compensation per hour worked.

Frequency: Annual

Time period: 1997 – 2018

Available breakdowns: By province and industry.

Coverage: Industry level data are not completely sufficient for the Ontario agri-food sector. Ontario data are publicly available at 4-digit NAICS; however, some 4-digit NAICS codes are grouped together. For example, NAICS 1110, 1112, 1113, and 1119 are grouped together into NAICS 111A (crop production excluding greenhouse, nursery, and floriculture production). This dataset does not include NAICS 3123 (cannabis manufacturing).

28 Including census agricultural regions, census divisions, and census consolidated subdivisions.

3.1.6 Agriculture Taxation Data Program

Source: Statistics Canada – Agriculture Taxation Data Program and Labour Force Survey

Source details: Employees in agriculture by industry – Table: 32-10-0215-01

Employees in agriculture by province – Table: 32-10-0216-01

Employees in agriculture by farm revenue – Table: 32-10-0217-01

All tables found here

Variables: Total number of employees (part-time, full-time, and seasonal) and number of agricultural operations with at least one employee

Frequency: Annual

Time period: 2016 - 2018 (one-time release – currently seeking funding to continue)

Available breakdowns: By province (territories excluded), industry, and size class of gross farm revenue.

Notes: The number of employees was derived from T4 slips produced by agricultural businesses identified by the Agriculture Taxation Data Program. As a result, data on the number of employees does not equal the number of individuals, as workers could work for more than one farm business during a season. The number of employees includes TFWs and owner operators of incorporated farm businesses (i.e. whenever there is a T4 produced which means unincorporated owner operators are not included). The number of non-TFW employees can easily be calculated by subtracting the number of TFWs (which is also published, see 3.2.3).

Coverage: Publicly available data do not sufficiently cover all the 4-digit NAICS for the agri-food sector in Ontario. Only NAICS 1121, 1122, 1123, 1124, 1129, 1111, 1112, 1113, 1114, and 1119 are covered which excludes aquaculture (NAICS 1125), support services (NAICS 1151 and 1152), and all food processing. Only national data are published at the 4-digit NAICS level. Provincial data are only published for the agriculture aggregate, but the 4-digit NAICS breakdown can be custom ordered.

Recommendations: More detailed datasets can be obtained through a custom order, including the number of employees by industry and category of farm revenue broken down for each province, the number of individual employees, and the proportion of all farm operators that pay themselves wages. Some industries may be merged in some provinces to respect confidentiality. This is a valuable data source, specifically for TFWs (as discussed in 3.2.3), which will hopefully continue to be produced.

3.1.7 Canadian Survey on Disability

Source: Statistics Canada – Canadian Survey on Disability

Source details: Employment of adults with disabilities by occupation – Table: 13-10-0355-01

Employment of adults with disabilities by industry – Table: 13-10-0354-01

Variables: Number of adults with disabilities employed

Frequency: Every five years

Time period: 2012

Available breakdowns: By age group, sex, occupation, and industry.

Coverage: Publicly available data do not sufficiently cover all the 4-digit NAICS for the agri-food sector in Ontario since data are only available at 1-digit NOC level and at 2-digit NAICS level for Canada.

Recommendations: Although the Canadian Survey on Disability does not provide detailed enough data for the Ontario agri-food sector, it could still be useful for other LMI research in the future.

3.2 Foreign Employment

Temporary foreign workers (TFWs) are an important source of labour for many industries within the agri-food sector. Temporary foreign workers are foreign workers (not Canadian citizens or permanent residents) who are hired through the Temporary Foreign Worker Program (TFWP), including the Seasonal Agriculture Workers program (SAWP), or International Mobility Program (IMP) to fill short-term labour and skill shortages. A Labour Market Impact Assessment (LMIA), a work permit, and other requirements are needed to hire a TFW through the TFWP.

There are four streams by which an agriculture TFW (under the TFWP) can be hired: the Seasonal Agriculture Worker Program, agriculture stream, high-wage stream and low-wage stream.[29] The Seasonal Agriculture Worker Program is for hiring workers from Mexico and participating Caribbean countries in occupations and activities related to primary agriculture as defined under the TFWP for producing goods on the National Commodities List.[30] The agriculture steam is for hiring TFWs from any country in occupations and activities related to primary agriculture for producing goods on the National Commodities List. The high-wage and low-wage streams is for hiring TFWs for high-wage and low-wage agriculture positions for producing goods not on the National Commodities List. More information about TWFs in agriculture can be found here.

TFWs are an important part of labour because they fill positions that are not filled by domestic workers. Thus, they help fill the gap between available domestic labour supply and labour demand in the agri-food sector. Data on TFWs by occupation and industry can show which occupations and industries rely most on TFWs. Since the supply of TFWs is more vulnerable to policy changes and global events, it is vital to have data on the number of TFWs to assess the vulnerabilities of a labour market. Furthermore, reliable data is necessary to assess current labour shortages and forecast labour demand in the future.

Unfortunately, this important source of labour is not formally accounted for in key sources such as the Labour Force Survey or Census of Population.[31] Without accurate data, it is difficult to assess the labour market and estimate labour productivity in the agri-food sector.

Employment and Social Development Canada (ESDC) and Immigration, Refugees and Citizenship Canada (IRCC) are the two main sources of data on TWFs and each come with advantages and disadvantages. ESDC publishes data on the number of approved positions for TFWs which is a broad scope and overestimates the number of TFWs employed. However, ESDC can provide data breakdown by 4-digit NAICS (needs to be custom ordered), 4-digit NOC, NOC skill level, and entry program/stream.

IRCC publishes data on the number of TFW work permit holders (by 4-digit NOC codes) which more accurately estimates the number TFWs employed. However, IRCC only reports the work permit holders by 4-digit NOC and entry program/stream. Thus, it is unfeasible to assess TFWs by industry using IRCC data. In turn, a potential solution is to take IRCC data by occupation and apply the industry distributions from ESDC data.

The geographical distributions from ESDC and IRCC can vary since they record location in slightly difference ways. IRCC reports the geographic location where a temporary resident is destined in Canada according to the information provided on the permit, whereas ESDC reports the geographic location for the job offer indicated on the LMIA. ESDC data includes breakdowns by province/territory, urban area, and economic region.[32] Whereas, IRCC only releases TFWs by province/territory. In turn, the geographic distribution from ESDC could be applied to IRCC data.

Recently, Statistics Canada's Agriculture Division has published data on total employment and TFW employment in agriculture by industry and province

29 Employment and Social Development Canada, "Hire a Temporary Foreign Agricultural Worker."
30 A definition of National Commodities List is in the glossary.
31 A small number of TFWs may be captured in the LFS. However, it is impossible to separate out the number of TFWs and they represent an insignificant percentage of total employment. For more information see Section 2.3.
32 An urban area is defined by Statistics Canada as an area having a population of at least 1,000 and a density of 400 or more people per square kilometre.

using data from the Agriculture Taxation Data Program (ATDP) and the Labour Force Survey (LFS). This could be an important data source going forward, given they receive funding to continue. There is also potential to obtain data on TFWs through a custom order from Statistics Canada's Canadian Employer-Employee Dynamics Database (CEEDD) in the future. However, since this data has never been produced before, there is limited information about what level of industry and provincial detail is available.

A summary of the available sources of data on TFWs is presented in Chart 6.

Data on the number of employers or firms hiring (or looking to hire) TFWs is also an important indicator as it provides insight into the distribution of TFWs across the agri-food sector. The Agriculture Taxation Data Program reports the number of agricultural operations with at least one temporary foreign worker by province, industry, and farm revenue. ESDC reports the number of unique employers with positive LMIAs by province, economic region, stream/program, and industry. Both these sources will be useful in assessing the number of farms/firms employing TFWs.

How to report TFW shares

There are several factors to consider when estimating the share to TFWs. First, consider the source of domestic employment. If looking at the entire agri-food sector, the LFS will be the best source. If only considering agriculture, there is potential to use employment data from the ATDP and if only considering food processing, there is the option to use employment data from the SEPH. In choosing the appropriate source for domestic labour, it is important to be mindful of definitional differences across sources. The LFS will cover unpaid family work whereas the SEPH and ATDP only include paid employees (and employees can be counted multiple times if they have multiple employers). As such, each source will provide a slightly different labour market perspective.

Second, choose what types of employment (paid, unpaid, operators, etc.) to include in domestic employment or workforce. This will be partly decided by the data source. For example, if using SEPH, only paid employees are included. If using LFS data, consider including the number of owner operators along with the number of permanent and seasonal employees (see Method II). The total number of owner operators can be calculated by summing employment (from the LFS) for NOC 0821, 0822, 0823, and other management positions (residual).

CHART 6: **Overview of sources of TFWs in Ontario's agri-food sector**

Source	Frequency	Reporting TFWs	Available breakdowns
Employment and Social Development Canada (ESDC)	Quarterly	The number of TFWs that are requested, given they received a positive LMIA.	By 4-digit NAICS (need to custom order), 4-digit NOC, skill level, and program/stream.
Immigration, Refugees and Citizenship Canada (IRCC)	Monthly	The number of TFWP work permit holders based on the number of work permits issued at ports of entry.	By 4-digit NOC and program/stream (limited).
Agriculture Taxation Data Program (ATDP)	Annual (2016 – 2018)	The number of TFWs derived from T4 slips produced by agricultural businesses.	By 4-digit NAICS within agriculture only (need to custom order), and farm revenue.

An alternative to calculating the number of owner operators based on NOC codes, is using the "class of worker" breakdowns found in the LFS which provides the number of self-employed individuals (see Method I).

Third, consider the source of foreign employment (i.e. the number of TFWs). ESDC and IRCC provide the most comprehensive data sets for the entire Ontario agri-food sector. However, using their data, especially at the provincial level, will require some manipulation. ESDC provides the relevant breakdowns by province (and sub regions), industry, and TFW program/stream, however their data overestimates the actual number of TFWs employed (as discussed above). IRCC provides more accurate data at a national level, but work must be done to apply the geographic, industry, and program/stream distribution from ESDC data. IRCC reports the number of TFWP work permit holders for agriculture which can be used to calculate the share of TFWs in agriculture (see Method I).

When calculating the share of TFWs for food processing, we must either use industry data from ESDC or use the data by occupation from IRCC.

In the latter case, data by occupation will not perfectly match industry level data since there can be occupations in multiple industries, for example there are managers in agriculture (NOC 0821) in both agriculture and food processing industries. In turn, the best approach would be to apply the industry distribution from ESDC to the aggregate data from IRCC when calculating the number of TFWs in food processing.

The ATDP also provides data on the number of TFWs employed, by province and industry, in an easier to access format. It is advised if using data on the numbers of TFWs from ATDP to also use their domestic employment estimates. This way the number for total employment and TFW employment were constructed using the same source and methodology which makes them comparable. However, this data is only relevant if considering agriculture (excluding 1125, 1151 & 1152). This data will also only capture paid employment (as discussed above) and is only available annually from 2016 to 2018. In turn, using ATDP is advantageous if looking for a simple way to calculate the share of TFWs in agriculture (see Method III).

Chart 7 below presents examples of three potential calculations for estimating the foreign worker share of agriculture employment across Canada. Each source provides a distinct result with the share of foreign workers ranging from 13% in Method I to 19% in Method III. Going forward, it will be valuable to estimate various TFW share statistics from difference sources in order to compose an interval of the true value.

3.2.1 Employment and Social Development Canada (ESDC)

Source: Employment and Social Development Canada (ESDC)

Source details: Number of temporary foreign workers – Table 01 - 09, 12 - 13, 22 - 24

Top countries of TFW residency – Table 10

Number of positive LMIAs – Table 14 - 18

Number of employers – Table 11, 19, 20, 21

(https://open.canada.ca/data/en/dataset/e8745429-21e7-4a73-b3f5-90a779b78d1e)

Annual data from 2010 to 2017 – https://open.canada.ca/data/en/dataset/c65d2014-ef25-4781-b9b2-e13a7293b72d

Annual data from 2012 to 2019 – https://open.canada.ca/data/en/dataset/76defa14-473e-41e2-abfa-60021c4d934b

(all tables found through https://open.canada.ca/en)

Variables: Number of temporary foreign worker positions with positive LMIAs, top countries of residency, number of positive LMIAs, and number of employers with positive and negative LMIAs

CHART 7: **Example of calculating shares of TFWs in agriculture (Canada, 2017)**

	Method I: (includes 1125, 1151 & 1152)	**Method II:** (includes 1125, 1151 & 1152)	**Method III:** (excludes 1125, 1151 & 1152)
Sources	**LFS and IRCC**	**LFS and ESDC**	**LFS and ATDP**
Domestic employment	Employees = 111,700 (Table: 14-10-0026-01)	Owner operators (NOC 0821,0822, and 0823)[33] = 145,143	Number of (paid) employees = 215,499
	Self-employed = 167,825 (Table: 14-10-0026-01)	Domestic (Permanent + Seasonal)[34] = 167,690	
Foreign employment	TFWs (agriculture work permit holders)[35] = 41,590	TFWs (positive LMIAs under the Primary Agriculture stream)[36] = 60,578	Number of TFW jobs = 50,641 (Table: 32-10-0219-01)
Total workforce	321,115	373,411	266,140 (Table: 32-10-0216-01)
Share of TFWs	13%	16%	19%

33 From Canadian Agricultural Human Resource Council, "Canadian Agriculture Workforce."
34 From Canadian Agricultural Human Resource Council, "Canadian Agriculture Workforce."
35 Data from IRCC, *Table: Canada - Temporary Foreign Worker Program work permit holders by province/territory of intended destination, program and year in which permit(s) became effective.*
36 Data from ESDC, *Table 09: Number of temporary foreign worker (TFW) positions on positive Labour Market Impact Assessments (LMIAs) under the Primary Agriculture stream by province/territory between 2010 and 2017.* Includes positive LMIAs from the SAWP, agricultural stream, high-wage, and low-wage stream.

Frequency: Quarterly, annual

Time period: 2019Q1 – 2020Q1, 2010 – 2019

Available breakdowns: By province, urban area, economic region, skill type (table 05), industry (table 06), and occupation (table 07). Breakdown by stream (Seasonal Agricultural Worker Program (SAWP), agricultural stream, high-wage, and low-wage stream) in table 09.

Notes: ESDC reports the number of TFWs that are requested, given they received a positive LMIA, rather than the actual number of TFWs employed. This could be perceived as the demand, rather than supply. The number of TWF requested by occupation and industry may show what types of jobs are in demand.

