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RESSOURCES HUMAINES EN AGRICULTURE

Identifying On-Farm Occupations Environmental Scan and Gap Analysis





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Executive Summary

The objective of the Canadian Agricultural Human Resource Council (CAHRC) is to address human resource issues facing agricultural businesses across Canada. CAHRC's objective with the *Identifying On-farm Occupations* project was to identify and define the occupations and classifications of work in the on-farm sector. This project aims to build on existing agricultural research studies and take them one step further by:

- developing a process to identify and define occupational groups specific to the on-farm sector,
- providing a comprehensive sector-specific framework/grid of on-farm occupations and skill levels by key commodity group,
- identifying gaps within current classification systems (National Occupational Classification system - NOC), and
- prioritizing those occupations requiring future development of occupational standards and essential skills profiles.

The research presented in this report summarizes the information found through an extensive environmental scan. This included looking at domestic occupational classification systems (NOC, NOC-S, and NAICS), as well as international classification systems from Australia, France, the International Labour Organization (ILO), New Zealand and the United Kingdom. Information available from public and private sector sources was also reviewed. The greatest amount of information in this part of the review came from AGRicarrières, the Quebec agriculture sector council. Other sources reviewed provided substantial information about training packages or best practices but provided little information with regard to detailed job profiles. Special attention was given to how management occupations were classified. All systems reviewed,

with the exception of the NOC, classify on-farm managers at the same level as managers from other sectors. Essential Skills profiles were also reviewed.

The key informant interviews focused on four questions to confirm if sources had been excluded from the environmental scan, to identify any trends in skill or education requirements for on-farm occupations, to determine the requirements necessary for a producer to manage farm operations and any additional information that may be helpful to the project. The results of the interviews identified the importance of general business management skills for on-farm managers similar to managers from other sectors and the increased need for all levels of on-farm occupations to have the skills required to meet the technical advancements in agricultural operations.

The NOC review looked at how on-farm occupations are classified by Human Resources and Skills Development Canada (HRSDC) in the NOC. It confirmed that no on-farm occupations are classified at the management level. It also indicated that aquaculture technicians were classified with biological technologists and technicians rather than with other aquaculture occupations.

The research conducted in the project revealed a significant quantity of existing information related to on-farm occupations. It also identified some key gaps when comparing these findings to the classification of on-farm occupations in the NOC. The gaps identified were as follows:

- Classification of on-farm managers are not equivalent to management-level occupations in other sectors.
- Terminology used in on-farm management descriptions do not accurately reflect all the skills and responsibilities of the occupation.

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- Aquaculture technicians are not classified as an on-farm occupation.
 - Aquaculture supervisors are not identified in the NOC.
 - The descriptions for all on-farm occupations need to be updated to more accurately reflect the skills, training and responsibilities required.
 - Essential skills profiles do not exist for all on-farm occupations, including farmer and farm manager.
 - The NOC does not provide clear career paths for workers.

In the next phase of this research project, regional focus groups will be held to gather first hand information on what commodity stakeholders are experiencing. It will also assist CAHRC in prioritizing the issues presented here.

Introduction

Understanding on-farm occupations in Canada is essential to providing farm employers, industry stakeholders and policy makers with information about the total picture of human resources in Canada's on-farm agricultural industry. Increasing our understanding of on-farm occupations will add to our knowledge of the occupations, the skills and training required for these occupations and how to attract and retain workers to meet the on-farm labour demand. This research project will serve as a foundational piece that will set the stage for identifying key occupations for further occupational analysis and standards development, as well as developing essential skills profiles. It will also help potential workers understand the on-farm career opportunities available and what is required to secure employment in each occupation.

The Canadian Agricultural Human Resource Council (CAHRC) was created to address human resource issues facing agricultural businesses across Canada. CAHRC works with industry leaders, governments, and education stakeholders to develop and implement programs and activities that deal with challenges related to agriculture employment and skills development. Its initiatives are led by industry leaders from each province and most commodities, and funded by the Government of Canada's Sector Council Program.

The objective of *Identifying On-farm Occupations* project was to identify and define the occupations and classifications of work in the on-farm sector. This project aims to build on existing agricultural research studies and take them one step further by:

- developing a process to identify and define occupational groups specific to the on-farm sector,
- providing a comprehensive sector-specific framework/grid of on-farm occupations and skill levels by key commodity group,
- identifying gaps within current classification systems (NOC), and
- prioritizing those occupations requiring future development of occupational standards and essential skills profiles.

This report presents the findings of this research by providing:

- a summary of the environmental scan of existing documents and systems,
- a summary of the key informant interviews,
- a review of how on-farm occupations are classified in Canada's NOC system,
- a gap analysis of the research findings compared to the NOC review.

Project Scope

The project included a review of existing on-farm occupations classified in the National Occupational Classification (NOC) and any other relevant systems used to classify occupations relating specifically to the sector. The focus was on domestic sources but also included international classification systems.

Key informant interviews were conducted to gather additional information not obtained during the environmental scan. This was followed by a gap analysis comparing data gathered with the current NOC across key commodity groups. The findings of this research resulted in recommendations for moving forward.

The key commodities used to categorize some of the findings in this report were provided by CAHRC. The key commodities are as follows:

- Cattle (includes beef and dairy),
- Poultry and Egg,
- Swine,
- Other animal (includes sheep, goats, bison, elk, llama, alpaca, horses, rabbits, deer, fox, mink),

- Crops (includes grains, cereals, oilseeds, pulses, pastures, forages, forage seed, fiber),
- Field Fruit and Vegetable (includes potato, melon),
- Tree Fruit and Vine (includes grapes),
- Aquaculture
- Greenhouse (includes fruit and vegetable, nursery and floriculture and does not include landscaping),
- Other (includes herbs and spices, maple, sod, bees, tobacco, hemp, non-timber forestry products).

There is also a “General” category that captures resources reviewed that were not specific to a particular commodity.

It should be noted that for-fee service providers (i.e. veterinarians, farm advisors) were not included in the scope of this research. As well, on-farm occupations, unrelated to agriculture, were not included in the research (i.e. HR managers, accountants who work on a farm).

Environmental Scan

The environmental scan revealed some key information that addresses the classification of on-farm occupations outside of the NOC. This section provides a summary of findings from the review of domestic and international information sources. A full list of sources reviewed can be found in Appendix I.

Classification Systems

The classification systems reviewed include those used in Canada as well as those developed by other countries. The North American Industry Classification System (NAICS) is reviewed in this section. The NOC is reviewed in detail in the NOC review section of this report. In addition, provincial and federal government information based on the NOC, such as the JobFutures website, Essential Skills Profiles and *l'Annuaire des métiers* is reviewed in this section. The international systems reviewed in this section are from the United Kingdom, Australia, New Zealand, France and the International Labour Organization (ILO). This includes occupational classification systems, similar to Canada's NOC, as well as national qualification frameworks (NQF). The results of this review are summarized here.

Canadian Systems

In order to understand how on-farm occupations relate to the sector, it is beneficial to understand how the industries within the sector are classified. NAICS is the industry classification system used by Statistics Canada as well as its counterparts in the United States and Mexico. It is designed to provide common definitions of the industrial structure for the three countries and has a common statistical framework to facilitate the analysis of the three economies.¹ On-farm industries are captured under "Agriculture, Forestry, Fishing and Hunting" with the following codes:

- 111 – Crop Production
 - 1111 – Oilseed and Crop Production
 - 1112 – Vegetable and Melon Farming
 - 1113 – Fruit and Tree Nut Farming
 - 1114 – Greenhouse, Nursery and Floriculture Production
 - 1119 – Other Crop Farming
- 112 – Animal Production
 - 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

Although NAICS focuses on industries and not occupations, it is helpful to have knowledge of the classifications of the industries in which these occupations are used.

Service Canada provides job profiles through the JobFutures website. Their profiles include information related to education and skills requirements, a description of what it is like to work in the occupation and the prospects for the occupation (i.e. compensation, future demand). The website is structured using the NOC system. The same approach is also taken on a provincial level, with each province customizing the information to meet that region's employment prospects and education requirements for each occupation.

¹ <http://www.statcan.gc.ca/subjects-sujets/standard-norme/naics-scian/2007/introduction-eng.htm>, Accessed June 26, 2009.

HRSDC has a series of essential skills profiles for select occupations. At this point in time there are only five profiles related to on-farm occupations:

- 8254 – Nursery and Greenhouse Operators and Managers,
- 8257 – Aquaculture Operators and Managers,
- 8431 – General Farm Workers,
- 8432 – Nursery and Greenhouse Workers,
- Primary Production Labourers which includes 8611 – Harvesting Labourers and 8613.1 – Aquaculture Support Workers.

There currently are no essential skills profiles for:

- 8251 – Farmer and Farm Managers,
- 8253 – Farm Workers and Specialized Livestock Workers (includes 8253.1 Farm Supervisor, and 8253.2 – Specialized Livestock Workers),
- 8256 – Supervisors, Landscape and Horticulture.

The most detailed information developed in a Canadian context from an organization outside of the federal government comes from AGRICarrières' Comité sectoriel de main-d'œuvre de la production agricole. This organization has developed an extensive classification of on-farm occupations. These findings have been validated by industry within Quebec. In 2006, AGRICarrières developed *l'Annuaire des métiers* which consists of a summary of results from studies conducted of occupations in 23 different agricultural subsectors. Of these, eleven studies relating to subsectors in horticultural production were produced by l'Institut québécois des ressources humaines en horticulture (IQRHH) in 1996 and 12 additional studies, i.e. 10 in animal production subsectors and 2 in plant production subsectors, were produced between 1999 and 2001 by AGRICarrières. The document is currently under review, with a new release expected in fall 2009. In addition, AGRICarrières has produced *l'Étude sur les ressources humaines et la structure des emplois en agriculture au Québec, 2001*. This study provides generic profiles and structure for occupations relating to plant and animal production.