Coverage: Publicly available data do not sufficiently cover all the 4-digit NAICS for the agri-food sector in Ontario. Table 06 only includes 2-digit NAICS (2002) industry categories including agriculture, forestry, and hunting fishing (NAICS 11) and manufacturing (NAICS 31-33). Table 07 sufficiently covers most of the 4-digit NOC (2011) codes for the Ontario agri-food sector except NOC 0823, 2123, 2222, 8613, 9463, 9465, and 9618.

Recommendations: It is possible to get the number of TFW positions on positive LMIAs by 4-digit NAICS and NOC skill levels for each province and territory. This data has been obtained in the past. There is no formal channel to request this data and producing these custom tables is only done occasionally for researchers in certain circumstances. There is potential for the 4-digit NAICS breakdown to be published on the Open Canada website in the future if there is enough demand.

3.2.2 Immigration, Refugees and Citizenship Canada

Source: Immigration, Refugees and Citizenship Canada (IRCC)

Source details: Data on the number of International Mobility Program (IMP) work permit holders and Temporary Foreign Worker Program work permit holders (https://open.canada.ca/data/en/dataset/360024f2-17e9-4558-bfc1-3616485d65b9)

(all tables found through https://open.canada.ca/en)

Variables: International Mobility Program (IMP) work permit holders and Temporary Foreign Worker Program (TFWP) work permit holders

Frequency: Monthly, annual

Time period: January 2015 – June 2020, 2000 – 2019

Available breakdowns: By province, sex, skill level, occupation at 4-digit NOC (2011), program, and country of citizenship. IMP work permit holders available by Census Division, Census Subdivision, and Census Metropolitan Area. TFWP breakdown by Seasonal Agriculture Worker Program and agriculture stream is only available annually.

Notes: This data show the number of work permit holders for each NOC classification based on the number of work permits issued at ports of entry. The data is broken down at the 4-digit NOC level with data values less than 5 are left blank ("--") for privacy reasons. More information on how IRCC measures TFWs can be found here.

Coverage: Publicly available data do cover most the 4-digit NOC codes for the agri-food sector in Ontario. Mainly, when data on IMP and TFWP work permit holders is combined, NOC 0822, 0823, 8432, 8613, and 9465 are not present. IRCC does not produce breakdowns by industry, by sub-provincial regions (e.g. counties) and by all primary agriculture streams: Seasonal Agricultural Worker Program (SAWP), agricultural stream, high-wage, and low-wage stream). Publicly available IRCC data reports monthly agricultural workers only. SAWP data is available through custom request.

Recommendations: IRCC does have data going back to 1995 but it is not publicly available. You may request a custom data table with a longer time series by sending an email to IRCC.CDOStatistics-StatistiquesDPD.IRCC@cic.gc.ca. IRCC should explore possibilities of publishing data by industry (3 and 4 digits NAICS), by all primary agriculture streams and by sub-provincial region (e.g. counties).

3.2.3 Agriculture Taxation Data Program

Source: Statistics Canada – Agriculture Taxation Data Program and Labour Force Survey

Source details: Jobs filled by temporary foreign workers by industry – Table: 32-10-0218-01

Jobs filled by temporary foreign workers by province – Table: 32-10-0219-01

Jobs filled by temporary foreign workers by category of farm revenue – Table: 32-10-0220-01

Countries of citizenship for temporary foreign workers – Table: 32-10-0221-01

All tables found here

2015 data here

Variables: Number of jobs filled by temporary foreign workers and the number of agricultural operations with at least one temporary foreign worker

Frequency: Annual

Time period: 2015 – 2018 (one-time release – currently seeking funding to continue)

Available breakdowns: By province (territories excluded), industry, and farm revenue (6 revenue categories). There is also a breakdown by country of citizenship for TFWs available.

Notes: The number of TFWs is derived from T4 slips produced by agricultural businesses identified by the Agriculture Taxation Data Program. As a result, data on the number of jobs filled by temporary foreign workers does not perfectly equal the number of individuals since workers could transfer to more than one farm business during a season.

Coverage: Publicly available data do not sufficiently cover all the 4-digit NAICS for the agri-food sector in Ontario. Only NAICS 1121, 1122, 1123, 1124, 1129, 1111, 1112, 1113, 1114, and 1119 are covered which excludes aquaculture (NAICS 1125), support services (NAICS 1151 and 1152), and all food and beverage processing. Only national data are published at the 4-digit NAICS level. Provincial data are only published for the agriculture aggregate, but the 4-digit NAICS breakdown can be custom ordered. Data is not available by TFW program/stream, or by any sub-provincial region (e.g. counties).

Recommendations: It is possible to obtain the number of jobs filled by TFW by industry and category of farm revenue broken down for each province through a custom request. Some industries will be merged in some provinces to respect confidentiality.

Table: 32-10-0220-01 provides data on the number of TFWs by farm size. This could allow for a better understanding of productivity trends by firm size which is an important part of forecasting labour demand.

3.2.4 Canadian Employer-Employee Dynamics Database

Source: Statistics Canada – Canadian Employer-Employee Dynamics Database (CEEDD)

Source details: Potential to custom order data from CEEDD

Variables: Number of jobs filled by temporary foreign workers (from both TFWP and IMP)

Frequency: Annual

Time period: 2005 – 2017[37]

Available breakdowns: By province and industry.

Notes: Although CEEDD and the Agriculture Taxation Data Program both use tax file data, they process the data differently. Thus, it is not recommended to use or compare data from both sources.

Coverage: There is potential to custom order data at the 4-digit NAICS level by province which would be sufficient to cover the Ontario agri-food sector. However, Statistics Canada cannot confirm the level of suppression present (which could be high).

Recommendations: There is potential to custom order data on TFWs from CEEDD which covers the Ontario agri-food sector. However, since they have not produced this data before they could not provide very much information on the level of detail that would be available. To find out more information, you would need to move forward with a custom order (at a cost).

37 This time period is not guarantee. It is based on our discussion with Statistics Canada.

3.3 Job vacancies

"A job vacancy broadly refers to an unfilled position within an organization for which the employer is looking to hire."[38] The number of job vacancies shows the number of jobs going unfilled in a specific industry or occupation and thus, displays important information about labour demand. Total labour demand equals employment (domestic and foreign) plus the number of vacancies. Data on job vacancies shows the depth of labour shortages or the lack thereof. Many job vacancies in an industry or for an occupation can indicate a lack of available and qualified workers.

The number of job vacancies has traditionally been estimated using data from employer surveys. In Canada, sources including the JVWS and SEPH collect and publish information on job vacancies. Note that the definition of a vacancy varies across surveys and other sources (see Text Box 4). Recently, job vacancy estimates are being obtained from other sources, such as Vicinity Jobs, which web scrape data from online job posting sites. In both cases — employer surveys and online data — the aim is to estimate the level and composition of unmet labour demand in Canada.[39]

DEFINITIONS OF JOB VACANCY

JOB VACANCY AND WAGE SURVEY:

A job is vacant if it meets all three of the following conditions:

- **it is vacant on the reference date (first day of the month) or will become vacant during the month,**
- **there are tasks to be carried out during the month for the job in question,**
- **and the employer is actively seeking a worker outside the organization to fill the job.[40]**

SURVEY OF EMPLOYMENT, PAYROLLS AND HOURS (JOB VACANCY STATISTICS):

A job is vacant if it meets all three of the following conditions:

- **a specific position exists,**
- **work could start within 30 days, and**
- **the employer is actively seeking a worker from outside the organization to fill the position.[41]**

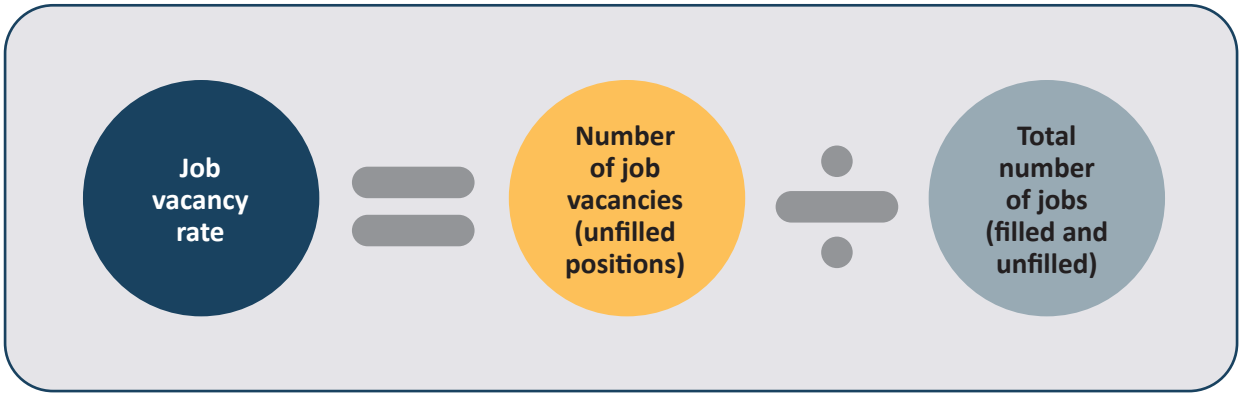
A detailed comparison of the JVWS and the vacancy component of the SEPH (JVS) can be found on Statistics Canada's website here.

VICINITY JOBS:

Vicinity Jobs collects data on online job postings. An online job posting is the advertisement of a job vacancy. The number of online job postings can be used as a proxy for the number of job vacancies. However, an employer may have a vacancy but not post it online (maybe they use other means of recruitment) or an employer may advertise a vacancy when there is not one (maybe they are looking to collect a pool of potential candidates).[42] In turn, using the number of job postings as a proxy for the number of job vacancies must be done with caution. However, since the nature of the bias would not be expected to change over time, data from the Vicinity Jobs dataset could be a good indicator for the rate of change over time in the number of vacancies.

38 Labour Market Information Council, "Job Vacancy."
39 Ibid.
40 Statistics Canada, "Guide to the Job Vacancy and Wage Survey, 2019."
41 Ibid.
42 Labour Market Information Council, "Job Vacancy."

CHART 8: **Calculating vacancy rates**



One key application of job vacancy estimation is the job vacancy rate (see Chart 8). The job vacancy rate is the percentage of total labour demand (i.e. the sum of vacancies and the number of people employed) that remains unfilled.[43] Furthermore, having data on job vacancy characteristics can allow researchers to compare job vacancy rates across aspects including industries, occupations, types of work, education levels, etc.

Data on the length of job vacancies, obtained from the JVWS or Vicinity Jobs, shows the number of days a job goes unfilled and thus, displays important information about labour demand. Jobs that go a long time without being filled can indicate employers are having difficulty finding qualified workers perhaps because of a lack of available workers, whereas jobs that are filled quickly can indicate employers can find workers easily perhaps because of an abundance of workers or the skills employers need are readily available. Long duration of job vacancies can be detrimental to businesses when they depend on those positions to operate and expand.

Chart 9 outlines the key sources of job vacancies for the agri-food sector in Ontario, including the industry and occupation coverage of each source.

CHART 9: **Overview of sources of job vacancies in Ontario**

Source	Frequency	NAICS available	NOC available
Job Vacancy and Wage Survey (JVWS)	Quarterly	3-digit NAICS for agri-food	4-digit NOC for agri-food (highly suppressed)
Survey of Employment, Payroll, and Hours (SEPH)	Annual (discontinued)	2-digit NAICS for food processing	N/A
Vicinity Jobs	Monthly	4-digit NAICS for agri-food	4-digit NOC for agri-food

43 Ibid.

3.3.1 Job Vacancy and Wage Survey

Source: Statistics Canada – Job Vacancy and Wage Survey (JVWS)

Source details: Job vacancies by industry – Table: 14-10-0326-01

Job vacancies by occupation – Table: 14-10-0356-01

Duration of job vacancy and other characteristics – Table: 14-10-0328-01

Other JVWS job vacancy tables here

Variables: Job vacancies, payroll employees, job vacancy rate, and average offered hourly wage.

Frequency: Quarterly

Time period: 2015Q1 – 2019Q3

Available breakdowns: By province, industry, occupation, and job vacancy characteristics. Job vacancy characteristics include type of work (full time and part time), minimum level of education sought, certification requirements, minimum experience requirement, duration of job vacancy, type of position (permanent or temporary), and recruitment strategy. Duration of job vacancy includes <15days, 15-29 days, 30-59 days, 60-89 days, 90+ days, and constantly recruiting.

Notes: Statistics Canada is not currently producing custom tables from the Job Vacancy and Wage Survey.

Coverage: Data are not available at the 4-digit NAICS level required for the Ontario agri-food sector. Most job vacancy data are available at the 3-digit NAICS (2017) for Ontario available with some data missing because the data are too unreliable to be published or it has been suppressed to meet the confidentiality requirements of the *Statistics Act*.

Publicly available data do cover 4-digit NOC (2016) codes in the Ontario agri-food sector, however the majority of data at the 4-digit NOC (2016) level is blank because the data is too unreliable to be published or it has been suppressed to meet the confidentiality requirements of the *Statistics Act*. Most of Ontario data at the 1-digit or 2-digit NOC (2016) codes are available.

Recommendations: The JVWS is the most comprehensive source of job vacancy data that is available publicly through Statistics Canada. However, use of this source is limited since there is a considerable amount of suppression.

3.3.2 Survey of Employment, Payrolls and Hours

Source: Statistics Canada – Survey of Employment, Payrolls and Hours (SEPH) and Job Vacancy Statistics (JVS)

Source details: List of SEPH job vacancy tables here

Variables: Number of job vacancies, labour demand, and job vacancy rate.

Frequency: Annual

Time period: 2011 – 2018 (discontinued)

Available breakdowns: By province and industry.

Notes: In 2019, the SEPH stopped the collection and dissemination of job vacancy statistics, as users will find more granular data with the Job Vacancy and Wage Survey.

Coverage: Publicly available data are not sufficient for the Ontario agri-food sector since it does not cover 4-digit NAICS levels and it excludes agriculture (NAICS 111, 112, and 115). Ontario data are publicly available at 2-digit NAICS (2017) level with manufacturing defined as NAICS 31–33.

Recommendations: Only useful for historical data since this data are no longer being produced.

3.3.3 Vicinity Jobs

Source: Vicinity Jobs

Source details: Data from online job postings – http://www.vicinityjobs.com/

Variables: Job posting characteristics, including skills, education, experience, certificates required, location, hourly wage, and job type (full-time/part-time, contract/ permanent, etc.).