International Systems

Internationally, many countries have national occupational classification systems similar to Canada. The details of the systems reviewed are provided in Appendix II.

Countries such as New Zealand, Australia and the United Kingdom have used their occupational classification systems in developing National Qualifications Frameworks (NQFs). NQFs focus on education and training outcomes rather than skills required to work in an occupation, the focus of Canada's NOC. The NQF allows for more detailed occupational information to be provided, as opposed to general groupings of occupations into broad categories as in the NOC. The NQF provides a clear career path by illustrating the building blocks of education, training and experience required to move from entry level occupations to more senior-level occupations in the same area of expertise. These frameworks focus on competencies required to work in an occupation. Standardized training and certification programs are aligned with each level of competency and specific areas of specialization. For example, in New Zealand if a worker wanted to develop from a labourer to a production manager on an arable, cattle, dairy, deer or sheep farm, they could progress through the following certifications:

- National Certification in Agriculture – Introductory Skills,
- National Certificate in Agriculture (Level 2) with strands in Cattle Farming, Dairy Farming, Deer Farming, and Sheep Farming,
- National Certificate in Agriculture (Cattle Breeding) (Level 3) with strands in Beef Cattle Farming, and Dairy Cattle Farming,
- National Certificate in Agriculture (Level 4) with strands in Arable Farming, Cattle Farming, Dairy Farming, Deer Farming, and Sheep Farming,

- National Certificate in Agriculture (Production Management) with strands in Arable Farming, Cattle Farming, Dairy Farming, Deer Farming, and Sheep Farming.²

Governments, educators, employers and job seekers are using the NQFs as a method of addressing skills shortages and in developing career paths for entry-level workers. Certification is regulated through approved courses for each level of skill development. This approach also provides more detailed information, allowing for certification levels to be available by each skill level by sub-sector or, in the case of agriculture, by commodity group.

Another international resource comes from l'Association Nationale pour l'Emploi et la Formation en Agriculture (ANEFA). This group has developed job profiles for the agriculture sector and a guide that presents 83 agriculture-related jobs, grouped in 13 "filières" (the equivalent of commodities).

General Findings

Outside of the systems discussed above, most of documentation found provided job descriptions prepared by employers or recruitment agencies. Although these job descriptions come from industry, they are based on the needs of individual employers and may not be an accurate reflection of generic requirements for the occupation.

Many associations provide material such as training packages, best practice documents and codes of practice that are meant to assist producers in their commodity specialty. The materials would need to be analyzed in detail to pull out the required skills of an on-farm occupation.

There were several documents identified within the aquaculture commodity group. These documents, however, were available in hard copy only and at the time of this report a request to receive copies had not

been fulfilled. From information gathered via the key informant interviews, these documents would provide helpful details related to understanding the skills required for on-farm aquaculture occupations.

Management Classifications

One area of potential weakness identified early in this research was the classification of on-farm managers. The following reflects the information reviewed related specifically to this group.

Statistics Canada's occupational classification system the National Occupational Classification – Statistics (NOC-S) system (more detail about this system can be found in the NOC review section of this report) defines management occupations as follows:

*Occupations in this broad occupational category are primarily concerned with carrying out the functions of management by planning, organizing, co-ordinating, directing, controlling, staffing, and formulating, implementing or enforcing policy, either directly or through other levels of management. Supervising is not considered to be a management function.*³

The definition of management occupations provided in HRSDC's NOC Career Handbook is very similar:

This Skill Type category contains legislators, senior management occupations and middle and other management occupations. These occupations span all Skill Type categories.

Management occupations are not assigned to a Skill Level category. Factors other than education and training (e.g., previous experience, ownership of real property and capital, ownership of intellectual property, inherent decision-making skills and organizational capabilities) are often more significant determinants for employment in management occupations.

² <http://www.nzqa.govt.nz/framework/explore/sub-field.do?frameworkId=76055>, July 10, 2009.

³ <http://stds.statcan.gc.ca/soc-cnp/2006/cs-rc-eng.asp?crtaria=A,,> Accessed June 4, 2009.



*Management occupations span the Skill Types of the entire classification structure and are found in all areas of the labour market.*⁴

Examples of management-level occupations that have the same education and training as farmer/farm manager can be found in Appendix III.

Looking outside of Canada to see how other countries' classification systems describe on-farm management occupations, it is interesting to note that all international systems reviewed as part of this research categorize farmers and farm managers at the management level.

⁴ <http://www5.hrsdc.gc.ca/NOC/English/NOC/2006/Tutorial.aspx#61>, Accessed June 4, 2009.

Key Informant Interviews

Key informant interviews were conducted to engage stakeholders in the research process as well as to ensure the research was as exhaustive as possible. One hundred and thirty-two contacts made either by telephone or email and included CAHRC Board members, national and provincial agricultural organizations. At the time this report was finalized, there were 10 respondents. Challenges with the time of year the contact was made (July) and the general difficulty in engaging people in interviews may have contributed to the low response rate.

This section provides a summary of the information from the respondents.

Q1. In (insert commodity group informant represents) the following information was located (insert the information found from the environmental scan). Are there any other sources of information, i.e. provincial commodity websites, literature, reports, documents, etc. that would provide this information and that would be beneficial to this project?

Additional sources were provided in some cases. These sources have been reviewed and added to the final version of the environmental scan.

Q2. Are you aware of any trends in skills or education requirements in any occupations in (insert informant's commodity group)?

The majority of responses indicated the increased skills required by farm managers/owners/producers. This information has been detailed under Question 3 which focuses specifically on farmer owners/producers. All skill levels of all workers were addressed in the comments. Below is a summary of the comments received:

- Increased technical skills required for all levels of workers including unskilled workers (i.e. GPS, computers, computerized electronic systems),

- Increased need for general farm workers to have heavy equipment operator skills and workplace safety skills to mitigate equipment damage due to the increased size and power of the equipment being used on the farm,
- Knowledge and skills related to chemical application rates required at all levels. This refers to safe handling issues as well as appropriate application rates to ensure the effectiveness of the chemical on the crop,
- Machinery maintenance skills required by all levels, and this is becoming more and more technical (i.e. use laptops to fix tractors),
- Food safety and food handling requirements,
- Plant identification (herb, spice, natural health products),
- Trend towards mechanization and automation. Some operators control much of the farming operation by smart phone or remotely operated controls,
- In aquaculture there is a trend towards mandated safety needs by Coast Guard and Workplace Health and Safety (WHS) such as radio operator proficiency, small vessel proficiency, Marine Emergency Duty training, etc.,
- In aquaculture, most have post-secondary training either at diploma level or university level in some capacity, though general labour with low skill levels make up a portion of the entrants to the industry and require upgrading.

Q3. In your opinion, what are the skills and requirements necessary for producers to manage and administer farm operations in your commodity? What are the duties, responsibilities and tasks?

- A stronger HR capacity and people skills for farm owners/producers, including in many cases the ability to manage a multilingual work force,
- Leadership skills for farm owners/producers,
- Ability to assess and mitigate risk for farm owners/producers,
- Farm owners/producers need to keep informed of trends and opportunities in the sector,
- Strong business skills required for farm owners/producers are needed now more than ever, including marketing skills,
- Skills in agronomics and full production methodology required by farm owners/producers,
- For aquaculture managers, information outlined in the *Skills Standards for Aquaculture, 2002* provides a good overview of these skills and needs as they have not changed a great deal.

Q4. Is there any other information that comes to mind that you feel would be beneficial for the objective of this project that may not have already been captured?

- NOC standard for aquaculture technician currently in existence are solely for land-based, tank farms such as hatcheries, government hatcheries in particular. These are not broadened to include commercial farming.

- The aquaculture industry could have some revalidation of skills and competencies undertaken for present day development of standards. The last reports were done six or seven years ago and are mostly still valid, but some things have changed, and it would be worthwhile to undertake a small but focused validation of key farm occupations. It should be noted this does vary by region and coast somewhat.

In summary, there are some common factors reported in the key informant interviews. Technological advancements are changing the type and complexity of the skills required at all levels of on-farm occupations. Safety has become increasingly important, as well. This relates to workplace safety, including the need for workers to utilize safe practices around tasks such as chemical application and heavy machinery operation. It also relates to the increasing need for food safety and disease prevention to be considered in tasks completed by all levels of workers. The complexity of managing farm operations also continues to grow with the increased globalization of markets, technical advancements in production, and general growth in size of farming operations. This increases the farmer/farm managers' need for strong general business skills (human resource management, marketing, leadership, financial management) as well as increased technical knowledge related to agronomics and high yield production.

NOC Review

This section focuses on how the National Occupational Classification (NOC) system classifies on-farm occupations. This includes a description of the classification systems used by the Canadian government, an analysis of how on-farm occupations are classified within the systems and a summary of existing occupational descriptions for on-farm occupations (including main characteristics, education/training and employment requirements).

HRSDC and Statistics Canada have established occupational classification systems to provide frameworks in organizing labour market information and statistics.⁵ The systems and their differences are described on Statistics Canada's website as follows:

Statistics Canada's occupational classification for 2006 is called the National Occupational Classification for Statistics 2006 (NOC-S 2006) to distinguish it from the National Occupational Classification (NOC) put out by the Department of Human Resources and Skills Development Canada. (The two classifications differ only in the aggregation structure of the classification). Both provide a complete listing of all the categories under which Canadian jobs are classified and their descriptions. The first use of the NOC-S 2006 was in the 2006 Census of Population.⁶

Although there are variances between the systems, to the common user the most apparent difference is the coding system used. NOC occupations are coded numerically (i.e. 0-Management, 1-Business, Finance, Administration occupations, 2-Natural and Applied Sciences and related occupations) with categories 0 to 9 and NOC-S uses an alphabetical system (i.e. A-Management level, B-Business, Finance,

Administration occupations, etc) with categories A – J. For the purpose of this analysis HRSDC's NOC will be used.