Frequency: Published monthly (but can be daily since job postings are dated)

Time period: June 2018 – August 2020

Available breakdowns: Job postings by province, region, industry, and occupation.

Notes: Data on Vicinity Jobs are web-scraped from many sources, including bcjobs.ca, indeed.com, AllStarJobs.ca, monster.ca, saskjobs.ca, regionalhelpwanted.com, etc. This data must be purchased since it is not publicly available.

Coverage: Vicinity Jobs' database covers the 4-digit NOC codes in the Ontario agri-food sector. There is no suppression in this data. Ontario data are available at the 4-digit and 6-digit NAICS level. However, many job postings are missing NAICS assignments which makes the breakdown by industry less reliable.

Recommendations: Data on job postings can provide more information about job vacancies. This data could provide an estimate for the number of job vacancies by NAICS and NOCs since job postings are indicative of which positions are wanting to be filled by employers.

3.4 Production and prices

Gross domestic product (GDP), revenues, and prices are important aspects of any industry. Data on GDP by industry provides information on an industry's relative importance and size in Ontario and Canada. The growth rates of GDP provide an indication of how well an industry or an economy is doing. Industries need access to proper resources, including labour, to grow. In turn, labour shortages can constrain an industry's production potential and dampen GDP growth. To forecast any labour demand for an industry, historical data on GDP by industry is needed to project the potential output. GDP is also used to compose productivity estimates.

Although the Canadian System of Macroeconomic Accounts provides GDP data, it is not sufficiently granular to assess each 4-digit NAICS in agriculture. Data on farm cash receipts can be used to estimate, on a provincial basis, agriculture industries' contribution to gross domestic product. Combined, data on GDP and farm cash receipts can be used to assess production patterns in the agri-food sector.

The farm product price and industrial product price indexes show the relative change in commodity prices over time, or in other words, it shows inflation for

these commodities. Having price indexes for the various commodities and food processing industries allows for price comparisons. Data on inflation over time can indicate the relative stability of an industry which can be important with regards to investment. Furthermore, the price indexes can be used to convert nominal data (i.e. revenues) into real terms.

3.4.1 Canadian System of Macroeconomic Accounts

Source: Statistics Canada – Canadian System of Macroeconomic Accounts (Gross Domestic Product by Industry - Provincial and Territorial (Annual))

Source details: Gross Domestic Product by industry – Table: 36-10-0402-01

Variables: GDP in current dollars and chained 2012 dollars.

Frequency: Annual

Time period: 1997 – 2019

Available breakdowns: By province and industry.

Coverage: Industry level data are not completely sufficient for the Ontario agri-food sector. Ontario data are publicly available at 4-digit NAICS; however, some 4-digit NAICS codes are grouped together. For example, NAICS 1110, 1112, 1113, and 1119 are grouped together into NAICS 111A (crop production excluding greenhouse, nursery, and floriculture production). This dataset does not include NAICS 3123 (cannabis manufacturing) but does include cannabis production NAICS 111CU and 111CL (under crop production).

Recommendations: This data source provides a detailed enough breakdown to estimate GDP for the agri-food sector; however, data is not available for all the 4-digit NAICS in agriculture but is sufficient for food processing.

3.4.2 Farm Cash Receipts

Source: Statistics Canada – Farm Cash Receipts, Net Farm Income, Direct Payments to Agriculture Producers

Source details: Farm cash receipts – Table: 32-10-0046-01

Variables: Total farm cash receipts can be broken down to 1) total crop receipts, 2) total livestock and livestock product receipts, and 3) total receipts from direct payments.

Frequency: Quarterly

Time period: 1971Q1 – 2020Q2

Available breakdowns: By province and type of cash receipts (for each type of crop and livestock).

Notes: Farm-to-farm sales between provinces are included as are all sales outside the sector. However, all inter-farm sales within a province are excluded from farm cash receipts estimates, as their inclusion would result in double counting. Farm cash receipts less than $500 is reported as 0.

Coverage: Ontario data are available for all Canadian agriculture operations including NAICS 112110, 112120, 1122, 1123, 1124, 1129, 1111, 1112, 1113, 1114, and 1119 (as defined by the Census of Agriculture). Data does not sufficiently cover the Ontario agri-food sector since data for aquaculture (NAICS 1125), support services (NAICS 1151 and 1152), and food processing are not included.

Recommendations: Since data for GDP is not available for all relevant 4-digit NAICS industries, farm cash receipts can be used to estimate, on a provincial basis, the agriculture sector's contribution to gross domestic product.

Since this data does not cover NAICS 1125 (aquaculture), it is recommended to use data on production (in dollars and tonnes) for aquaculture found on Table: 32-10-0107-01. This data is available starting in 1991 with breakdowns by provinces and by type of aquaculture (i.e. salmon, trout, clams, oysters, etc.).

3.4.3 Farm Product Price Index

Source: Statistics Canada

Source details: Farm product price index – Table: 32-10-0098-01

Variables: Farm product price index (indexed to 2007)

Frequency: Monthly

Time period: January 1971 – June 2020

Available breakdowns: By province and commodity.

Notes: Commodity groups are based on North American Product Classification System (NAPCS) definitions (found here).

Coverage: Ontario data available for all agri-food commodity groups (includes grains, oilseeds, specialty crops, fresh fruit, fresh vegetables, fresh potatoes, cattle and calves, hogs, chickens and turkeys, eggs in shell, and unprocessed milk) starting in 1992. Does not sufficiently cover the Ontario agri-food sector since it excludes aquaculture and food processing.

3.4.4 Industrial Product Price Index

Source: Statistics Canada

Source details: Industrial Product Price Index – Table: 18-10-0029-01

Variables: Industrial Product Price Index (indexed to 2010)

Frequency: Monthly

Time period: January 2001 – July 2020

Available breakdowns: By product group.

Notes: Industry product groups are based on North American Product Classification System (NAPCS) definitions (found here).

Coverage: Data may not be sufficient for the Ontario agri-food sector since indexes are only for Canada. However, it is likely there is a close association between Ontario-level price changes and the Canada-level price changes, and thus, the Canada-level data could be sufficient for use in Ontario. Data does cover food processing since industrial products include meat, fish and dairy products, fruit, vegetables, feed and other food products, and beverages (except juices).

3.4.5 Input-Output Accounts

Source: Statistics Canada – Input-Output Accounts

Source details: Input-output multipliers – Table: 36-10-0595-01

Variables: Output, GDP (at market and basic prices), taxes on products, subsidies on products, labour income, wages and salaries, employer's social contributions, labour income of unincorporated sector, gross operating surplus, subsidies on production, taxes on production, international imports, and jobs.

Frequency: Annual

Time period: 2010 – 2016

Available breakdowns: By province, multiplier type (simple, direct, indirect, etc.) and industry.

Notes: Input-output multipliers provide estimates of economic impact per dollar of output delivered to final demand (final consumption expenditures, capital formation, or exports). Data are available about two and half years after the end of the reference year; this is because of the delay in obtaining the needed source data and by the complex nature of producing such a detailed account.[44]

Coverage: Data sufficiently covers the Ontario agri-food sector. However, industries are defined using Input-Output Industry Classification (not NAICS). Input-Output Industry Classification can be matched to NAICS (see chart here).

Recommendations: This data can be used to show the number of jobs created in the supply chain for every direct job in the agriculture sector.[45]

44 Statistics Canada, "Supply, Use and Input-Output Tables."
45 See example in the New Brunswick Agriculture Workforce Development Plan 2020-2024. Jupia Consultants Inc., Mellor Murry Consulting, and Vimino Recherche et Analyse Inc., "New Brunswick Agriculture Workforce Development Plan 2020 - 2024."

3.5 Business counts

An important aspect of assessing the labour market in Ontario involves knowing the number, location, and size of farm operations and food processing businesses. This data provides insight on the geographic distribution of agri-food production. Moreover, it allows researchers to track consolidation and examine the competitive landscape for businesses in specific industries. It is valuable to know where agri-food businesses are located, what they produce, and how labour-reliant they are. This allows researchers to analyze how many businesses would be affected by an isolated shock, like an extreme weather event. Similarly, if market conditions change supply or demand for certain commodities, it is important to know the number of farms this may impact.

The data for these LMI indicators comes from the Census of Agriculture and Business Register. The Census of Agriculture provides a more comprehensive dataset with breakdowns by province and smaller sub regions, farm type (corresponding to 4-digit NAICS), and by revenue class. However, this data is only published every five years and only includes the industries covered by the Census of Agriculture. The Business Register provides biannual data on the number businesses for various levels of employment. This data is available at the 4-digit NAICS and for both agriculture and food processing.

3.5.1 Census of Agriculture - Farm counts by commodity production

Source: Statistics Canada – Census of Agriculture

Source details: Farm count by farm type – Table: 32-10-0403-01

Historical data here

Variables: Number of farms[46]

Frequency: Every five years

Time period: 2001, 2006, 2011, 2016

Available breakdowns: By province, region (census division, census agricultural region, and census consolidated subdivision), and by farm type corresponding to NAICS.

Notes: Since NAICS is revised periodically, the NAICS codes (commodity production) will not match up perfectly between some censuses as NAICS changes. However, changes in farm types over time generally reflect a shift in farming activity. Farm-type data for the 2016 Census of Agriculture were derived using NAICS 2012. The 2011 Census of Agriculture data were derived using NAICS 2007.

Coverage: Data from the Census of Agriculture only covers agriculture (NAICS 1111, 1112, 1113, 1114, 1119, 1121, 1122, 1123, 1124, and 1129). Ontario data are publicly available at the 6-digit NAICS for the industries covered by the Census of Agriculture with no suppression.

46 Farms are defined as “census farms” by the Census of Population, see glossary for the definition of a census farm.

3.5.2 Census of Agriculture - Farm counts by revenue class

Source: Statistics Canada – Census of Agriculture

Source details: Farm count by class size of total gross farm receipts – Table: 32-10-0436-01

Farms classified by total gross farm receipts in 2015 constant dollars – Table: 32-10-0157-01

Historical data here

Variables: Number of farms[47], total gross farm receipts

Frequency: Every five years

Time period: 1976 – 2016, 1981 – 2016 (in five-year frequency).

Available breakdowns: There is a breakdown available by province and region (census division, census agricultural region, and census consolidated subdivision), at a revenue range from $10,000 and under, to over $2,000,000, with 7 other ranges between these two.

Notes: The revenue class of a farm is determined by the total gross farm receipts. In 2011, gross farm receipts and some operating expenses are understated at the aggregate level due to the increase in contractual arrangements (e.g., contract feeding), custom work performed by non-farmers, and the involvement in primary agriculture of large non-farm corporations such as food processors, meatpacking plants and others.

Coverage: Data from the Census of Agriculture only covers agriculture (NAICS 1111, 1112, 1113, 1114, 1119, 1121, 1122, 1123, 1124, and 1129). Ontario data on number of farms by revenue range are publicly available with no suppression. Some suppression in data on total gross farm receipts.

3.5.3 Business Register

Source: Statistics Canada – Business Register

Source details: Business counts by employment – Table: 33-10-0267-01

Older tables can be found here

Variables: Number of businesses

Frequency: Biannual – in June and December

Time period: June 2015 – June 2020

Available breakdowns: By province, employment size (8 categories), and industry (at 6-digit NAICS (2017)).

Notes: The table for each time period is published separately. Be cautious when combining datasets since Statistics Canada's Business Register changes the assignment of geographic codes and industry (NAICS) codes overtime.

Coverage: Publicly available data sufficiently covers the 4-digit NAICS codes in the Ontario agri-food sector. However, some data are not available for certain 4-digit NAICS (2017) in a specific reference period. Agri-food business counts are available down to 6-digit NAICS (2017), including NAICS 312310 (cannabis product manufacturing).

Recommendations: This data source is valuable because it covers the entire agri-food sector. It is especially useful for obtaining the number of businesses in aquaculture (NAICS 1125), support activities (NAICS 1151 & 1152) and food processing industries (NIACS 311 & 312) since they are not covered under the Census of Agriculture farm counts.

This data has also been used to estimate employment, specifically in smaller provinces which have more data suppression from other sources.[48] However, it is not an ideal approach since employment estimates are based off employment ranges. It would be a fallible assumption to decide on the level of employment to assign to each employment size class, especially the top open-ended employment class (500+).

47 Farms are defined as "census farms" by the Census of Population, see glossary for the definition of a census farm.
48 See example in the New Brunswick Agriculture Workforce Development Plan 2020-2024. Ibid.

3.6 Labour productivity

Labour productivity provides a measure for how efficient or productive labour is in each industry. Tracking labour productivity over time allows us to see whether labour is becoming more or less productive. Generally, labour becomes more productive as technology is employed because it enables workers to produce more output in less time. For example, the development of farm machinery drastically increased labour productivity in many agricultural industries. In turn, increases in labour productivity can alleviate some labour shortages when less labour is required to produce the same value of output. In the context of labour market forecasts, data on labour productivity are critical to forecasting labour demand.

Traditionally, labour productivity is measured by output per worker. However, this metric fails to capture the true labour input into production. Indeed, workers in different industries work different hours. Thus, data on hours worked is used to more accurately estimate labour productivity. For example, if two businesses within an industry have the same level of employment and generate the same level of output, one might assume equal labour productivity across the two. However, if employees at one business average 50-hour workweeks, while employees at the second business averages 30, the latter business is actually more productive.

Data on hours worked is valuable for other reasons as well. For example, a rising number of hours worked within an industry may highlight rising demands on current employees as businesses struggle to fill vacancies. To the extent that other industries are not experiencing similar increases in hours workers, this increase could dissuade potential recruits, but also increase turnover.

The Labour Force Survey provides the most comprehensive and frequent data on hours worked by industry and occupation. However, custom orders must be obtained (often at a cost) to receive the necessary amount of detail to cover the agri-food sector and some data are suppressed. The Survey of Employment, Payrolls and Hours provides hours by industry at 4-digit NAICS level which is sufficient only for food processing. Labour productivity can be estimated using data on hours from the LFS or SEPH and data on output from Statistics Canada. The Canadian System of Macroeconomic Accounts also produces annual estimates of hours and labour productivity by industry.

Chart 10 outlines the key sources of hours worked for the agri-food sector in Ontario, including the industry and occupation coverage of each source.

CHART 10: **Overview of sources of hours worked in Ontario**

Source	Frequency	NAICS available	NOC available
Labour Force Survey (LFS)	Monthly	4-digit NAICS for agri-food (need to custom order)	4-digit NOC for agri-food (need to custom order)
Survey of Employment, Payroll, and Hours (SEPH)	Monthly	4-digit NAICS for food processing	N/A
Canadian System of Macroeconomic Accounts (CSMA)	Annual	4-digit NAICS for agri-food (1110, 1112, 1113, and 1119 combined)	N/A

3.6.1 Labour Force Survey

Source: Statistics Canada – Labour Force Survey

Source details: Actual hours worked by industry – Table: 14-10-0036-01

Actual hours worked by occupation – Table: 14-10-0299-01

Usual hours worked by occupation – Table: 14-10-0298-01

Average hours worked by type of work (part-time and full-time) – Table: 14-10-0042-01

List of other LFS tables found here

Variables: total usual hours, average usual hours, total actual hours, and average actual hours.

Frequency: Monthly

Time period: January 1987 – August 2020

Available breakdowns: By province, class of worker (employee or self-employed), sex, occupation, and industry. Table: 14-10-0042-01 has breakdown by age group.

Notes: Full-time employment consists of persons who usually work 30 hours or more per week at their main or only job. Part-time employment consists of persons who usually work less than 30 hours per week at their main or only job. The LFS reference week usually contains the 15th day of the month and stretches from Sunday to Saturday.

Coverage: Publicly available data do not sufficiently cover all the 4-digit NAICS or 4-digit NOC codes in the Ontario agri-food sector. Ontario data are available for agriculture (defined as NAICS 111-112, 1100, 1151-1152) and manufacturing (defined as NAICS 31-33) which does not meet our definition of the agri-food sector. Ontario data are publicly available at 2-digit NOC (2016) codes with no suppression.

Recommendations: It is possible to obtain more detailed dataset from Statistics Canada though a custom order. Keep in mind there will be suppression, especially when looking at occupation by industry.

Example tables that could be ordered:

Table A: Average hours and wages by selected industries showing class of worker, type of work, job permanency, age and sex, Ontario, monthly.

Table B: Average hours and wages by selected occupations showing class of worker, type of work, job permanency, age and sex, Ontario, monthly.

3.6.2 Survey of Employment, Payrolls and Hours

Source: Statistics Canada – Survey of Employment, Payrolls and Hours

Source details: Average weekly hours by industry – Table: 14-10-0255-01

Standard work week by industry – Table: 14-10-0211-01

Variables: Number of hours

Frequency: Monthly

Time period: January 2001 – June 2020

Available breakdowns: By province and industry (excluding agriculture). Data on average weekly hours can include or exclude overtime.

Coverage: This data set does not sufficiently cover the Ontario agri-food sector since the SEPH does not cover any agriculture industries. Ontario data are available at 4-digit NAICS (2017) breakdown for food processing. However, around 60 percent of data are not available at the 4-digit NAICS breakdown because they were too unreliable to be published or have been suppressed to meet the confidentiality requirements of the *Statistics Act*.

3.6.3 Canadian System of Macroeconomic Accounts

Source: Statistics Canada – Canadian System of Macroeconomic Accounts (Canadian Productivity Accounts)

Source details: Labour statistics – Table: 36-10-0489-01

Labour productivity by industry – Table: 36-10-0480-01

Variables: Total number of jobs, number of employee jobs, number of self-employed jobs, hours worked for all jobs, hours worked for employee jobs, hours worked for self-employed jobs, annual average number of hours worked for all jobs, annual average number of hours worked for employee jobs, annual average number of hours worked for self-employed jobs, total compensation for all jobs, compensation of employees, self-employed income, total compensation per job, total compensation per hour worked, employee's compensation per hour worked, nominal value added, real value added, labour productivity, unit labour cost (in CAD and USD), and labour share.

Frequency: Annual

Time period: 1997 – 2019

Available breakdowns: By province and industry.

Notes: Labour productivity is the ratio between real value added and hours worked. Real value added for each industry and each aggregate is constructed from a Fisher chain index.[49]

Coverage: This data source provides a detailed enough breakdown to estimate hours and labour productivity for the aggregate Ontario agri-food sector. Ontario data are publicly available at 4-digit NAICS; however, some 4-digit NAICS codes are grouped together. For example, NAICS 1110, 1112, 1113, and 1119 are grouped together into NAICS 111A (crop production excluding greenhouse, nursery, and floriculture production). Thus, breakdown by 4-digit NAICS are not sufficient for agriculture. Breakdown by 4-digit NAICS are sufficient for food processing except does not include NAICS 3123 (cannabis manufacturing).

3.7 Wages and compensation

Wages are an important aspect of the labour market since labour market tightness or weakness is often reflected in wages. When the labour market is tight (weak) there is upward (downward) pressure on wages. Comparing wages across occupations and industries can provide insight on wage gaps and inequalities. It can also provide a better understanding of the relative competitiveness of occupations and industries, with more competitive jobs generally offering relatively higher wages. Furthermore, comparing compensation across industries can provide an understanding of additional benefits received.

Wages and salaries broadly refer to the monetary compensation that employees receive for work performed.[50] It represents the many types of payments given to all employees regardless of their type of work (full- or part-time), method of payment or duration of employment. Wages and salaries are often used interchangeably. The essential difference between them is that salaries typically refer to a fixed amount per pay period, usually per year or per month, while wages refer to an amount paid per hour.[51] Compensation is the value of all benefits, whether in the form of a paycheck or other benefits paid by the employer, that an employee receives. Wages and compensation are estimated from employer surveys, household surveys and extraction of data from administrative databases.[52] Note, the definitions of wages and salaries vary across data sources (see Text Box next page).

The Labour Force Survey provides the most frequent wage data for all industries, occupations, and provinces. However, data published on the Statistics Canada website does not have the level of detail necessary to assess the agri-food sector. As such, custom requests must be obtained (often at a cost). Also, the breakdown for wages by occupation for each industry is highly suppressed because of the small sample size in each NOC / NAICS subgroup. The Survey of Employment, Payroll, and Hours does publish the detailed (4-digit NAICS) industry

49 More information about the Fisher Chain Index found here.
50 Labour Market Information Council, "Wages and Salaries."
51 Ibid.
52 Ibid.

DEFINITIONS OF WAGES AND COMPENSATION

LABOUR FORCE SURVEY:

Wages measure the usual wages or salary of employees at their main job which:

- excludes contributions to pension plans, insurance (EI, etc.), and retirement allowances,
- excludes overtime,
- is before taxes and other deductions,
- and includes tips, commissions, and bonuses.[53]

Each month, LFS respondents are asked to report their current and usual earnings (including if paid by piece rate) at their main job. Respondents can report their earnings in the form of their choice (annual salary, biweekly earnings, etc.). Earnings are converted into hourly, weekly, and monthly wage rates based on the typical number of hours worked reported (both for employed and self-employed workers).[54]

JOB VACANCY AND WAGE SURVEY:

JVWS collects data on the average hourly offered wage which refers to the average hourly wage offered by employers for vacant positions. It excludes overtime, tips, commissions, and bonuses. Salaries are converted to hourly wages based on information regarding the salary frequency and the expected average number of hours worked per week. The offered wage will be different from the actual wage paid once the position is filled.[55]

JVWS no longer collects data on average hourly wages paid to full-time employees. The collection of this wage data has been suspended until further notice to review and improve the data collection methodology.[56]

SURVEY OF EMPLOYMENT, PAYROLLS AND HOURS:

Average weekly earnings (including and excluding overtime) are calculated as the gross taxable payroll divided by the total number of weekly paid hours which:

- excludes contributions to pension plans, insurance (EI, etc.) and retirement allowances,
- includes or excludes overtime and special payments (both reported),
- is before taxes and other deductions,
- and includes tips, commissions, and bonuses.[57]

The SEPH collects wage information through a combination of payroll deduction accounts provided by the Canada Revenue Agency (CRA) and the Business Payrolls Survey (BPS). The BPS gathers a representative sample of payroll data from employers.[58]

CENSUS OF POPULATION:

Gross wages collected by the Census of Population:

- excludes contributions to pension plans, insurance (EI, etc.), and retirement allowances,
- includes overtime,
- is before taxes and other deductions,
- and includes tips, commissions, and bonuses.[59]

In the past, income statistics were collected on the long-form questionnaire.[60] However, the most recent 2016 Census, derived income statistics, including wages and salaries, from the CRA administrative data (including T1, T4 and records from other tax files). This was done to reduce response burden and increase the quality and quantity of income statistics available.[61] Income data from the Census of Population is also cross-referenced with many demographic variables.

CANADIAN SYSTEM OF MACROECONOMIC ACCOUNTS:

The Canadian System of Macroeconomic Account's reports labour compensation (also referred to as labour income) which:

- includes contributions to pension plans, insurance (EI, etc.), and retirement allowances,
- and includes an imputed labour income for self-employed workers.[62]

Labour compensation is comprised of two components: wages and supplementary labour income. Supplementary labour income includes employers' contributions to private and public sector pension plans, Canada and Quebec pension plans, Employment Insurance (EI), workers' compensation, health and life insurance plans, and retirement allowances.[63]

53 Statistics Canada, "Guide to the Labour Force Survey, 2020."
54 Labour Market Information Council, "Wages and Salaries."
55 Statistics Canada, "Guide to the Job Vacancy and Wage Survey, 2019."
56 Labour Market Information Council, "Wages and Salaries."
57 Statistics Canada, "Guide to the Survey of Employment, Payrolls and Hours."
58 Labour Market Information Council, "Wages and Salaries."
59 Statistics Canada, "Dictionary, Census of Population, 2016 - Wages, Salaries and Commissions."
60 Labour Market Information Council, "Wages and Salaries."
61 Ibid.
62 Statistics Canada, "User Guide: Canadian System of Macroeconomic Accounts: Chapter 5 Income and Expenditure Accounts."
63 Ibid.

breakdown for wages, however, it only covers food processing and some data is suppressed. The Census of Population, on the other hand, contains more detailed breakdowns for wages with no suppression. However, the Census of Population is only conducted every five years and can take a long time for the data to be published after the census is completed. Yet, the Census of Population is the most reliable source for demographic information about wages and income.

The Job Vacancy and Wage Survey and the Canadian System of Macroeconomic Account (Canadian Productivity Accounts) provide supplemental data on wages offered and compensation. The JVWS produces data on the average hourly wage offered by employers for vacant positions which will be different from the average actual wage paid to all employees in each NOC group. The CSMA produces data on the total compensation received by employees. These two data sets can provide insight about what employers are willing to pay and the final cost of labour.

Chart 11 outlines the key sources of wages for the agri-food sector in Ontario, including the industry and occupation coverage of each source.

3.7.1 Labour Force Survey

Source: Statistics Canada – Labour force survey

Source details: Wages by occupation – Table: 14-10-0306-01

Wages by industry – Table: 14-10-0063-01

Variables: Total wages, average and median hourly wage rate, and average and median weekly wage rate

Frequency: Monthly

Time period: January 1997 – August 2020

Available breakdowns: Wages by occupation are broken by province, sex, and age group. Wages by industry broken down by province, sex, age group, and type of work (full-time and part-time).

Coverage: Publicly available data do not sufficiently cover all the 4-digit NAICS or 4-digit NOC codes in the Ontario agri-food sector. Ontario data are available for agriculture (defined as NAICS 111-112, 1100, 1151-1152) and manufacturing (defined as NAICS 31-33) which does not meet our definition of the agri-food

CHART 11: **Overview of sources of wages in Ontario**

Source	Frequency	NAICS available	NOC available
Labour Force Survey (LFS)	Monthly	4-digit NAICS for agri-food (need to custom order)	4-digit NOC for agri-food (need to custom order)
Survey of Employment, Payroll, and Hours (SEPH)	Monthly	4-digit NAICS for food processing	N/A
Census of Population	Every five years	4-digit NAICS for agri-food (1111, 1112, 1113, 1119, 1121, 1122, 1123, 1124, and 1129 combined)	4-digit NOC for agri-food
Job Vacancy and Wage Survey (JVWS)	Quarterly	3-digit NAICS for agri-food	4-digit NOC for agri-food (highly suppressed)
Canadian System of Macroeconomic Accounts (CSMA)	Annual	4-digit NAICS for agri-food (1110, 1112, 1113, and 1119 combined)	N/A

sector. Industries are defined using NAICS (2012) classification and do not include NAICS 3123. Ontario data are publicly available at 2-digit NOC (2016) codes with NOC 01-05 and 07-09 suppressed.

Recommendations: Would need to custom order from Statistics Canada to get 4-digit NOC and 4-digit NAICS breakdown, however there will be suppression especially if getting the breakdown for occupation by industry as there are too few sample observations in many of these subgroups.

3.7.2 Survey of Employment, Payrolls and Hours

Source: Statistics Canada – Survey of Employment, Payrolls and Hours

Source details: Weekly earnings by industry – Table: 14-10-0203-01

Hourly earnings for employees paid hourly by industry – Table: 14-10-0205-01

Hourly earnings for employees on salary by industry – Table: 14-10-0209-01

Variables: Average weekly wage and average hourly wage.

Frequency: Monthly

Time period: January 2001 – June 2020

Available breakdowns: By province, type of employee (salaried or paid hourly), by overtime (including or excluding) and by industry (excluding agriculture).

Notes: Average hourly earnings for salaried employees includes overtime.

Coverage: This data set does not sufficiently cover the Ontario agri-food sector since the SEPH does not cover any agriculture industries. Ontario data available at 4-digit NAICS (2017) breakdown for food processing. However, around 60 percent of data are not available at the 4-digit NAICS breakdown because they were too unreliable to be published or have been suppressed to meet the confidentiality requirements of the *Statistics Act*.

3.7.3 Census of Population

Source: Statistics Canada – Census of Population

Source details: Income statistics by industry – Catalogue number: 98-400-X2016359

Income statistics by occupation – Catalogue number: 98-400-X2016281

All tables with income statistics found here

Variables: Total employment income, median employment income, average employment income, median wages, salaries and commissions, and average wages, salaries and commissions.

Frequency: Every five years

Time period: 2016 (earlier censuses are available going back to 1971, excluding 1976, however, it is challenging to combine census datasets since definitions and classifications change over time)

Available breakdowns: By province and census sub-regions, sex, work activity (full-time and part-time), industry, and occupation. Income by industry also comparable by age group, class of worker (employee, self-employed and unpaid family worker), Aboriginal identity, immigration period, and visible minority status.

Notes: The version of the NAICS and NOC system used will change between surveys.