In the NOC system, on-farm occupations are currently classified under Category 8 – Occupations Unique to Primary Industry, and include the following NOC codes:

- 8251 – Farmers and Farm Managers
- 8253.1 – Farm Supervisors
- 8253.2 – Specialized Livestock Workers
- 8254 – Nursery and Greenhouse Operators and Managers
- 8256 – Supervisors, Landscape and Horticulture
- 8257 – Aquaculture Operators and Managers
- 8431 – General Farm Workers
- 8432 – Nursery and Greenhouse Workers
- 8611 – Harvesting Labourers
- 8613.1 – Aquaculture Support Workers

It is worth noting that aquaculture technicians do not fall under any occupation classification related to on-farm work. This occupation is classified within 2221 – Biological Technologists and Technicians. Supervisors in aquaculture are not included in any NOC category.

⁵ <http://www5.hrsdc.gc.ca/NOC/English/NOC/2006/AboutNO.aspx>, Accessed June 26, 2009.

⁶ <http://www.statcan.gc.ca/subjects-sujets/standard-norme/soc-cnp/2006/noc2006-cnp2006-eng.htm>, Accessed July 31, 2009.



The table provided in Appendix V provides key details about each NOC code aligned with on-farm occupations, including a description, the main characteristics about the occupation, the education/training level required (as per HRSDC rating methodology), and employment requirements. The table is taken from HRSDC's *Career Handbook – Second Edition* and provides a summary of information related to on-farm occupations. It appears that some occupations can have more than one required, or possible, level of education. There is no real explanation provided in the methodology regarding these wide ranges in required education levels.

Gap Analysis

The purpose of the gap analysis is to identify disparity between the classification of on-farm occupations in the NOC and the findings from the environmental scan, NOC review and key informant interviews. This section provides a description of potential gaps identified as areas for future consideration.

On-farm Managers

The key issue identified in this research is the absence of on-farm occupations at the management-level in the NOC. There is one management-level classification for primary industries, 0811 – Primary Production Managers (Except Agriculture). Managers working in agriculture are specifically excluded from this classification. Farm managers are currently classified as '8251 Farmer and Farm Managers', nursery and greenhouse managers as '8254 Nursery and Greenhouse Operators and Managers' and aquaculture managers as '8257

Aquaculture Operators and Managers. These occupations are grouped together in the 'Skilled Occupations in Primary Industry' category along with supervisory and technical occupations. This report's environmental scan's Management Classifications sub-section quotes the definition for management provided in the *NOC Handbook*. The definition applies to all occupations classified at the management level. Farmers and Farm Managers meet the management-level criteria outlined in this definition with regard to previous experience, ownership of real property and capital, inherent decision-making skills, and organizational capabilities. Table 1 below demonstrates how the key points of the definition are matched in the descriptions provided for on-farm occupations in the NOC.

Table 1. Management Definition Compared to NOC Descriptions⁷

Key Points in Definition	8251 – Farmer and Farm Manager	8254 – Nursery and Greenhouse Operators and Managers	8257 – Aquaculture Operators and Managers
Previous experience	Employment requirements include extensive farming experience	Employment requirements state experience as a nursery or greenhouse supervisor is required	Employment requirements state if not meet education requirements than have several years of experience in fishing or aquaculture operations
Ownership of real property and capital	Main characteristics include directive interest in supervising purchasing machinery, livestock, seed, feed and other supplies	Main characteristics state methodical interest in ordering materials, stock and supplies	Ownership of real property and capital is not directly stated as a characteristic.
Ownership of intellectual property	Not applicable	Not applicable	Not applicable

⁷ <http://www5.hrsdc.gc.ca/NOC/English/CH/2001/Welcome.aspx>, Access date: August 14, 2009

Table 1. Management Definition Compared to NOC Descriptions (continued)

Key Points in Definition	8251 – Farmer and Farm Manager	8254 – Nursery and Greenhouse Operators and Managers	8257 – Aquaculture Operators and Managers
Inherent decision making skills	Main characteristics state the directive interest in supervising and hiring farmer workers and in determining crop/livestock production, purchase of machinery and supplies	Main characteristics state directive interest in supervising staff, hiring staff, setting work schedules and determining types and quantities of stock, methodical interest in coordinating information to organize nursery/greenhouse operations	Main characteristics include general learning ability to manage the operations of fish hatcheries, fish farms and other aquatic farms, verbal ability to collect to establish marketing strategies and inventory and quality control methods, form perception to identify species' requirements, methodical interest in co-ordinating to determine food requirements and to structure feeding regimes
Organizational capabilities	Main characteristics state general learning ability to manage operations, the methodical interest in coordinating information to plant, cultivate and harvest crops and in raising and breeding livestock and poultry.	Main characteristics state directive interest in supervising staff, hiring staff, setting work schedules and determining types and quantities of stock, methodical interest in coordinating information to organize nursery/greenhouse operations	Main characteristics include general learning ability to manage the operations of fish hatcheries, fish farms and other aquatic farms, to coordinate selection and maintenance of brood stock and to scuba dive to inspect sea farm operations, verbal ability to collect and record growth and production data, to maintain financial records and to establish marketing strategies and inventory and quality control methods, form perception to conduct and supervise stock examinations to identify diseases and parasites, methodical interest in co-ordinating information to monitor environments and maintain optimum conditions, to apply prescribed medicinal substances to control and prevent infection, to determine food requirements and to structure feeding regimes, objective interest in designing and constructing pens, floating stations, collector strings and fences for sea farms

All key informant interviews indicated there has been an increased level of management skills required for these occupations. When asked about the skill requirements necessary for producers to manage and administer farm operations, all respondents indicated strong management skills (HR, financial, marketing, leadership, production) were required now more than ever.

As discussed in the environmental scan section of this report, all the international systems reviewed classify Farmers and Farm Managers at the management level of their system.

Further analysis could be considered to support the re-classification of the three on-farm management occupations (Farmer/Farm Manager, Nursery and Greenhouse Operators and Managers, Aquaculture Operators and Managers) from technical and supervisory occupations (category 8 – Occupations Unique to Primary Industry) to category 0 (Management).

Update Job Description Terminology – On-farm Managers

The language used for Farmer/Farm Manager in the NOC description is not equivalent to the level of skill (verbal ability, education, characteristics) described for other farm-related management occupations (e.g. Aquaculture Manager). Detailed descriptions from the NOC for all these occupations are referenced in Appendix V.

For example, the verbal ability for Farmer and Farm Manager is described as “to establish marketing programs”. This is compared to the verbal ability for Nursery and Greenhouse Operators and Managers, which is described as “to maintain records on stock, finances and personnel and to develop marketing plans”, or Aquaculture Operator and Manager which is described as “to collect and record growth and production data, to maintain financial records and to establish marketing strategies and quality control methods”. Farmers and Farm Managers also maintain records on stock, finances and personnel and they collect and record growth and production data. Revising the description to include this level of detail

may better reflect the level of verbal ability required as in the Farmer and Farm Manager occupation.

The directive interest for Farmer and Farm Manager is “supervising and hiring farm workers; and in determining amounts and kinds of crops to be grown and livestock to be raised...” The characteristic for Nursery and Greenhouse Operators and Managers is “supervising staff in planting, transplanting, feeding and spraying stock, and in hiring staff and overseeing training, in setting work schedules...” and for Aquaculture Operators and Managers is “supervising and training workers, technicians and technologists, and in selecting and overseeing preparation of sites..” Providing more detail to the Farmer and Farm Manager description, similar to the terminology used in the other two occupations that describe the supervision of workers, creation of work schedules, training workers and overseeing production would better illustrate what is required in the Farmer and Farm Manager occupation.

Re-classify Aquaculture Occupations

Two potential gaps were identified in the review of aquaculture occupations. Aquaculture technicians are classified as ‘2221 Biological Technologists and Technicians’, a skilled technical occupation. If individuals in this occupation are employed directly in aquaculture businesses rather than employed as consultants in off-farm businesses, this occupation may be reclassified as an on-farm occupation. Further investigation is needed to determine whether aquaculture technicians are predominately employed on farm or off site.

Identify Aquaculture Supervisors

The development of an Aquaculture Supervisor classification within the NOC could be considered. At this point in time there are supervisor-level classifications for farm supervisors and horticulture supervisors but there is no mention of the occupation of aquaculture supervisor occupation. More work could be done in this area to determine if a separate classification is warranted for this occupation, or if it could be accurately represented by identifying it in an existing occupation classification.

Update Skills Required in All Occupational Descriptions

In all cases, the descriptions of the skills required for on-farm occupations in the NOC do not seem to match the results of the environmental scan and key informant interviews. As reported in the key informant interviews section of this report, when asked about the trends in skills or education requirements in on-farm occupations, respondents stated that movement towards automation and the increased use of technology has increased the skills required in most on-farm occupations. They also stated that knowledge of chemical application protocol, seed and feed ratios, and fertilizer application techniques in many cases are being required at even the general farm worker level. Mention is made, in the NOC Classification Structure description of on-farm occupations, of motor coordination and manual dexterity required to perform these tasks but there is no specific mention of the knowledge and skills required. For example, the main characteristics described in the NOC for General Farm Workers is “motor coordination and manual dexterity to plant, fertilize, cultivate, spray, irrigate and harvest crops; and to milk cows,”⁸ It does suggest the availability of training for these tasks but does not state any requirement to have skills or knowledge in this area. Furthermore, although operation of machinery is mentioned in this same description, the need for the ability to operate heavy equipment is not specified. The environmental scan and the key informant interviews revealed that, as farm operations continue to grow and machinery used in production continues to become larger and more powerful, this is an area of training/skill development. Review and updating of all the NOC job descriptions could help ensure the skills, education and training related to all on-farm occupations are accurately represented.