Coverage: Publicly available data are not completely sufficient for Ontario agriculture since NAICS 1111, 1112, 1113, 1119, 1121, 1122, 1123, 1124, and 1129 are grouped together into 1110 “Farms”. Data are sufficient for Ontario food processing since all 4-digit NAICS (2012) industries are available except NAICS 3123 (cannabis manufacturing). Ontario income statistics are publicly available for 4-digit NOC (2016) codes with no suppression.

Recommendations: The Census of Population provides the most detailed income statistics comparable by many demographic characteristics. Custom data tables can be ordered with the provincial breakdown of occupation at 4-digit NOC by industry at 4-digit NAICS, but Statistics Canada is unable to separate 1110 into NAICS 1111 to 1113, 1119 to 1124 and 1129. Income data reported is annual and is not recommended to use for hourly or weekly wage estimations.

3.7.4 Job Vacancy and Wage Survey – Offered wages for vacant jobs

Source: Statistics Canada – Job Vacancy and Wage Survey

Source details: Average offered hourly wage by industry – Table: 14-10-0326-01

Average offered hourly wage by occupation – Table: 14-10-0328-01

Variables: Job vacancies, job vacancy rate (by industry), proportion of job vacancies, and average offered hourly wage (for vacant positions).

Frequency: Quarterly

Time period: 2015Q1 – 2019Q3

Available breakdowns: By province, industry, and occupation.

Notes: The average hourly wage offered by employers for vacant positions will be different from the actual wage paid once the position is filled. It excludes overtime, tips, commissions and bonuses. JVWS's data on paid wages (Table: 14-10-0103-01) has been suspended. Statistics Canada is not producing custom tables from the Job Vacancy and Wage Survey currently.

Coverage: Data are not available at the 4-digit NAICS level required for the Ontario agri-food sector. Most wage data are available at the 3-digit NAICS (2017) for Ontario with a few data points missing because they were too unreliable to be published or they were suppressed to meet the confidentiality requirements of the *Statistics Act*. All Ontario data are available at the 2-digit NAICS (2017) level with most of the data deemed excellent quality.

Data are available at the 4-digit NOC level required for the Ontario agri-food sector; however, around one third of data at the 4-digit NOC (2016) level is blank because it is too unreliable to be published or it has been suppressed to meet the confidentiality requirements of the *Statistics Act*. All Ontario data are available at the 1 and 2-digit NOCS level with most the data deemed excellent quality.

3.7.5 Canadian System of Macroeconomic Accounts

Source: Statistics Canada – Canadian System of Macroeconomic Accounts (Canadian Productivity Accounts)

Source details: Labour statistics – Table: 36-10-0489-01

Variables: Total number of jobs, number of employee jobs, number of self-employed jobs, hours worked for all jobs, hours worked for employee jobs, hours worked for self-employed jobs, annual average number of hours worked for all jobs, annual average number of hours worked for employee jobs, annual average number of hours worked for self-employed jobs, total compensation for all jobs, compensation of employees, self-employed income, total compensation per job, total compensation per hour worked, employee's compensation per hour worked.

Frequency: Annual

Time period: 1997 – 2019

Available breakdowns: By province and industry.

Notes: Data are based on administrative tax files and surveys (e.g., the LFS and SEPH).

Coverage: Industry level data are not completely sufficient for the Ontario agri-food sector. Ontario data are publicly available at 4-digit NAICS; however, some 4-digit NAICS codes are grouped together. For example, NAICS 1110, 1112, 1113, and 1119 are grouped together into NAICS 111A (crop production excluding greenhouse, nursery, and floriculture production). This dataset does not include NAICS 3123 (cannabis manufacturing).

Recommendations: Comparing compensation across industries can provide an understanding of the additional value of 'in-kind' benefits received in specific industries. Certain industries may have lower wages but offer other benefits which could make up for the lower wages. As such, it is important to be aware that wages only may not cover all the benefits received by employees.

3.8 Education

Education level is an important characteristic of any labour market. Since the labour market involves matching workers with available positions, part of the matching process includes matching the education level of the worker to the education level required by the employer. As such, having data on education levels of workers and educational requirements for jobs is important when assessing any labour market. The JVWS provides data on the minimum level of education sought by employers for vacant positions while the Census of Population and Census of Agriculture provide data on the education levels of all employees and farm operators.

Data on education level by occupation gives insight into the barriers to enter an occupation, the type of work performed, and the potential earnings. High education levels come with a cost and occupations requiring higher levels of education can deter workers. In turn, an occupation with lower education requirements can be perceived as an undesirable job and deters individuals with higher education levels. Looking at education levels could shed light on reasons for labour shortages, for example, not enough workers with specific education. Furthermore, public policy may have a role to play in ensuring workers have the sufficient education levels to match the available jobs.

3.8.1 Job Vacancy and Wage Survey

Source: Statistics Canada – Job Vacancy and Wage Survey

Source details: Education, certification, and experience requirements for job vacancies – Table: 14-10-0328-01

Variables: Job vacancies, proportion of job vacancies and average offered hourly wage

Frequency: Quarterly

Time period: 2015Q1 – 2019Q3

Available breakdowns: By province, by job vacancy characteristics (include type of work (full time and part time), minimum level of education sought (includes a category that cover vacancies for which there is high school diploma, university certificate or diploma below bachelor's level, Bachelor's degree, university certificate or diploma above bachelor's level and no educational requirement), certification requirements, minimum experience requirement, duration of job vacancy, type of position (permanent or temporary), recruitment strategy, duration of job vacancy (<15days, 15-29 days, 30-59 days, 60-89 days, 90+ days, and constantly recruiting)) and occupation.

Notes: Statistics Canada is not producing custom tables from the Job Vacancy and Wage Survey currently.

Coverage: Data are available at the 4-digit NOC level required for the Ontario agri-food sector; however, around two-thirds of data at the 4-digit NOC (2016) level is blank because it is too unreliable to be published or it has been suppressed to meet the confidentiality requirements of the *Statistics Act*.

3.8.2 Census of Population

Source: Statistics Canada – Census of Population

Source details: Education by occupation – Catalogue number: 98-400-X2016258 and Catalogue number: 98-400-X2016281

Education by industry – Catalogue number: 98-400-X2016358 and Catalogue number: 98-400-X2016359

All tables from the 2016 Census of Population with education statistics found here

Variables: Education attainment (the highest-level degree, diploma, or certificate attained by a worker)

Frequency: Every five years (with census)

Time period: 2016 (earlier censuses are available going back to 1971, excluding 1976, however, it is challenging to combine census datasets since definitions and classifications change over time)

Available breakdowns: By province, sex, age group, occupation, industry, Aboriginal identity, class of worker, immigrant status, major field of study, location of studies, first official language, language used most often at work, and other family characteristics.

Notes: The version of the NAICS and NOC system used will change between surveys.

Coverage: Publicly available data are not completely sufficient for Ontario agriculture since NAICS 1111, 1112, 1113, 1119, 1121, 1122, 1123, 1124, and 1129 are grouped together into 1110 "Farms". Data are sufficient for Ontario food processing since all 4-digit NAICS (2012) industries are available, excluding NAICS 3123 (cannabis manufacturing). Education attainment and major field of study are publicly available for 4-digit NOC (2016) codes with no suppression.

Recommendations: Custom data tables can be ordered with the provincial breakdown of occupation at 4-digit NOC by industry at 4-digit NAICS, but they are unable to separate 1110 into NAICS 1111 to 1113, 1119 to 1124 and 1129.

3.8.3 Census of Agriculture

Source: Statistics Canada – Census of Agriculture (through the Agriculture-Population Linkage program)

Source details: Educational attainment of farm operators – Table: 32-10-0024-01

Historical data on farm operators with university degrees from 2001 and 2006 found here.

Variables: Number of farm operators

Frequency: Every five years

Time period: 2016

Available breakdowns: By province, farm type (associated with a 4-digit NAICS (2012)), and educational attainment (six categories). Educational attainment has six categories; no certificate, diploma, or degree, secondary high school diploma, apprenticeship or trades certificate or diploma, college, CEGEP, or other non-university certificate or diploma, university certificate or diploma below bachelor level, and university certificate, diploma, or degree at bachelor level.

Coverage: Data from the Census of Agriculture does not sufficiently cover the Ontario agri-food sector since it does not include data on aquaculture (NAICS 1125), support activities (NAICS 1151 and 1152) and food processing. Data are available for educational attainment by farm type associated with NAICS (2012) 1111, 1112, 1113, 1114, 1119, 112110, 112120, 1122, 1123, 1124, and 1129 with no suppression.

3.9 Skills

Skills encompass the wide range of abilities workers may have. It is important to understand the skill profiles or average skill levels in specific industries, occupations, and regions in order to deal with labour imbalances. Certain skills are essential for specific occupations and thus if there is a labour shortage it may be because there are not enough qualified workers to fill the vacant positions. In turn, knowing the skills in demand can guide policies and programs help to fill those gaps.

In the past, there has not been a standardized skills framework in Canada besides the broad skill levels defined in the NOC system. However, these skill levels centre around education levels which are not always a good representation of the skills required for an occupation. In turn, work is being done to fill this gap by the Future Skills Centre which is a partnership between Blueprint, Ryerson University, and The Conference Board of Canada and funded by the Government of Canada's Future Skills Program.

The Future Skills Centre has been working on mapping the United States' O*NET database to the Canadian NOC system. The O*NET Content Model is a comprehensive framework with data on worker characteristics (such as abilities and interests), worker requirements (such as skills and education), experience requirements (such as certification and training), occupational requirements (such as work activities and context), and occupation-specific information (such as tasks and technology skills) for each occupation. More information on the O*NET Content Model can be found here.

According to the O*NET Content Model, skills refer to proficiencies or competencies that are developed through training or experience. O*NET Content Model contains 35 skills, classified into seven areas: content, process, social, complex problem solving, technical, systems, and resource management. O*NET trained occupational analysts give each skill an importance rating (between 1 and 5) and level rating (between 1 and 7) for every occupation.[64]

The Future Skills Centre has also been collecting data on skills from Vicinity Jobs which web scrapes data from job posting websites. Skills, according to Vicinity Jobs, is a very broad concept which covers essentially all competences and equipment requested in a job posting that are not actual certificates. For each job posting, only the skills required will be listed. Vicinity Jobs classifies skills into four areas: general/soft skills, specialized skills, technologies, and tools and equipment.

Lastly, by combining the O*NET- NOC framework with Vicinity Jobs data, the Future Skills Centre is developing a job transition data set. This data set maps viable and desirable job transitions given they fit a certain criterion (i.e. similar skills, similar wages, etc.). This data set provides information about where labour from less demanded occupations can go and where labour for in-demand occupations can come from.

As mentioned earlier, skills shortages or gaps often lead to labour shortages. Yet, to incentivize business owners or governments to engage in upskilling or training programs, they need to be shown the benefits of said programs, in other words their return on investment (ROI).

$$ROI = \frac{\textit{Value of program benefits} - \textit{Value of program costs}}{\textit{Value of program costs}}$$

The difficulty in estimating ROI for upskilling or training programs is in estimating the value of benefits from the program which could include increases in labour supply, labour productivity, wages, employee retention, and sales. Having accurate and detailed data on skills will help in estimating the return on investment because it will allow businesses and governments to understand how certain skill profiles can transition into more valuable skill profiles and then compare the value of the new skill profile to the investment made on the upskilling program.

Looking forward, understanding the future demand for skills in the agri-food sectors will be key to assessing future labour shortages and growth potential within the sector. Future skill needs may be approximated by combining skills databases such as Future Skill's Centre's O*NET-NOC framework with occupational forecasts. However, the prevalent Canadian Occupational Projection System (COPS)

64 Fleisher and Tsacoumis, "O*NET Analyst Occupational Skills Ratings: Procedures Update."

produced by ESDC is limited in its ability to forecast agri-food occupation since it does not include temporary foreign worker positions. Without this large source of labour, the COPS will underestimate the demand for occupations which rely on TFWs. The Conference Board of Canada is developing their own, more detailed, occupational forecast which could be considered for use in future research and there is potential to work with the Conference Board of Canada to build a forecast which factors in TFWs.

3.9.1 ESDC Skills and Competencies Taxonomy

Source: Employment and Social Development Canada (ESDC)

Source details: Skills and Competencies Taxonomy

Variables: Set of terminology across seven main categories; skills, personal abilities and attributes, knowledge, interests, work context, work activities, and tools and technology.

Frequency: N/A

Time period: N/A

Available breakdowns: N/A

Notes: The Taxonomy was constructed based on ESDC products (e.g. Career Handbook, Skills and Knowledge Checklist, and Essential Skills profiles), the O*Net system, as well as a variety of national and international competency-based frameworks.

Coverage: The Skills and Competencies Taxonomy is composed of hundreds of occupational descriptors used in the labour market to describe job requirements and/or individuals' personal characteristics.

Recommendations: ESDC's Skills and Competencies Taxonomy is a set or terminology built to help facilitate dialogue on skills in Canada.

3.9.2 O*NET-NOC Skills framework

Source: Future Skills Centre – O*NET- NOC Skills framework

Source details: O*NET database has been mapped to Canadian NOC codes – O*NET database

Variables: Skills, abilities, and knowledge for each 4-digit NOC (2016)

Frequency: O*NET updates annually (although not all occupations are updated every year)

Time period: 2010 - 2019 (not published yet)

Available breakdowns: By 4-digit NOC (2016). Average skills profiles by province, age group, or sex can be estimated using Census of Population data on the number of workers in each NOC by province, age group, and sex.

Notes: Not all O*NET occupations could perfectly map to NOC occupations; economists' judgment was used to fill in the blanks.

Coverage: Dataset includes 35 skill and 52 ability measures for each 4-digit NOC (2016) occupation with no suppression which is sufficient for the Ontario agri-food sector. For each skill there is a level and importance measure. This data is pending publication.

Recommendations: Despite being Canada's most detailed occupation breakdown, some 4-digit NOC categories cover a wide range of activities. For example, an egg grader and a combine operator are both jobs which fall under general farm worker (NOC 8341), yet they require different skill sets. Since the skills from the O*Net framework are mapped to 4-digit NOC codes, it will miss any occupation diversity that is not captured by the NOC system. Future research should be done to assess the accuracy of the NOC system in classifying occupations within the agri-food sector and propose updates accordingly.

Occupational forecasts can be used to forecast the skills and abilities found in this database. ESDC has a Canadian Occupational Projection System (COPS) which produces an occupational forecast (found here). The COPS does not include temporary foreign worker positions in their forecast which limits its ability to accurately forecast agri-food occupations. The Conference Board of Canada is developing their own, more detailed, occupational forecast and there is potential to work with the Conference Board of Canada to build a forecast which incorporates TFWs.

3.9.3 Vicinity Jobs

Source: Vicinity Jobs

Source details: Data from online job postings – http://www.vicinityjobs.com/

Variables: Job posting characteristics, including skills, education, experience, certificates required, location, occupation, industry, and wages.

Frequency: Published monthly (but can be daily since job postings are dated)

Time period: June 2018 – August 2020

Available breakdowns: Job postings by province, region, 4-digit and 6-digit NAICS industry (although many job postings are missing NAICS assignments), and 4-digit NOC occupation.

Notes: This data must be purchased since it is not publicly available. Data is web-scraped from many sources, including bcjobs.ca, indeed.com, AllStarJobs.ca, monster.ca, saskjobs.ca, regionalhelpwanted.com, etc.

Coverage: Vicinity Jobs' database covers a larger number of job posting characteristics for regions across Canada. Job postings are assigned a 4-digit NOC occupation which is sufficient for the Ontario agri-food sector. There is no suppression in this data.

Recommendations: Data on job postings can be helpful in determining in demand jobs and skills.

3.9.4 Future Skills Centre

Source: Future Skills Centre (FSC) – job transitions database

Source details: Using data from O*NET and Vicinity Jobs, FSC created a database of viable and desirable job transitions for every occupation.

Variables: Viable occupation transitions (based on the similarity score and skill level) and desirable occupation transitions (based on the similarity score, skill level, occupation growth rate, and wage).

Frequency: O*NET updated annually, and Vicinity Jobs published monthly

Time period: 2018 – 2019 (not published yet)

Available breakdowns: The viability component is the same for all jobs across Canada. The desirability component can vary by province or region using Census of Population data.

Notes: As part of the FSC's quantitative work, each occupation is given a similarity score to every other occupation. The similarity score measures the likeness of two occupations and is estimated using a metric called *cosine similarity*.

Coverage: Job transition data available for every 4-digit NOC (2016) code which is sufficient for the Ontario agri-food sector. This data is pending publication.

Recommendations: This data set could help to identify current and potential future skills shortages, as well as which occupations in other sectors of the economy could alleviate these shortages. However, the usefulness of this data will depend on the accuracy of NOC classification of occupations within the agri-food sector. Future research should be done to assess the accuracy of the NOC system in describing occupations in the agri-food sector and propose updates accordingly.

3.10 Population and migration

Migration, which is the movement of people across areas, is an important component of labour supply. Data on migration provides information on how the labour market is evolving in a given area. For example, a labor market in an area with positive net international migration is gaining immigrants which grows its labour supply. Furthermore, data from the Census of Population on mobility status (which includes internal migrants, intraprovincial migrants, interprovincial migrants, and external migrants) by educational attainment, sex, and age by can reveal how the composition of labour supply is changing over time. For example, an area may be losing highly educated workers and gaining less educated workers which will change the composition of the labour supply. Similarly, younger workers may be migrating out of an area which will increase the average age of the labour supply. The Census of Population provides the most detailed data on migration demographics while Annual Demographic Estimates from Statistics Canada provides simple statistics on population by province.

3.10.1 Annual Demographic Estimates

Source: Statistics Canada – Annual Demographic Estimates

Source details: Population estimates – Table: 17-10-0005-01

Variables: Population and median age

Frequency: Annual

Time period: 1971 – 2019

Available breakdowns: By province, sex, and age group.

Notes: Data for the Northwest Territories and Nunavut begin in 1991.

Coverage: Provincial level data available for all age groups except data for the over 90 groups only begins in 2001.

3.10.2 Census of Population

Source: Statistics Canada – Census of Population

Source details: Labour force and mobility status – 2006, 2011, 2016

All tables from the 2016 Census of Population with mobility and migration statistics found here

Variables: In the labour force, employed, unemployed, not in the labour force, participation rate, employment rate, unemployment rate.

Frequency: Every five years

Time period: 2006, 2011, 2016 (earlier censuses are available going back to 1971, excluding 1976, however, it is challenging to combine census datasets since definitions and classifications change over time)

Available breakdowns: By province, sex, age group, occupation, industry, immigrant status, major field of study, location of studies, first official language, language used most often at work, and other family characteristics.

Notes: Mobility Status 5 Years Ago refers to the status of a person with regard to the place of residence on the reference day in relation to the place of residence on the same date five years earlier. Includes internal migrants, intraprovincial migrants, interprovincial migrants, and external migrants.

Coverage: Publicly available data do not sufficiently cover all the 4-digit NAICS or 4-digit NOC codes in the Ontario agri-food sector.

Recommendations: Custom data tables can be ordered with the provincial breakdown for occupation at 4-digit NOC and industry at 4-digit NAICS, but Statistics Canada is unable to separate industry "1110" into NAICS 1111 to 1113, 1119 to 1124 and 1129.

4.0 Conclusion

The agri-food sector is a vital part of the Ontario's labour market – accounting for 2.7 per cent of employment in Ontario in 2018.[65] Yet, it continues to face labour shortages which threaten its ability to grow in the future. The CAHRC, with funding through the Canadian Agricultural Partnership, is developing a standard LMI framework for Ontario's agri-food sector in an effort to understand and address these labour shortages.

This LMI framework provides a foundation for researchers and other stakeholders looking to find labour market data and information on the agri-food sector. The following commentary summarizes how this research has met its four objectives, which include:

1. Review existing data describing the agriculture and agri-food workforce in Ontario;
2. Identify existing data sets available to stakeholders that describe the scope of the workforce and its current and future needs;
3. Propose a framework of common terminology and best practices in generating labour market information in the agriculture and agri-food sector;
4. Identify gaps in knowledge of agricultural labour markets including information on technology adoption;

Moreover, this section provides recommendations for the LMI framework.

Objective 1 & 2 - Review, identify and assess available LMI data

The bulk of this report addresses the first two objectives by reviewing existing data and identifying the relevant data sets for LMI in the Ontario agri-food sector.

Before we could review LMI data, we had to develop a clear definition of the agri-food sector in terms of industries and occupations (outlined Section 1.0). We define the agri-food sector as the combination of agriculture and food processing. The former comprises all farming activities, including crop production (NAICS 111), animal production and aquaculture (NAICS 112), and support activities for crop and animal production (NAICS 1151 & 1152). In turn, food processing is composed of food (NAICS 311) and beverage manufacturing (NAICS 3121) with tobacco manufacturing (NAICS 3122) excluded. In terms of occupations, we include all 4-digit NOC occupations employed within either agriculture or food processing.

After the agri-food sector was defined, we evaluated the major sources of LMI data in Canada. The five most used sources of LMI data available to stakeholders are: the Canadian System of Macroeconomic Accounts, Census Program, Labour Force Survey, Job Vacancy

65 Fleisher and Tsacoumis, "O*NET Analyst Occupational Skills Ratings: Procedures Update."

and Wage Survey, and the Survey of Employment, Payroll and Hours. Data from these sources are used to describe the agri-food sector workforce.

Leveraging these major sources of LMI data, we conducted an environmental scan to determine which indicators should be considered in a comprehensive LMI framework. This was done by consulting recent studies and reports on the agri-food sector labour market and taking note of the data used and LMI indicators presented.

Finally, we assessed our LMI data on its timeliness to allow for current analysis, availability over time to allow for the analysis of trends, and sufficient coverage of the agri-food sector. We also made sure the LMI indicators would be comprehensive enough to facilitate in estimating labour supply and labour demand, both currently and in the future. Where existing data was insufficient or lacking, we identified approaches for collecting this information by other means.

Objective 3 - Propose LMI framework and best practices

An LMI framework involves a set of common terminology for key terms, such as employment and job vacancies. However, our scan of labour market data highlighted how varying data sources will often have their own definitions for these key terms. The result is discrepancies in data. To manage such differences, we aimed to be consistent with WorkWords, a platform of definitions developed by the Labour Market Information Council (LMIC).

Chart 12 outlines the proposed LMI framework for Ontario by highlighting the key LMI indicators as well as their data sources. The chart is colour coded to show which sources are relevant for the agriculture, food processing, and the agri-food sector. Many indicators require data to be custom ordered to get data sufficiently granular for the industries and occupations in the agri-food sector. As such, many of our recommended best practices will involve custom ordering data sets.

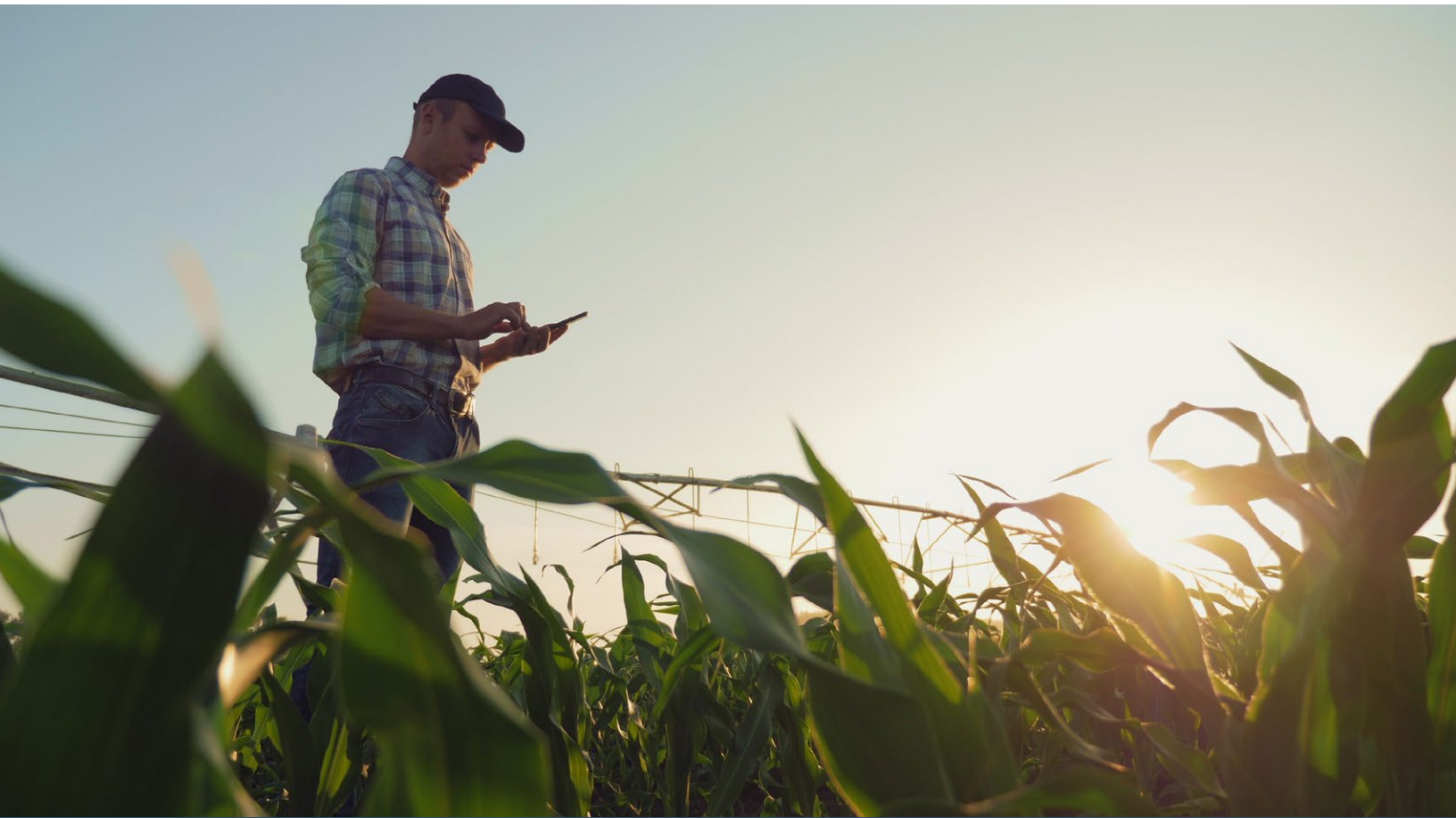
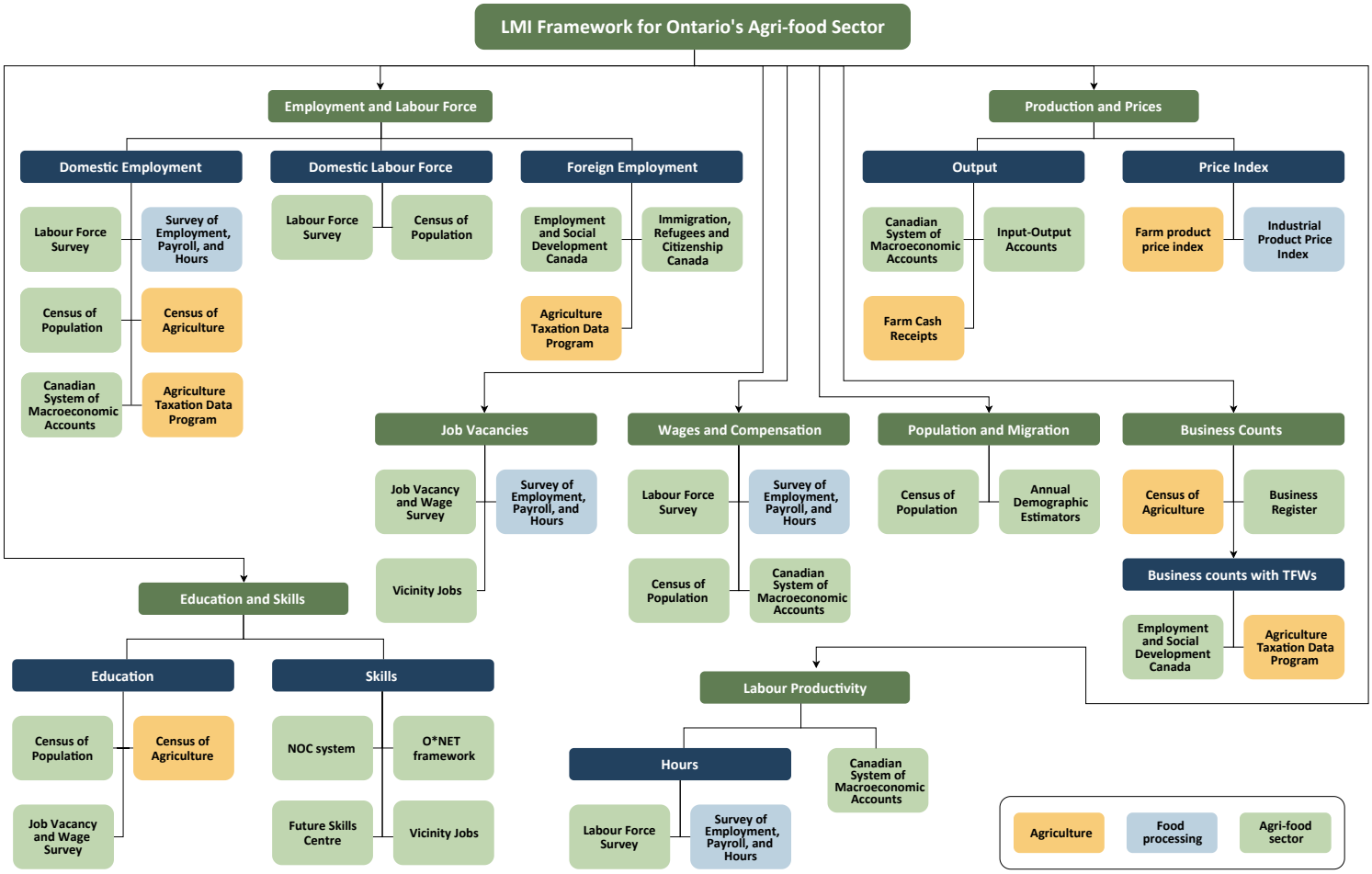
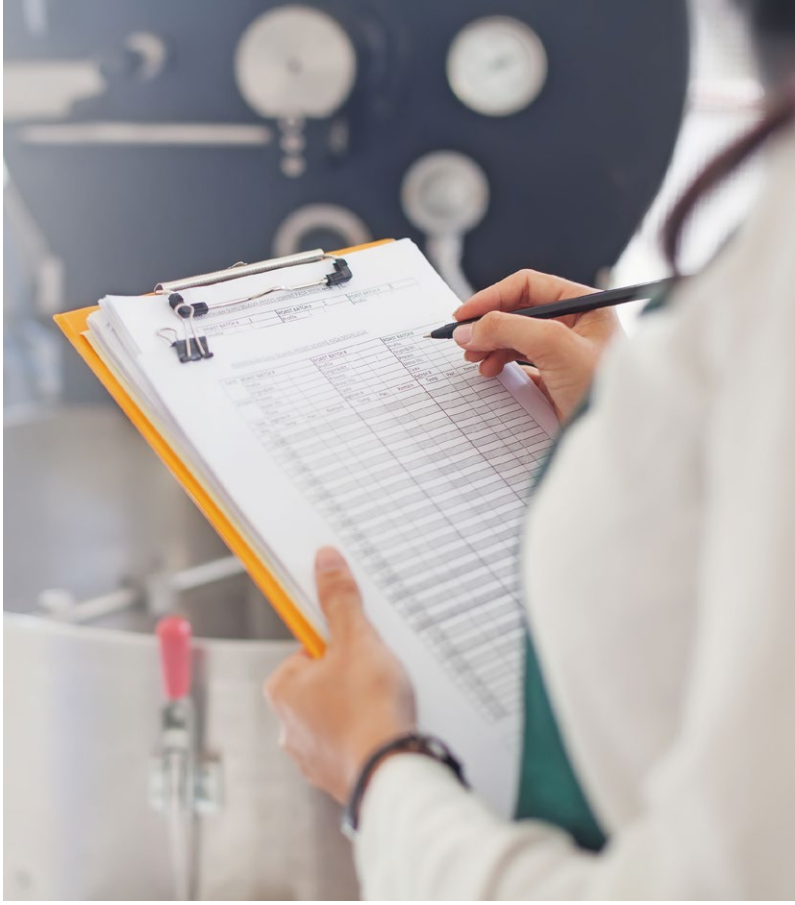