Develop More Essential Skills Profiles

As identified in the environmental scan, there are five essential skills profiles related to on-farm occupations. It may be beneficial for more work to be done in developing essential skills profiles for occupations such as farm manager. Having essential skills profiles for key management and supervisory-level occupations would provide a formal recognition of the skills and training required for these occupations. It would also be a source for developing training and information regarding career paths in order to attract more people to the industry.

Develop Career Paths using National Qualifications Framework for On-farm Occupations

National Qualification Frameworks (NQFs) describe training outcomes rather than skills required to work in an occupation. Clear career paths for on-farm occupations could be developed by illustrating the building blocks of education, training and experience required to move from entry level occupations to more senior-level occupations by using existing NQFs or by developing a ‘Canadian NQF’. The NQF allows for very specific occupations to be defined as opposed to the generic occupation groupings offered by the NOC system. For example, instead of having Farmer and Farm Manager, the NQF would have Farmer and Farm Manager – Dairy, Farmer and Farm Manager – Seed Crop, and Farmer and Farm Manager – Poultry. The NQF differs from Canada’s Essential Skills profiles as it assigns certifications to be achieved to move from one level to the next. This certification comes from completion of an approved training or education program. Comprehensive career paths could be documented for specific occupational groups, capturing the nuances of individual occupations.

⁸ <http://www5.hrsdc.gc.ca/NOC/English/CH/2001/ClassificationStructure.aspx>, Accessed June 23, 2009

Conclusion

The research conducted in the project revealed a significant quantity of existing information related to on-farm occupations. It also identified some key gaps when comparing these findings to the classification of on-farm occupations in the NOC. The gaps identified were as follows:

- Classification of on-farm managers are not equivalent to other management-level occupations in other sectors.
- Terminology used in on-farm management descriptions do not accurately reflect all the skills and responsibilities of the occupation.
- Aquaculture technicians are not classified as an on-farm occupation;
- Aquaculture supervisors are not identified in the NOC.
- The descriptions for all on-farm occupations need to be updated to more accurately reflect the skills, training and responsibilities required.
- Essential skills profiles do not exist for all on-farm occupations, including farmer and farm manager.
- The NOC does not provide clear career paths for workers.

In the next phase of this research project, regional focus groups will be held to gather first hand information on what commodity stakeholders are experiencing. It will also assist CAHRC in prioritizing the issues presented here.

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<http://www.bls.gov/soc/#classification>. Publication date: Not stated. Access date: July 9, 2009.

Bureau of Labour Statistics. *2010 Standard Occupational Classification. (SOC)—OMB's Final Decisions; Notice*.

<http://www.bls.gov/soc/soc2010final.pdf>. Publication date: January 21, 2009. Access date: July 9, 2009.

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<http://www5.hrsdc.gc.ca/NOC/English/NOC/2006/AboutNOC.aspx>. Publication date: February 11, 2009. Access date: June 26, 2009.

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<http://www5.hrsdc.gc.ca/NOC/English/CH/2001/DetailSearch.aspx>. Publication date: February 11, 2009. Access date: June 30, 2009.

Human Resources and Skills Development Canada. *Essential Skills*.

http://www10.rhdsdc.gc.ca/CE/English/all_profiles.aspx. Publication Date: August 25, 2009. Access date: August 25, 2009.

Human Resources and Skills Development Canada. *National Occupational Classification (NOC) Career Handbook*.

<http://www5.hrsdc.gc.ca/NOC/English/CH/2001/Welcome.aspx>. Publication date: June 25, 2009. Access date: August 14, 2009.

Human Resources and Skills Development Canada. *National Occupational Classification (NOC) (NOC) Career Handbook – Rating Methodology*. <http://www5.hrsdc.gc.ca/NOC/English/CH/2001/RatingMethodology.aspx>.

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Appendix I – Environmental Scan References

The following outlines the sources reviewed as part of the environmental scan by commodity group. It includes a short description of any relevant information uncovered during the review.

General Farm-related Content

Agcareers.com: www.agcareers.com

Agcareers.com is an on-line HR services organization that focuses on agriculture, food, biotechnology and natural resources. As part of their services, job profiles have been established for occupations, including those specific to the farm.

Agriculture in the Classroom: www.aitc.ca

This site provides links to provincial Agriculture in the Classroom websites. Most of the provincial sites provide program resources that focus on describing the industry, food safety and on-farm safety as well as providing teachers and students with hands-on activities. They also promote agriculture ambassador programs and farm tours for students. The Ontario site includes a career path diagram with job titles but there are no descriptions included with these job titles. The PEI site has a link to Agriculture Education (PEI) which also provides job titles but no occupational descriptions.

Service Canada's JobFuture program:

<http://www.jobfutures.ca/noc/8251p1.shtml>

A website designed to be a career and education planning tool for Canadians. The NOC codes are used as the structure for presenting the information.

Service Canada's JobFutures program by province:

<http://www.jobfutures.org/>

Government of Alberta's Alberta Learning Information System:

<http://alis.alberta.ca/ep/eps/hotline/abouthot.htm>

The site provides career planning tools including job profiles and education requirements for all occupations in the classification system. The

information provided is similar to JobFutures but the site also provides career management tools and live advisors that can be called or connected to on-line.

Government of Nova Scotia's Nova Scotia Career Options website: <http://www.nscareeroptions.ca/>

This site is very similar to Alberta's Learning Information System. It builds on the occupational profiles provided on JobFutures by offering career management tools as well.

Agriculture Labour Pool:

<http://www.agri-labourpool.com/industryinfo.aspx>,

A job posting website focused on agriculture, including on-farm work. Postings include jobs in horticulture, dairy operations,

National Farm Animal Care Council:

<http://www.nfacc.ca/code.aspx>

Provides codes of practice for many commodities.

Government of Alberta Agriculture and Rural Development:

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/apa549](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/apa549)

The site provides training material for farmers to develop skills in direct marketing and ebusiness.

Canadian Agriculture Library:

<http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1176485402230&lang=eng>

An email was sent to the assistant librarian. No response has been received to date.

Ontario Agriculture College:

<http://www.oac.uoguelph.ca/future/>

An email has been sent to inquire about existing occupational information that may not be posted on the website.

Nova Scotia Agriculture College: www.nsac.ca

An email has been sent to inquire about existing occupational information that may not be posted on the website.

New Brunswick Community College:

<http://www.nbcc.ca/campuses/st%5Fandrews/>

An email has been sent to inquire about existing occupational information that may not be posted on the website.

Canadian Farm Business Management Council:

<http://www.farmcentre.com/Home.aspx>

Series of reports available about managing farm operations & HR.

Canadian Agriculture Safety Association:

<http://www.casa-acsa.ca/english/>

Safety training documents available on the website.

Prince Edward Island Agriculture Sector Council:

<http://www.peiagisc.ca/resources.shtml>

This site has career profiles for the following on-farm occupations:

- Farm worker (Potato)
- Field Production Manager (Blueberries)

The profiles are based on specific people working in these occupations but also provide general occupation information such as education required, compensation ranges and career path potential.

This site also has a brochure listing agriculture career titles. This brochure does not provide any detailed information about each career.

Soil to Sky: <http://www.soiltosky.ca>

This website has been developed through funds from the Government of Canada, Government of Alberta, Agriculture and Food Council and the Innovation in Agribusiness Management Fund. It provides career profiles in addition to industry-related news, education information, and job postings.

The following sites were reviewed but no information relating to job classification or definition was found:

Canadian 4-H Council:

<http://www.4-h-canada.ca/english/publications.php>

Agcall: www.agcall.com

Agriculture Institute of Canada:

<http://www.aic.ca/Careers/index.cfm>

Canadian Federation of Agriculture:

http://www.cfa-fca.ca/pages/index.php?main_id=319
www.growingcanada.ca

Foreign Agriculture Resource Management Services:

<http://www.farmsontario.ca/>

Site developed by Ontario Farm Animal Council and

AgCare: www.farmissues.com

Newfoundland and Labrador Federation of

Agriculture: <http://www.nlfa.ca/>

Nova Scotia Federation of Agriculture:

<http://www.nsfa-fane.ca/>

PEI Federation of Agriculture: <http://www.peifa.ca/>

L'Union des Producteurs Agricole :

http://www.upa.qc.ca/eng/agriculture_quebec/sector_profile.asp

Western Agriculture Labour Initiative:

<http://www.walicanada.com/index.htm>

Wild Rose Agriculture Producers:

<http://www.wrap.ab.ca/resources/>

Cattle (includes beef and dairy)

Beef

The following sites were reviewed but no information relating to job classification or definition was found.

Canadian Cattlemen's Association:

<http://www.cattle.ca/cca%20home.htm>

Beef Information Centre: www.beefinfo.org

Dairy

Alberta Milk:

<http://www.albertamilk.com/farmlabour/Farmlabour.aspx>

To assist its producers, Alberta Milk has developed job descriptions for a number of dairy farm positions. In conjunction with Service Canada's Labour Market Analysts, it has also developed a wage grid broken into Service Canada regions. The job descriptions and

wage grid can be used as a guide in hiring domestic labour or applied to the Temporary Foreign Worker program through Service Canada. Job descriptions available:

- Assistant Herdsmen
- Calf Rearer
- Dairy Herd Operator
- Dairy Manager
- Dairy Worker
- General Farm Worker
- Herdsmen
- Milker
- Yardsman

AGRIcarrières: <http://www.agricarrieres.qc.ca/>
Has developed standards approved by Emploi-Québec for "OUVRIER AGRICOLE EN PRODUCTION LAITIÈRE" in May 2008. (Summary at http://emploi.quebec.net/guide_qualif/apprentissage-qualification/apprentissage-travail/metiers/ouvrier_agricole_lait.asp, full standards at http://emploi.quebec.net/publications/Pages-statiques/00_fnfmo_NP_ProductionLaitiere.pdf)

BC Ministry of Agriculture and Land:
http://www.agf.gov.bc.ca/busmgmt/human_resource/book2/book2_describe.pdf

Includes a sample job description for Dairy Herd Manager.

AgriSeek.com:
<http://www.agriseek.com/work/e/Employment/Cattle-Dairy/z/Canada/>

A job posting site for agricultural sectors; could contain interesting references for "real-life" job descriptions.

The following sites were reviewed but no information relating to job classification or definition was found:

Dairy Farmers of Canada:
<http://www.dairygoodness.ca>

Dairy Farmers of Ontario: <http://www.milk.org>
Provides a complete job profile in its Bulk Tank Milk Grader Manual (part of a certification program), which is not an on-farm occupation. There are not other job profiles provided on the site.

Agriculture and Agri-Food Canada:
<http://www.agr.gc.ca>

Dairy Practices Council: <http://www.dairypc.org/>

Canadian Dairy Information Centre:
<http://www.dairyinfo.gc.ca>

Ontario Dairy Council: <http://www.ontariodairies.ca>

Dairy Farmers of Manitoba: <http://www.milk.mb.ca/>

BC Dairy Foundation:
<http://www.bcdairyfoundation.com>

British Columbia Milk Producers Association:
<http://www.bcmilkproducers.ca>

BC Milk Marketing Board: <http://www.milk-bc.com>

UBC Dairy Centre and Research Centre:
http://www.landfood.ubc.ca/dairy_centre/index.htm

Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (MAPAQ) :
<http://www.mapaq.gouv.qc.ca>

Fédération des producteurs de lait du Québec :
<http://www.lait.org/en/index.asp>

Dairy Farmers of Nova Scotia: <http://www.dfns.ca/>

Dairy Farmers of New Brunswick:
<http://www.nbmilk.org>

Newfoundland and Labrador Federation of Agriculture (NLFA) (*website under construction*)

Dairy Farmers of Saskatchewan (*no website*)

Poultry and Egg

British Columbia Farm Industry Review Board

http://www.firb.gov.bc.ca/reports/specialty_reports/oabc_position.pdf

The site had a report outlining the core requirements to become a certified egg producer:

Manitoba Turkey Producers: www.turkey.mb.ca

Provides key responsibilities of turkey producers in Manitoba.

Canadian Ostrich Association:

<http://www.ostrich.ca/manual/facts.htm>

Details about processing available but there are no skill specific information.

The following sites were reviewed but no information relating to job classification or definition was found:

New Brunswick Egg Producers – www.nbegg.ca

Nova Scotia Egg Producers – www.nsegg.ca

Saskatchewan Egg Producers – www.saskegg.ca

Prince Edward Island Egg Producers – www.eggspei.ca

Manitoba Egg Producers – www.eggs.mb.ca

Newfoundland and Labrador Egg Producers – www.nleggs.ca

Egg Farmers of Ontario – www.getcracking.ca

Turkey Farmers of Canada:
www.turkeyfarmersofCanada.ca

British Columbia Turkey Growers: www.bcturkey.com

Turkey Farmers of Ontario: www.turkeyfarmers.on.ca

Les Eleveurs de volailles du Quebec:
<http://www.volaillesduquebec.qc.ca/>

Canadian Poultry and Egg Processors Council :
<http://www.cpepc.ca/>

Further Poultry Processors Association of Canada:
<http://www3.sympatico.ca/fppac/>

Canadian Broiler Hatching Egg Producers Association:
http://chep-poic.ca/english/whats_new/Young%20Farmers%20Application%202008.pdf

Canadian Hatching Egg Producers: www.chep-poic.ca

Further Poultry Processors Association of Canada:
<http://www3.sympatico.ca/fppac/>

Swine

Alberta Pork Producers Development Corporation (known as Alberta Pork)

<http://www.albertapork.com/>

The Alberta Pork Producers Alliance (APPA) has drawn up a list of job descriptions for use by producers applying for a Labour Market Opinion (LMO) in order to recruit a foreign worker. This has been developed in order to align jobs within the pork industry with the National Occupation Classification (NOC), which is a standardized framework for defining job categories. This document is available at http://www.albertapork.com/Uploads/Objects/APPA/job_Def_May07.pdf

Saskatchewan Pork Development Board (Sask Pork)

<http://www.saskpork.com>

Has a separate site for "Careers in the pork industry" that presents a few job profiles.
(http://www.pigtour.ca/Careers/job_profiles.html).

Agri-carrières

<http://www.agricarrieres.qc.ca/>

Has developed standards approved by Emploi-Québec for "OUVRIER EN PRODUCTION PORCINE" in May 2007. (Summary at http://emploi.quebec.net/guide_qualif/apprentissage-qualification/apprentissage-travail/metiers/ouvrier_production_porcine.asp, full standards at http://emploi.quebec.net/publications/Pages-statiques/00_fnfmo_NP_production_porcine.pdf)

Manitoba Pork

<http://manitobapork.com>

Has a "Job Opportunities" section, but no standard profiles. Also has a video to present "some of the exciting career choices available in Manitoba's pork industry". Refers to "PigCareers.com", a job posting

site for the swine industry (North America and Worldwide, <http://www.pigcareers.com/>)

Canadian Pork Council

<http://www.cqa-aqc.ca/>

Has a Code of Practice (1993) for the care and handling of farm animals, and an "Animal Care Assessment" manual, designed as an educational and assessment tool for producers to track the welfare of animals on their farms, independent of the production system. Neither covers occupation profiles or competencies.

Canadian Center for Swine Improvement

<http://www.ccsi.ca/>

Has an accreditation process for swine technicians, but it doesn't seem related so much to an occupation as to a specific skill area (follow national standards for ultrasonics probing).

The following sites were reviewed but no information relating to job classification or definition was found:

British Columbia Pork Producers Association/BC Hog Marketing Commission: <http://www.bcpork.ca/>

Agri-Réseau : www.agrireseau.qc.ca

Ontario Pork Producers' Marketing Board: <http://www.ontariopork.on.ca>

Prince Edward Island Hog Commodity Marketing Board: <http://www.peipork.pe.ca/>

Centre de développement du porc du Québec : <http://www.cdpqinc.qc.ca>

Pork Nova Scotia: <http://www.pork.ns.ca>

Fédération des producteurs de porcs du Québec : www.leporcduquebec.qc.ca

New Brunswick Hog Marketing Board (no corporate website)

Other animal ((includes sheep, goats, bison, elk, llama, alpaca, horses, rabbits, deer, fox, and mink)

British Columbia Sheep Federation:

http://www.bcsheepfed.com/PDF/Marketing_plan.pdf, Contains education information and strategies for expanding production in Canada.

BC Goat Breeders Association:

<http://www.bcgba.netfirms.com/>

National Goat Handbook (USA) listed on the website but the link to the document did not work.

Llama Canada: www.llamacanada.com

The site indicated the organization was doing strategic planning for future of industry including education and training.

The following sites were reviewed but did no information relating to job classification or definition was found:

Canadian Sheep Foundation: www.cansheep.ca

Alberta Lamb Producers: http://www.ablamb.ca/promotions/ablamb_producer_s.html

Saskatchewan Sheep Development Board: www.sksheep.com

Canadian National Goat Federation: <http://www.cangoats.com/en/index.html>

Canadian Goat Society: www.goats.ca

Canadian Meat Goat Association: www.canadianmeatgoat.com

Goat Association of Nova Scotia: <http://www3.ns.sympatico.ca/gans/>

Ontario Goat Breeders Association: www.ogba.ca (link did not work)

Regroupement des Eleveurs de chevres de Boucherie du Quebec : <http://www.recbq.com/>

Syndicat des producteurs de Chevre du Quebec : <http://www.chevreduquebec.com/>

Alberta Goat Breeders Association :
<http://www.albertagoatbreeders.ca/>

Alberta Mohair Breeders Association: link did not work

Manitoba Goat Association:
<http://www.manitobagoats.com>

Saskatchewan Goat Breeders Association:
<http://www.saskgoatbreeders.com/>

Canadian Bison Association:
<http://www.canadianbison.ca/consumer/default.aspx>

Canadian Mink Breeders Association:
www.canadamink.ca

Alpaca Canada: <http://www.alpacainfo.ca/>

Equine Canada: <http://www.equinecanada.ca/>

Crops – (includes grains, cereals, oilseeds, pulses, pastures, forages, forage seed, fibre)

Ontario Canola Growers:

<http://www.ontariocanologrowers.ca/Production%20Info/Spring%20Canola%20Grower%20Guide.pdf>

Ontario Spring Canola Growing Guide outlines growing techniques but not specific skill sets.

Manitoba Canola Growers:

<http://www.mcgacanola.org/>

Information about the canola learning centre provided on the site.

Saskatchewan Canola Development Commission:

<http://www.saskcanola.com/>

The site has a career section but there were no job postings at the time the site was reviewed.

Canadian Seed Growers Association:

www.seedgrowers.ca

Information about the seed certification program which appears to be more focused on the seed process than the skills required.

Canadian Seed Trade Association:

http://www.cdnseed.org/career/Careers_Intro.pdf

This site includes general information about careers available in the seed industry but does not provide specific job profiles.

The following sites were reviewed but no information relating to job classification or definition was found:

Flax Council of Canada: www.flaxcouncil.ca

Western Barley Growers Association:
<http://www.wbga.org/index.html>

National Sunflower Association of Canada:
http://www.canadasunflower.com/about_mission.htm

Canada Canola Growers Association:
<http://www.ccca.ca/>

Saskatchewan Canola Growers Association:
<http://www.canologrowers.ca/net/DesktopDefault.aspx>

Alberta Canola Development Commission:
<http://www.canola.ab.ca/>

British Columbia Grain Producers: www.bcgrain.com

Canadian Hemp Trade Alliance:
<http://www.hemptrade.ca/index.php>

Field Fruit and Vegetable (includes potato, melon)

Canadian Horticultural Council: www.hortcouncil.ca/chcmain.htm

This site includes information related to food safety and production. There is a section that describes HR challenges facing the industry. However, there is no information specific to job profiles.