CHART 12: **Proposed LMI Framework**



Within this LMI framework, we identified four important indicators including domestic employment and labour force, foreign employment, job vacancies, and skills. We outline some of the best practices for generating data for each of these four indicators below.



1. Domestic employment and labour force

Domestic employment and labour force are essential LMI indicators, yet they are complicated to obtain because there are many sources of this data which yield differing statistics. Overall, custom ordered data sets from the Labour Force Survey provides the most frequent and detailed data on employment and labour force by industry and occupation sufficient for the Ontario agri-food sector. The LFS also accounts for unpaid family work in their employment estimates which can be an important source of labour in agriculture industries. Thus, it is recommended to use employment and labour force data from the LFS when assessing the agri-food sector workforce in Ontario.

Data from the LFS is suppressed when there are not enough survey respondents which makes the breakdown of occupation by industry highly suppressed. A possible solution is to use custom data sets from the Census of Population to obtain the breakdown of occupation by industry when required. This is not a perfect solution since NAICS 1111, 1112, 1113, 1119, 1121, 1122, 1123, 1124, and 1129 are grouped together into 1110 “Farms” in the Census of Population. Overall, the LFS and Census of Population can provide data on domestic employment and labour force by industry and occupation in Ontario.

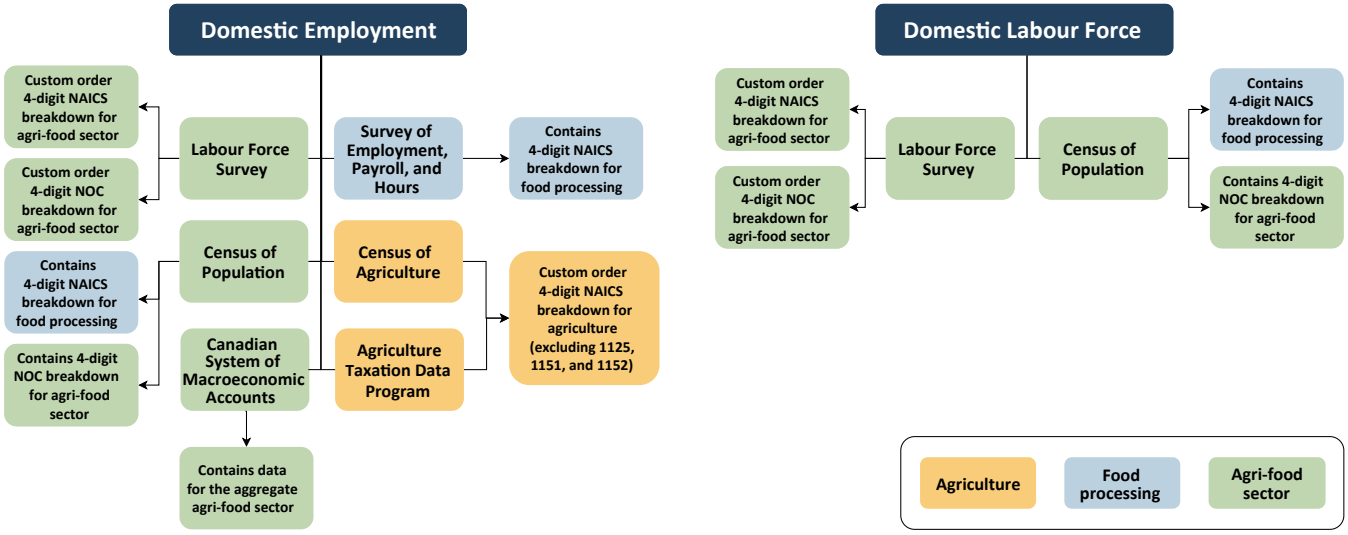
The Census of Population provides detailed demographic information, for characteristics such as age, sex, immigrant status, and Aboriginal status, with little suppression. Similarly, the Census of Agriculture (through the Agriculture-Population Linkage program) provides detailed demographic information for industries within agriculture (excluding NAICS 1125, 1151, and 1152). It is recommended to use the Census of Population and Census of Agriculture to obtain agri-food sector workforce demographics.

The Survey of Employment, Payroll and Hours (SEPH) is a recommended source of employment (paid work only) for food processing. Data from SEPH is updated monthly and covers all the 4-digit NAICS within food processing without needing to custom order data.

The Canadian System of Macroeconomic Accounts (Canadian Productivity Accounts) also releases employment (paid work only) data at the 4-digit NAICS level. However, NAICS 1110, 1112, 1113, and 1119 are grouped together into NAICS 111A, which makes this source only useful for assessing aggregate employment in agriculture and agri-food. This source can be used for food processing, however, since it is only updated annually it is less relevant than the SEPH. Overall, CSMA is only recommended if looking for employment data on the aggregate agri-food sector in a previous year.

Chart 13 outlines the best practices for obtaining data on domestic employment and labour force. Ultimately, there are many sources of employment data, each with its advantages and disadvantages. When conducting labour market research, it is recommended to compare and evaluate several sources of employment data since each source provides a unique perspective of Ontario’s labour market.

CHART 13: **Domestic employment and labour force best practices**



2. Foreign employment

Foreign employment makes up a vital and growing proportion of the workforce in the Ontario agri-food sector and as such, it is important to have accurate and timely data on the number of temporary foreign workers.

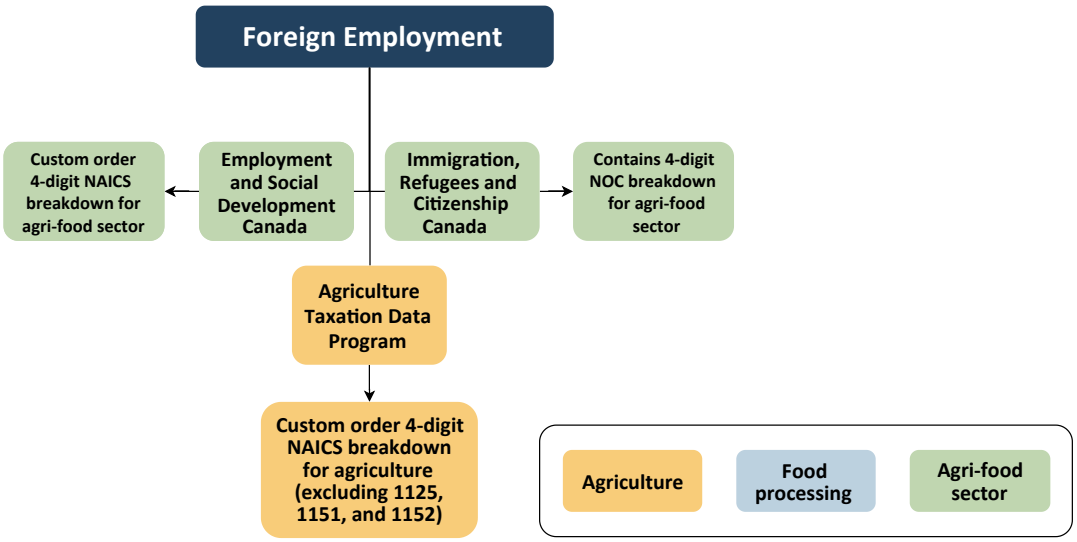
The number of TFW work permit holders from IRCC is closer to the actual level of TFW employment than the number of positive LMIAs from ESDC. However, since IRCC only produces data by occupation, it is not sufficient for assessing the agri-food sector workforce. Data from ESDC is available by 4-digit NAICS through a custom order which makes it useful for assessing the industries within the agri-food sector. Overall, we recommend data from IRCC can be combined with the industry distribution from ESDC to get a breakdown of TFWs by occupation and industry sufficient for the Ontario agri-food sector. The aggregate number of work permit holders from the International Mobility Program and Temporary Foreign Worker Program can be obtained from IRCC.

Recently, Statistics Canada has developed products through the Agriculture Taxation Data Program which reports the actual number of TFWs employed (paid work only) in agriculture based on tax information. This source may provide more rigorous data on TFW employment which is comparable to Statistics Canada's total employment estimates. However, it only covers industries in agriculture (excluding NAICS 1125, 1151, and 1152) with makes it insufficient for the Ontario agri-food sector. Furthermore, Statistics Canada is currently seeking funding to be able to continue to produce this data. If they obtain funding and continue to publish this data, it will be a valuable source of information on TFWs in agriculture in the future.

Overall, it is recommended to compare data from IRCC and ESDC to data from the Agriculture Taxation Data Program. Together these sources could provide a range for the actual number of TFWs employed in Ontario agriculture. Data on the number of TWFs employed in Ontario food processing must be obtained from IRCC and ESDC. Also, in the future, there is potential to obtain data on TFWs from Statistics Canada's Canadian Employer-Employee Dynamics Database (CEEDD). However, since this data has never been produced before, there is limited information about what level of industry and provincial detail is available.

Chart 14 outlines the best practices for obtaining data on employment of temporary foreign workers.

CHART 14: **Foreign employment best practices**



3. Job Vacancies

Estimates of labour demand, composed of employment (domestics and foreign) and the number of unfilled positions, are extremely dependent on job vacancy data. Generally, the most reliable data on job vacancies and job vacancy rates come from the Job Vacancy and Wage Survey, yet these data are only available at the 3-digit NAICS level which are not sufficiently granular for the agri-food sector and there are considerable amounts of suppression. In future LMI research, it is recommended that time be spent evaluating web scraped data from sources such as Vicinity Jobs. There may be a method of combining JVWS data with web scraped data to get more accurate and detailed estimates of job vacancies.

4. Skills

Lastly, an important addition to existing LMI research will be the inclusion of data and information on skills (both current and future) in the agri-food sector. In the past, the NOC system has been the only standardized skills framework in Canada. Yet, NOC skill levels centre around education levels which are not always a good representation of the skills required in the agri-food sector. In turn, the Future Skills Centre is building a more comprehensive skills framework by mapping the NOC system to the O*NET skills framework used in the United States. This work will include vast amounts of data on skills, as well as abilities, knowledge, interests, work activities, work styles, and training, for each occupation. These data will provide a robust skills profile for each occupation which can be used to assess skills gaps and identify which occupations in other sectors of the economy could alleviate labour shortages in the agri-food sector. Going forward, data produced by the Future Skills Centre may be key in tackling the labour shortages in the agri-food sector.

Data produced by the Future Skills Centre relies on the accuracy of NOC system's classification of occupations within the agri-food sector. Despite being Canada's most detailed occupation breakdown, each 4-digit NOC covers a wide range of activities across many industries and geographies. Since the skills from the O*Net framework are mapped to 4-digit NOC codes, it will miss any occupation diversity that is not captured by the NOC system. Future research should be done to assess the accuracy of the NOC system in classifying occupations within the agri-food sector and propose updates accordingly.