Tree Fruit and Vines (includes grapes)

Government of Alberta – Agriculture and Rural Development

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex10853](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex10853),

Includes requirements to be a wine maker but does not include skills required to produce grapes.

Aquaculture

Aquaculturejobs.com:

<http://www.aquaculturejobs.com/>

Several job postings are included on this website.

Examples of job titles are:

- Freshwater technician
- Hatchery technician
- Hatchery manager

Canadian Aquaculture Industry Alliance:

<http://www.aquaculture.ca/files/education-training.php>

This site includes a list of sample job titles for the industry but it does not provide detailed information for these occupations.

Memorial University:

<http://www.mi.mun.ca/harvesting/>

Information provided about the fish harvesting certificate offered by the university.

The following documents were cited during key informant interviews and exist only in hard-copy format. A request was put forward to obtain copies but, at the time of the final report, no response had been received:

- 1) Skill Standards for Aquaculture. 2002. ISBN # 1-894048-0607 (available from CAIA or the library). Completed for the Canadian Aquaculture Industry Alliance including DACUM analysis and validation of occupations for 1) general farm labourers, 2) farm technicians, 3) foreman, 4) site manager, 5) general manager.
- 2) Situational Analysis of the Aquaculture Industry in Canada. 2002. Completed by Praxis Consulting for CAIA. A study of the labour market, demographics, etc. for the entire industry. Available from CAIA, funded by HRSDC.
- 3) Canadian Aquaculture Industry Profile and Labour Market Analysis. 1998. Completed by Sales Growth Programs for CAIA. Funded by HRSDC.
- 4) Training Needs of the Canadian Aquaculture Industry. 1998. Completed by Sales Growth Programs for CAIA. Funded by HRSDC.

- 5) Occupational Analysis of Aquaculture Operator/ Entrepreneur in the Newfoundland Aquaculture Industry – Summary of Competencies. 1997. Completed by the Marine Institute for the NAIA.
- 6) Occupational Analysis of Aquaculture Technician in the Newfoundland Aquaculture Industry – Summary of Competencies. 1997. Completed by the Marine Institute for the NAIA.
- 7) Occupational Analysis of Fish Farm Worker (shellfish and finfish) in the Newfoundland Aquaculture Industry – Summary of Competencies. 1997. Completed by the Marine Institute for the NAIA.
- 8) The development and validation of major skill areas in the Canadian aquaculture industry. 1997. Completed for CAIA by the Marine Institute.

The following sites were reviewed but no information relating to job classification or definition was found:

Aquaculture Association of Canada:

<http://www.aquacultureassociation.ca/>

École des pêches et de l'aquaculture du Québec:

<http://www.cgaspesie.qc.ca/english/index.php>

Greenhouse (includes fruit and vegetable, nursery and floriculture)

Canadian Horticultural Council:

<http://www.hortcouncil.ca/hr.HTM>

This site provides information related to HR issues facing the horticultural industry. There are no specific job profiles posted on this site.

Canadian Nursery Landscape Association:

<http://www.canadanursery.com/Page.asp?PageID=122&ContentID=1298>

This site provides job titles but does not provide job descriptions. There is also an industry job board which has specific job postings from employers.

Flowers Canada Growers:

www.flowerscanadagrowers.com

The site provides HR-related information for employers.

Other (includes herbs and spices, maple, sod, bees, tobacco, hemp, non-timber forest products)

Saskatchewan Herb and Spice Association:

www.saskherbspice.org

The website contained information related to the technical skills required to work in the industry but did not contain occupation-specific profiles.

Medicinal Plant Working Group:

<http://www.nps.gov/plants/medicinal/index.htm>

The website contained information related to the technical skills required to work in the industry but did not contain occupation-specific profiles.

Canadian Honey Council: www.honeycouncil.ca

The Council has a bee-keeping certification and training manual.

Canadian Herb, Spice & Natural Health Products

Coalition: <http://www.saskherbspice.org/>

Best practice documents provided on the site.

The following sites were reviewed but no information relating to job classification or definition was found:

The Ontario Flue-Cured Tobacco Growers' Marketing Board: <http://www.ontarioflue-cured.com/>

Ontario Maple Syrup Producers Association:
www.ontariomaple.com

Maple Syrup Federation:
<http://www.maplesyrupfederation.com/Afficher.aspx?section=5&langue=en>

Natural Products Information (NPI) Center:
www.npicenter.com

Appendix II – International Comparison of On-farm Occupational Classifications

Country	Additional information
USA	<p>The United States is undergoing a revision of their Standard Occupational Classification (SOC) system and has recently posted their proposed changes for SOC2010 on-line. The occupation, “11-9010 Farmers, Ranchers and Other Agricultural Managers” is listed under the Management Occupations Group. This grouping includes “Farmers and Ranchers 11-9012” Under “Farming, Fishery and Forestry Occupations” there is an occupational group for first-line supervisory positions in agriculture (45-1010) which is different from general farm and aquaculture workers (45-2093).</p> <p>http://www.bls.gov/soc/soc_structure_2010.pdf</p> <p>http://www.bls.gov/soc/#classification</p> <p>http://www.bls.gov/soc/soc2010final.pdf</p>
New Zealand and Australia	<p>In the occupational classification system in Australia and New Zealand, the ‘Major Group 1’ for Managers, has a minor group of 121 for farmers and farm managers. Occupations included in this minor group include 1211 – Aquaculture Farmers, 1212 Crop Farmers, 1213 Livestock Farmers, 1214 Mixed Crop and Livestock Farmers.</p> <p>Farmers and farm managers plan, organize, control, coordinate and perform farming operations in agricultural establishments to grow crops, and breed and raise livestock, and fish and other aquatic life.</p> <p>Indicative Skill Level: Most occupations in this sub-major group have a level of skill commensurate with a bachelor degree or higher qualification. At least five years of relevant experience may substitute for the formal qualification. In some instances relevant experience and/or on-the-job training may be required in addition to the formal qualification (ANZSCO Skill Level 1).</p> <p>Tasks Include: planning and coordinating the operation of hatcheries and crop production; breeding and raising livestock and aquatic stock; monitoring and maintaining the health of stock; identifying and controlling environmental toxins, weeds, pests and diseases; organising and conducting farming operations such as maintaining buildings, water supply systems and equipment; managing business capital, monitoring market activity and planning production to meet contract requirements and market demand</p> <p>Note: Australia and New Zealand use the same occupational classification system, the Australian and New Zealand Standard Classification of Occupations. Therefore the information provided for New Zealand applies to Australia as well</p> <p>http://www.abs.gov.au/ausstats/abs@.nsf/Product+Lookup/1220.0~First+Edition,+Revision+1~Chapter~SUB-MAJOR+GROUP+12+Farmers+and+ Farm+Managers</p>

Country	Additional information
United Kingdom	<p>Standard Occupational Classification (SOC2000), Office for National Statistics, UK</p> <p>There is a separate occupation for Farm Manager (1211) listed in the Managers and Senior Officials (Major Group 1). Farmers (5111), Horticultural Trades (5112) and Agricultural and Fishing Trades (5119) are listed under Skilled and Occupational Trades. Farm Labourers (9111) are classified under Elementary Agricultural Occupations.</p> <p>http://www.statistics.gov.uk/methods_quality/soc/section1.asp</p>
France	<p>1 Agricultural Producers 10 Agricultural Producers (salaried employees of the business)</p> <p>This group is specifically for the classification of individuals (professionals) who perform duties of chief executive officer or chief administrator of an agricultural business, and who receives a salary.</p> <p>Normally, the jobs classified in this category relate to one individual in each business, such as the chief operating officer, or as may be the case, a small number of individuals who carry out joint management or assistant management or assistant administrative functions.</p> <p>http://www.insee.fr/fr/methodes/default.asp?page=nomenclatures/pcse/pcse2003/n2_10.htm</p> <p>3 Executives and upper management occupations 37 Business administrative and marketing executives</p> <p>This category includes salaried workers who hold executive positions in marketing or administration within a business.</p> <p>The duties often include supervision of personnel.</p> <p>The following activities are specific to this category:</p> <ul style="list-style-type: none"> - general education in economics and social sciences , including statistics and actuarial ; - administration, management (personnel, finances, accounting); - administration marketing and other marketing related occupations; - technical marketing (sales) activities in occupations where no significant technical skills are required; - communications, advertising and public relations; - activities specific to the banking, insurance, hotel-restaurant and real estate sectors .

Country	Additional information
International Labour Organization (ILO) ISCO – 08	<p>1 Management Occupations</p> <p>Management occupations are classified under Major Group 1. The following two agricultural management occupations are classified under sub-major group 13, production and specialized services managers.</p> <p>1311 Agricultural and forestry production managers</p> <p>Agricultural and forestry production managers plan, direct, and coordinate production in large scale agricultural, horticultural and forestry operations such as plantations, large ranches, collective farms and agricultural cooperatives to grow and harvest crops, and breed and raise livestock.</p> <p>1312 Aquaculture and fisheries production managers</p> <p>Aquaculture and fisheries production managers plan, direct, and coordinate production in large scale aquaculture and fishery operations to catch and harvest fish and shellfish, and to grow fish shellfish or other forms of aquatic life, as cash crops or for release into freshwater or saltwater.</p> <p>http://www.ilo.org/public/english/bureau/stat/isco/docs/gdstruct08.doc</p> <p>6 Skilled agricultural, forestry and fishery workers</p> <p>Skilled agricultural, forestry and fishery workers are classified in major group 6. This group consists of sub-major group 61, market-oriented skilled agricultural workers, 62, market-oriented skilled forestry, fishery and hunting workers, and 63, subsistence farmers, fishers, hunters and gatherers.</p> <p>Individuals in these occupations grow and harvest field or tree and shrub crops, gather wild fruits and plants, breed, tend or hunt animals, produce a variety of animal husbandry products, cultivate, conserve and exploit forests, breed or catch fish and cultivate or gather other forms of aquatic life in order to provide food, shelter and income for themselves and their households. Most occupations in this major group require skills at the second ISCO skill level.</p> <p>http://www.ilo.org/public/english/bureau/stat/isco/docs/gdstruct08.doc</p>

Appendix III – Management-level Education and Training Requirements

The following table illustrates the management-level occupations that require the same education levels as on-farm management occupations which are not classified at the management-level in NOC.

Level 4 education and training requirements is equivalent to “completion of coursework, training, workshops and/or experience related to occupation. Level 6 of education and training refers to the equivalent of ‘college, technical school (certificate or diploma)’. Some management occupations have R as an education and training level equivalent to “regulated requirements”:

NOC	Level 4	Level 6	R
On-farm Occupations			
8251 – Farmers and Farm Managers (in addition to Level 1, no formal education or training requirements)		X	
8254 – Nursery and Greenhouse Operators and Managers		X	
8257 – Aquaculture Operators and Managers	X	X	X
Other Occupations			
0012 – Senior Government Managers and Officials		X	
0013 – Senior Managers - Financial, Communications and Other Business Services			X
0014 – Senior Managers - Health, Education, Social and Community Services and Membership Organizations		X	X
0015 – Senior Managers - Trade, Broadcasting and Other Services, n.e.c.		X	X
0016 – Senior Managers - Goods Production, Utilities, Transportation and Construction		X	X
0111 – Financial Managers			X
0113 – Purchasing Managers		X	X
0114 – Other Administrative Services Managers		X	X
0121 – Insurance, Real Estate and Financial Brokerage Managers		X	X
0122 – Banking, Credit and Other Investment Managers		X	
0123 – Other Business Services Managers		X	X
0132 – Postal and Courier Services Managers		X	
0211 – Engineering Managers		X	X

NOC	Level 4	Level 6	R
0212 – Architecture and Science Managers			X
0311 - Managers in Health Care			X
0312 - Administrators - Post-Secondary Education and Vocational Training		X	X
0313 - School Principals and Administrators of Elementary and Secondary Education			X
0411 - Government Managers - Health and Social Policy Development and Program Administration		X	X
0413 - Government Managers - Education Policy Development and Program Administration			X
0512 - Managers - Publishing, Motion Pictures, Broadcasting and Performing Arts		X	
0513 - Recreation and Sports Program and Service Directors		X	X
0611 - Sales, Marketing and Advertising Managers		X	
0621 - Retail Trade Managers			
0631 - Restaurant and Food Service Managers		X	
0632 - Accommodation Service Managers	X	X	
0651 - Other Services Managers		X	
0711 - Construction Managers	X	X	X
0713 - Transportation Managers	X	X	X
0721 - Facility Operation and Maintenance Managers		X	
0811 - Primary Production Managers (Except Agriculture)	X		
0911 - Manufacturing Managers		X	
0912 - Utilities Managers		X	

Appendix IV – NOC Job Titles for On-Farm Occupations

Note: All information presented in this section comes directly from HRSDC's NOC website:
<http://www5.hrsdc.gc.ca/NOC/English/NOC/2006/Occupations.aspx?val=8>. Accessed August 26, 2009.

NOC	Job Titles Included in this NOC
8251 Farmers and Farm Managers	animal breeder animal farmer apiarist apiculturist apple grower apple producer bean sprout farmer bean sprout grower beef cattle farmer beef producer beekeeper bird breeder broiler chicken producer broiler producer cat breeder cattle rancher cereal and oilseed grower cereal and oilseed producer cereal farm manager cereal grower cereal producer chicken farmer cow-calf operator crop farmer dairy cattle breeder dairy farm manager dairy farmer dog breeder domestic animal breeder egg producer farm business manager farm manager farmer (except nursery and fish farm) feedlot farmer feedlot manager feedlot operator forage crop farmer fruit farm operator fruit farmer fruit grower fruit producer fur farmer fur-bearing-animal farmer ginseng grower

NOC	Job Titles Included in this NOC
<p>8251 Farmers and Farm Managers</p>	<p>goat breeder grain and oilseed farmer grain and oilseed grower grain and oilseed producer grain farm manager grain farm operator grain farmer grain grower grain producer grape grower grape producer hatchery manager hatchery operator hog breeder hog farmer hog producer hop grower hop producer horse breeder kennel operator livestock farmer maple syrup producer market gardener mixed farmer mushroom grower mushroom producer pheasant breeder potato farmer potato grower potato producer poultry breeder poultry breeder – egg production poultry farm manager poultry farmer – egg production poultry producer rabbit breeder rancher ranchman/woman rodent breeder rodent raiser seed farmer seed grower seed producer sheep farm operator sheep farmer sod farmer sugar beet farmer sugar maple grower tobacco farmer tomato grower tropical fish breeder truck farmer turf farmer turkey producer vegetable gardener vegetable grower vineyard manager</p>

NOC	Job Titles Included in this NOC
8251 Farmers and Farm Managers	viticulturist wheat farmer wheat grower wheat producer
8253 Farm Supervisors and Specialized Livestock Workers	agriculture foreman/woman animal farm foreman/woman animal husbandry foreman/woman apple orchard foreman/woman beef cattle herdsman cattle feedlot foreman/woman cattle herdsman cattle ranch foreman/woman corral boss dairy farm foreman/woman dairy farm workers foreman/woman dairy herdsman dressage and stunt horse trainer farm boss farm business foreman/woman farm foreman/woman farm operation foreman/woman farm operation supervisor farm supervisor farm workers supervisor feedlot foreman/woman feedlot herd attendant field crop and vegetable workers foreman/woman field crop foreman/woman field-grown crop foreman/woman field-grown crop workers foreman/woman fruit farm foreman/woman fruit farm workers foreman/woman grain crop foreman/woman hatchery foreman/woman hatchery workers foreman/woman herd attendant herd superintendent herdsman/woman herdsman hog farm foreman/woman hog farm supervisor hog farm workers supervisor hog operation supervisor hop farm foreman/woman horse stable foreman/woman horse trainer irrigation supervisor – agriculture livery stable foreman/woman livestock attendant livestock farm workers foreman/woman livestock foreman/woman livestock raising foreman/woman maple products foreman/woman – agriculture orchard foreman/woman pasture-managing supervisor pork production technician

NOC	Job Titles Included in this NOC
Farm Supervisors and Specialized Livestock Workers	pork production technician apprentice poultry farm foreman/woman poultry farm workers foreman/woman poultry operation supervisor racehorse trainer ranch foreman/woman sheep handler sheep herdsman shepherd stable boss stockyard and herdsman foreman/woman sugarcane operation foreman/woman swine herdsman tobacco farm foreman/woman tobacco farming workers foreman/woman turkey farm foreman/woman turkey farming workers foreman/woman vegetable farm foreman/woman vegetable farm workers foreman/woman vineyard foreman/woman vineyard workers foreman/woman
8254 Nursery and Greenhouse Operators	Christmas tree farm operator evergreen grower flower grower greenhouse farmer greenhouse manager greenhouse operator horticultural contractor horticultural greenhouse operator hothouse flower grower hydroponic greenhouse operator hydroponics grower hydroponics operator nursery farmer nursery manager nursery operator nurseryman/woman plant grower – nursery rose grower shrub grower tree grower – nursery tree nursery operator
8257 Aquaculture Operators and Managers	aquaculture manager aquaculture operator eel farmer fish culture manager fish culture operator fish farm manager fish farm operator fish farmer fish hatchery manager fish hatchery operator lobster farmer mussel farmer

NOC	Job Titles Included in this NOC
8257 (continued) Aquaculture Operators and Managers	mussel grower oyster farmer oyster grower salmon farmer salmon grower trout farmer
8431 General Farm Workers	apiary worker artificial breeding worker attendant, livestock yard baler – agriculture baling machine operator – farm barn worker beef cattle farm worker binder operator – agriculture cattle ranch labourer cattle ranch worker chick sexer chicken catcher chore hand – agriculture combine operator cowboy/cowgirl cowhand cowherd cowpuncher crewperson, custom harvest crowsprayer machine operator cultivator operator custom harvest crewperson dairy farm labourer dairy farm worker dairy hand egg candler egg gatherer egg grader egg grading machine tender egg grading station labourer egg processing machine tender farm equipment operator farm hand farm labourer farm labourer, grain farm machinery operator farm worker farm worker, fruit farm worker, general farm worker, grain farm worker, hogs farm worker, mushrooms farm worker, pheasants farm worker, poultry farm worker, sugar-beets farm worker, tobacco farm worker, vegetables feedlot assistant feedlot worker

NOC	Job Titles Included in this NOC
<p>8431 (continued) General Farm Workers</p>	<p>feedyard assistant feedyard worker field and vegetable crop labourer field crop and vegetable-growing worker fruit examiner – agriculture fruit farm labourer fruit farming labourer fruit tree pruner fruit tree thinner fur farm worker fur farming worker fur ranch labourer grafter – orchard grain thresher groom – farm harvester machine operator hatchery worker herder – stockyards hop-picking machine operator horse breaker incubator tender – agriculture irrigation worker irrigator sprinkler system irrigator wheel line system labourer, poultry farming lamb feedlot worker livestock driver livestock labourer livestock weigher livestock yard attendant livestock yardman/woman maple syrup maker maple tapping worker market garden worker milk production labourer milking machine tender oilseed crop worker orchard worker pasture rider penrider poultry yard cleaner racehorse exerciser ranch hand ranch labourer, fur ranch worker row irrigator sheep feedlot worker sheep shearer soya bean crop worker stable assistant stable hand stable worker stableman/woman stock attendant stockyard attendant sugar bush worker</p>