Objective 4 - Knowledge gaps and future research

An outcome of this report was the recognition of knowledge gaps and constraints when it comes to assessing labour markets in the Ontario agri-food sector. A primary area of constraint is in obtaining data at a sufficiently granular industry (4-digit NAICS) and occupation (4-digit NOC) level, particularly for indicators such as TFW employment and job vacancies. It is also unfeasible to obtain data by 4-digit NOC occupation for each 4-digit NAICS industry for almost all indicators. Data is either not collected at such granular levels or it is suppressed since there are not enough survey respondents. Overall, not having sufficiently granular data makes assessing the industries and occupations within the Ontario agri-food sector challenging.

Secondly, data on more qualitative LMI, such as human resource challenges, workforce characteristics or skills, are also limited in their availability. To help fill this gap, work is being done by the Future Skills Centre to create a comprehensive database of skills and abilities for each 4-digit NOC. Hopefully, data from the Future Skills Centre can be used to assess skills gaps in future research. Custom surveys also represent an important tool to fill data gaps. For example, they can solicit information on hiring challenges employers face, workforce characteristics, turnover rates, and the cost of vacancies, all of which represent valuable LMI. Unfortunately, such surveys require effort and resources to implement and maintain, which may limit the availability this information.

Lastly, there is limited information on technology adoption. Technology is an important factor when assessing both the agri-food sector historic growth and future potential. The Ontario agri-food sector has experienced above average gains in labour productivity over the past decade do to increased employment of technology. And as a result of technology adoption, there is a growing need for upskilling in many occupations. Going forward, we expect technology adoption to play a vital role in addressing the growing labour shortages in the Ontario agri-food sector. Unfortunately, there is a lack of formal data sources measuring technology adoption and resulting upskilling needs.

5.0 Glossary

Actual hours worked: According to the LFS guide, actual hours worked are the number of hours actually worked by the respondent during the reference week, including paid and unpaid hours. These hours reflect temporary decreases or increases in work hours (for example, hours lost due to illness, vacation, or holidays or more hours worked due to overtime).[66]

Adult with a disability: An adult with a disability refers a person who is limited in his or her daily activities according to a prescribed level of difficulty with particular tasks due to a long-term condition or health problem lasting, or expecting to last, for a specified period of time.[67]

Agriculture Taxation Data Program: The Agriculture Taxation Data Program (ATDP) is an annual census of unincorporated and incorporated tax filer records used to estimate a range of financial agricultural variables. The financial variables covered by the ATDP include detailed farm revenues and expenses and income of farm families.[68] Recently, data from the ATDP and the labour force survey has been used to compose datasets on TFW employment in the agriculture industry.

Business counts: The business counts are the number of Canadian businesses which meet at least one of the three following criteria: have an employee workforce for which they submit payroll remittances to CRA; or have a minimum of $30,000 in annual revenue; or are incorporated under a federal or provincial act and have filed a federal corporate income tax form within the past three years.[69]

Census division: A census division (CD), according to Statistics Canada is a group of neighbouring municipalities joined together for the purposes of regional planning and managing common services (such as police or ambulance services).[70]

Census farm: A census farm refers to a farm, ranch or other agricultural operation that produces at least one of the following products intended for sale: crops, livestock, poultry, animal products, greenhouse or nursery products, Christmas trees, mushrooms, sod, honey or bees, and maple syrup products. Also included are feedlots, greenhouses, mushroom houses and nurseries; farms producing Christmas trees, fur, game, sod, maple syrup, or fruit and berries; beekeeping and poultry hatchery operations; operations with alternative livestock or alternative poultry, when the animal or derived products are intended for sale; backyard gardens if agricultural products are intended for sale; and operations involved in boarding horses, riding stables, and stables for housing or training horses, even if no agricultural products are sold.[71]

66 Statistics Canada, "Guide to the Labour Force Survey, 2020."
67 Statistics Canada, "Canadian Survey on Disability (CSD)."
68 Statistics Canada, "Agriculture Taxation Data Program (ATDP)."
69 Statistics Canada, "Definitions and Concepts Used in Business Register."
70 Statistics Canada, "Census division (CD)."
71 Statistics Canada, "Dictionary, Census of Population, 2016 – Census farm."

Census subdivision: Census subdivision (CSD), according to Statistics Canada, is the term for municipalities (as determined by provincial/territorial legislation) or areas treated as municipal equivalents for statistical purposes (e.g., Indian reserves, Indian settlements and unorganized territories).[72]

Compensation: Compensation is the value of all benefits, whether in the form of a paycheck or perhaps vehicle allowance, that an employee receives.

Economic Region: An economic region (ER), according to Statistics Canada, is a grouping of complete census divisions (with one exception in Ontario) created as a standard geographic unit for analysis of regional economic activity.[73]

Educational attainment: Educational attainment refers to the highest level of education that a person has successfully completed and is derived from the educational qualification questions, which asked for all certificates, diplomas, and degrees to be reported.[74]

Employment: Employment is the number of persons working for pay in an economy. Employment is often broken down by industry, occupation, and region to gain information about specific labour markets.

Employment income: Employment income refers to the sum of wages, salaries and commissions from paid employment and net self-employment income (from farm or non-farm unincorporated business and/or professional practice) during the reference period.[75]

Farm cash receipts: Farm cash receipts represent the cash income received from the sale of agricultural commodities as well as direct program payments made to support or subsidize the agriculture sector.[76]

Farm product price index (FPPI): The Farm product price index (FPPI) measures the change through time in prices received by farmers from the sale of agricultural products. The FPPI uses a five-year rolling average base; the annual weighting pattern is updated every year which reflects the continual shift in agriculture commodities produced and sold.[77]

Gross Domestic Product (GDP): The GDP of an industry (also referred to as value added) equals output by the industry minus the value of intermediate inputs that were purchased from other industries, domestic or foreign. Value added is a measure of how much an industry has contributed to the value of its output over and above the value of intermediate inputs. GDP by industry for the entire economy is the sum of values added by all industries resident in Canada.[78]

Industry: Industry broadly refers to the general nature of the business carried out in the establishment where the person worked (main job only) and is most often based on the North American Industry Classification System (NAICS).[79]

Industrial Product Price Index (IPPI): The Industrial Product Price Index (IPPI) measures price changes for major commodities sold in Canada. The prices covered by the IPPI refer to what the producer receives which excludes all indirect taxes, such as sales taxes and tariffs, as this money does not go to the producer. They also exclude any transportation and any distribution services performed.[80]

Input-Output Accounts: The input-output accounts produced by Statistics Canada aim to measure the productive structure of the Canadian economy. The framework consists of the supply and use tables, the industry by industry input-output tables and several other derived products. The supply and use tables track the production of products by domestic industries, combined with imports, through their use as intermediate inputs or as final consumption, investment, or exports.[81] The input-output tables allow researchers to investigate "what if?" scenarios at a fairly detailed level, exploring the impact of exogenous changes in final demand on output while accounting for the interdependencies between different industries and regions of the economy and the leakages to imports and taxes.[82]

72 Statistics Canada, "Census subdivision (CSD): Detailed definition."
73 Statistics Canada, "Economic region (ER)."
74 Statistics Canada, "Guide to the Labour Force Survey, 2020."
75 Statistics Canada, "Dictionary, Census of Population, 2016 – Employment income."
76 Statistics Canada, "Farm Cash Receipts (FCR)."
77 Statistics Canada, "Farm Product Price Index (FPPI)."
78 Statistics Canada, "Gross Domestic Product by Industry - Provincial and Territorial (Annual)."
79 Statistics Canada, "Guide to the Labour Force Survey, 2020."
80 Statistics Canada, "Industrial Product Price Index (IPPI)."
81 Statistics Canada, "Supply, Use and Input-Output Tables."
82 Ibid.

International Mobility Program: The International Mobility Program lets employers hire temporary foreign workers without a Labour Market Impact Assessment (LMIA).[83] Sections 204 to 208 of the Immigration and Refugee Protection Regulations provide information when a worker who does not require a LMIA (see here).

Job permanency: Job permanency refers to the length of the job position, as determined by the employer. A permanent job is expected to last indefinitely, as long as the employee wants it and business conditions permit. A temporary job has a predetermined end data and covers seasonal, term or contract, casual and other temporary jobs.[84]

Job tenure: According to the LFS guide, job tenure is the number of consecutive months or years that a person has worked for the current (or most recent) employer. Job tenure measures the most recent period of uninterrupted work. The employee may have worked in multiple positions and locations or have experienced periods of temporary layoffs, but they still have continuous tenure if their employer has not changed.[85]

Job vacancy: Job vacancy broadly refers to an unfilled position within an organization for which the employer is looking to hire.[86]

Labour Market Impact Assessment (LMIA): Labour Market Impact Assessment is a labour market verification process through which Employment and Social Development Canada (ESDC) assesses an offer of employment to ensure that the employment of a foreign worker will not have a negative impact on the Canadian labour market.[87] A positive Labour Market Impact Assessment (LMIA) is issued when the employer has tried but has been unable to find a Canadian or permanent resident for the job, the job offer is genuine, and the employer has met job offer commitments to temporary foreign workers they have hired in the past.[88] A positive LMIA must be obtained by an employer before hiring a TFW for a specific occupation. After obtaining a positive LMIA, the worker needs to apply to IRCC for a work permit and the employer must provide a copy of the positive LMIA from ESDC to include with the worker's application.[89]

Labour Force: In general, the labour force is the total number of workers (employed and unemployed) in an economy. More specifically, according to the LFS guide, the labour force is the number of civilian, non-institutionalized persons 15 years of age and over who, during the reference week, were employed or unemployed.[90]

National Commodities List: The National Commodities List is a list of agriculture products. The National Commodities List is as follows: fruits, vegetables (including canning/processing of these products if grown on the farm), mushrooms, flowers, nursery-grown trees including Christmas trees, greenhouses/nurseries, pedigreed canola seed, sod, tobacco, bovine, dairy, duck, horse, mink, poultry, sheep, and swine.[91]

National Occupational Classification (NOC): The National Occupational Classification (NOC) is Canada's national system for identifying, grouping, and describing occupations. In Canada, Employment and Social Development Canada (ESDC) and Statistics Canada maintain and update the official NOC.[92]

North American Industry Classification System (NAICS): The North American Industry Classification System (NAICS) is an industry classification system covering all economic activities developed by the statistical agencies of Canada, Mexico, and the United States.[93]

North American Product Classification System (NAPCS): The North American Product Classification System (NAPCS) is Statistics Canada's official standard classification of products (goods and services)

83 Immigration, Refugees and Citizenship Canada, "Hiring through the International Mobility Program."
84 Statistics Canada, "Guide to the Labour Force Survey, 2020."
85 Ibid.
86 Labour Market Information Council, "Job Vacancy."
87 Immigration, Refugees and Citizenship Canada, "Facts and Figures 2017 - Immigration Overview - Temporary Residents."
88 Ibid.
89 Ibid.
90 Statistics Canada, "Guide to the Labour Force Survey, 2020."
91 Employment and Social Development Canada, "Hire a Temporary Foreign Worker through the Agricultural Stream - Overview."
92 Statistics Canada, "Introduction to the National Occupational Classification (NOC) 2016 Version 1.0."
93 Statistics Canada, "Introduction to the North American Industry Classification System (NAICS) Canada 2017 Version 3.0."

designed for use in statistical programs. It is used, for example, in statistics on the value of exports and imports by type of product, the value of industry production and consumption by type of product, and industrial product price indices.[94]

Occupation: Occupation broadly refers to the types of professional activities in which one engages. It can be used to characterize a worker or a job.[95] In Canada, the National Occupational Classification (NOC) system is used to classify occupations.

Owner operators: Owner operators are the people responsible for the management and/or financial decisions concerning agricultural operations. They can be owners, tenants or hired managers of the agricultural business.[96]

Skills: Skills encompass the wide range of abilities and proficiencies workers may possess. Sources often have their own definition and classifications of skills.

Temporary Foreign Workers: Temporary foreign workers (TFWs) are foreign workers hired through the Temporary Foreign Worker Program (TFWP) or International Mobility Program (IMP) to fill short-term labour and skill shortages when Canadians or permanent residents are not available.[97]

Temporary Foreign Worker Program: The Temporary Foreign Worker Program (TFWP) allows Canadian employers to hire foreign nationals to fill temporary labour and skill shortages when qualified Canadian citizens or permanent residents are not available. A Labour Market Impact Assessment (LMIA) and a work permit are needed to hire a TFW through this program.[98]

Turnover rate: Turnover rate refers to the percentage of employees leaving a business within a time period. Turnover can broadly be categorized into two types: voluntary turnover and involuntary turnover. Voluntary turnover happens when the employee initiates the departure, generally because they are taking another job. Involuntary turnover happens when the employee is laid off or dismissed by the employer.

Unpaid family work: Unpaid family work is defined by Statistics Canada as unpaid work contributing directly to the operation of a farm, business or professional practice owned and operated by a related member of the same household.[99]

Usual hours worked: According to the LFS guide, usual work hours refer to the employed person's normal paid or contract hours, not counting any overtime. For the self-employed, including unpaid family workers, usual work hours refer to the number of hours usually worked by the person in a typical week, regardless of whether he or she was paid.[100]

Wages: Wages and salaries broadly refer to the monetary compensation that employees receive for work performed. It represents the many types of payments given to all employees regardless of their type of work (full- or part-time), method of payment, or duration of employment. Wages typically refers to earnings per hour. Salaries typically refers to annual earnings paid regardless of the actual number of hours worked.[101]

Workforce: The workforce on a farm comprises every person who contributed to the operation of a farm, including owner-operators, paid workers, unpaid workers, and foreign workers.

Work permit: A work permit is an official document issued by an immigration officer that allows someone who is not a Canadian citizen or a permanent resident to work in Canada.[102]

Work permit holders: Work permit holders are temporary residents who are in Canada on a work permit in the observed calendar year. Work permit holders may also be a permit holder of another type at the same time.[103]

94 Statistics Canada, "Introduction."
95 Labour Market Information Council, "Occupation."
96 Statistics Canada, "Farm Operator."
97 Immigration, Refugees and Citizenship Canada, "Temporary Workers."
98 Employment and Social Development Canada, "Temporary Foreign Worker Program."
99 Statistics Canada, "Guide to the Labour Force Survey, 2020."
100 Ibid.
101 Labour Market Information Council, "Wages and Salaries."
102 Immigration, Refugees and Citizenship Canada, "Facts and Figures 2017 - Immigration Overview - Temporary Residents."
103 Ibid.

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