NOC	Job Titles Included in this NOC
8431 (continued) General Farm Workers	threshing machine operator tobacco curer tobacco harvesting machine operator tobacco primer tractor operator, farming vegetable thinner vineyard pruner worker, artificial insemination
8432 Nursery and Greenhouse Workers	Christmas tree shearer Christmas tree trimmer forest assistant nursery forest nursery worker greenhouse worker hand sprayer – greenhouse horticulture worker hothouse worker hydroponics worker interior landscaper nursery worker plant propagator – greenhouse or nursery sprayer, hand – greenhouse stadium groundskeeper tree grafter – nursery
8611 Harvesting Labourers	apple picker berry picker crop farm labourer – harvesting cucumber picker field-grown crop farm labourer – harvesting fruit harvest worker fruit harvester fruit or vegetable picker fruit packer – agriculture fruit picker fruit sorter – agriculture harvest hand harvest worker mushroom picker packer, vegetables – agriculture small fruit picker tobacco cutter – tobacco harvesting tobacco picker tobacco stripper – tobacco harvesting tomato picker vegetable packer vegetable packer – agriculture vegetable picker vegetable sorter – agriculture

NOC	Job Titles Included in this NOC
8613 Aquaculture and Marine Harvest Labourers	aquaculture support worker aquaculture worker attendant, lobster pound fish farm helper fish farm worker fish hatchery attendant fish hatchery tagger fish hatchery worker – aquaculture fish tagger fry marker fry marker – fishing fry tagger hatchery helper hatchery worker – aquaculture lobster pound attendant mussel farm labourer mussel harvester oyster harvester oyster picker oyster picker-shucker sea farm attendant sea farm worker shellfish bed attendant shellfish harvester

Appendix V – Summary of NOC Classification Descriptions

NOC	Description	Main Characteristics	Education -Training*	Employment Requirements
8251 – Farmers and Farm Managers	Farmers and farm managers manage the operations and functions of farms, such as growing crops, raising and breeding livestock, poultry and other animals and marketing farm products.	<p>General learning ability to manage the operation of farms, ranches and orchards.</p> <p>Verbal ability to establish marketing programs.</p> <p>Numerical ability to develop and keep financial and production records.</p> <p>Directive interest in supervising and hiring farm workers; and in determining amounts and kinds of crops to be grown and livestock to be raised, and in purchasing farm machinery, livestock, seed, feed and other supplies.</p> <p>Methodical interest in coordinating information to plant, cultivate and harvest crops; and in raising and breeding livestock and poultry.</p> <p>Objective interest in driving – operating and maintaining farm machinery, equipment and buildings.</p>	Levels - 1+, 6+	Extensive farming experience (obtained as a farmer, farm supervisor or specialized livestock worker or by working on a family farm) is usually required. A college diploma in agriculture may be required.
8253.1 Farm Supervisors	Farm supervisors oversee the work of general farm workers and harvesting labourers and perform general farm duties.	<p>General learning ability to supervise the work of general farm workers and harvesting labourers and to perform general farm duties.</p> <p>Directive interest in supervising and coordinating the work of general farm workers and harvesting labourers; and in supervising breeding programs and harvest operations.</p> <p>Methodical interest in handling equipment to perform general farm duties; and in maintaining quality control and production records.</p> <p>Innovative interest in coordinating information to develop work schedules and establish procedures.</p>	Levels - 1, 5, 6	Farm supervisors may require a college certificate or other specialized training in agriculture or livestock husbandry.

NOC	Description	Main Characteristics	Education -Training*	Employment Requirements
8253.2 Specialized Livestock Workers	Specialized live-stock workers carry out feeding, health and breeding programs on dairy, beef, sheep, poultry, equine and hog farms, and may also supervise general farm workers and harvesting labourers.	<p>General learning ability to carry out pasture and pen breeding programs, and to recognize and treat certain livestock health problems.</p> <p>Methodical interest in handling equipment to perform general farm duties; and in maintaining livestock performance records and in training horses.</p> <p>Innovative interest in coordinating information to formulate feeding programs.</p> <p>Directive interest in supervising feeding, health and breeding programs; may supervise general farm workers and harvesting labourers.</p>	Levels - 1, 5, 6	Specialized livestock workers may require a college certificate or other specialized training in agriculture or livestock husbandry.
8254 Nursery and Greenhouse Operators and Managers	Nursery and greenhouse operators and managers plan, organize, direct and control the activities of nursery and greenhouse staff who grow and market trees, shrubs, flowers and plants.	<p>General learning ability to manage the operations of nurseries and greenhouses and to establish the environmental conditions required to grow trees, shrubs, flowers and plants.</p> <p>Verbal and numerical ability to maintain records on stock, finances and personnel and to develop marketing plans.</p> <p>Directive interest in supervising staff in planting, transplanting, feeding and spraying stock; and in hiring staff and overseeing training, in setting work schedules and in determining types and quantities of stock.</p> <p>Methodical interest in coordinating information to organize nursery and greenhouse operations; and in ordering materials such as fertilizer, garden and lawn care equipment, and other nursery and greenhouse accessories.</p> <p>Social interest in providing information to customers on gardening and the care of trees, shrubs, flowers, plants and lawns.</p>	Education/ Training 6+	Completion of a college program in horticulture is usually required. Experience as a nursery or greenhouse supervisor is required.

NOC	Description	Main Characteristics	Education-Training*	Employment Requirements
8256 Supervisors, Landscape and Horticulture	Supervisors, landscape and horticulture, supervise and coordinate the activities of Nursery and Greenhouse Workers (8432).	<p>General learning ability to supervise and coordinate the activities of workers to provide horticultural services and to establish work procedures; may perform the same duties as workers.</p> <p>Verbal ability to train workers in job duties and company policies, and to prepare progress and other reports.</p> <p>Directive interest in supervising workers who plant, cultivate and harvest trees, shrubs, flowers and plants.</p> <p>Social interest in coordinating information to resolve work-related problems, to establish work schedules and to coordinate activities with other units.</p> <p>Methodical interest in operating equipment and in requisitioning supplies and materials and in submitting progress and other reports.</p>	Education/ Training 4, R	<p>Completion of secondary school is usually required.</p> <p>Experience in the occupation supervised is required.</p> <p>A provincial license to apply chemical fertilizers, fungicides, herbicides and pesticides may be required.</p>
8257 Aquaculture Operators and Managers	Aquaculture operators and managers manage operations of facilities that cultivate and harvest fish, shellfish and marine plants for replenishment of wildlife stocks and for commercial sale.	<p>General learning ability to manage the operations of fish hatcheries, fish farms and other aquatic farms, to coordinate selection and maintenance of brood stock and to scuba dive to inspect sea farm operations.</p> <p>Verbal ability to collect and record growth and production data, to maintain financial records and to establish marketing strategies and inventory and quality control methods.</p> <p>Form perception to conduct and supervise stock examinations to identify diseases and parasites, and to identify species' requirements.</p> <p>Directive interest in supervising and training workers, technicians and technologists; and in selecting and overseeing preparation of sites for species cultivation, and supervising the processing of products.</p> <p>Methodical interest in coordinating information to monitor environments and maintain optimum conditions, to apply prescribed medicinal substances to control and prevent infection, to determine food requirements and to structure feeding regimes.</p> <p>Objective interest in operating and maintaining cultivating and harvesting equipment; and in designing and constructing pens, floating stations, collector strings and fences for sea farms.</p>	Education/ Training 4+, 6, R	<p>Completion of secondary school is usually required.</p> <p>A college diploma in aquaculture or a related field or several years of experience in fishing or aquaculture operations are usually required.</p> <p>A commercial aquaculture or fish hatchery license, permit or lease is required for self-employed aquaculture operators and managers.</p>

NOC	Description	Main Characteristics	Education -Training*	Employment Requirements
8431 – General Farm Workers	General farm workers plant, cultivate and harvest crops, raise livestock and poultry, and maintain and repair farm equipment and buildings. This group includes operators of farm machinery.	<p>General learning ability to plant, cultivate and harvest crops, raise livestock and poultry, and maintain and repair farm equipment and buildings.</p> <p>Motor coordination and manual dexterity to plant, fertilize, cultivate, spray, irrigate and harvest crops; and to milk cows.</p> <p>Methodical interest in comparing information to examine produce for quality and prepare for market, to feed and tend livestock and poultry, and to clean stables, barns, barnyards and pens; and to set and monitor water lines, air flow and temperature in barns, pens and chicken coops.</p> <p>Objective interest in driving – operating and maintaining farm machinery and equipment.</p> <p>Innovative interest in detecting disease and health problems in crops, livestock and poultry.</p>	Levels 1, 4, 6	<p>There are no specific education or training requirements. However, a college certificate or specialized courses related to farming, such as farm equipment mechanics, agricultural welding, tree pruning and pesticide application are available.</p> <p>Basic farm knowledge, usually obtained from working on a family farm, may be required for employment.</p>
8432 – Nursery and Greenhouse Workers	Nursery and greenhouse workers plant, cultivate and harvest trees, shrubs, flowers and plants, and serve nursery and greenhouse customers.	<p>General learning ability to plant, cultivate and harvest trees, shrubs, flowers and plants and to serve nursery and greenhouse customers.</p> <p>Motor coordination and manual dexterity to dig, cut and transplant trees, shrubs, flowers and plants and prepare them for sale, and to clean working area.</p> <p>Methodical interest in speaking to provide information to customers on gardening and the care of trees, shrubs, flowers, plants and lawns; and in maintaining inventory and order materials.</p> <p>Objective interest in operating equipment to spray against disease and pests; and in positioning and regulating greenhouse and outdoor irrigation systems; may operate tractors and other machinery and equipment to fertilize, cultivate, harvest and spray.</p> <p>Innovative interest in comparing information to prepare soil and plant bulbs, seeds and cuttings; and in grafting and budding plants and in transplanting seedlings and rooted cuttings.</p>	Levels - 2, 4, R	<p>Completion of secondary school may be required.</p> <p>Completion of college courses in horticulture or a related field may be required.</p> <p>On-the-job training is provided.</p> <p>A provincial license to apply chemical fertilizers, fungicides, herbicides and pesticides may be required.</p>

NOC	Description	Main Characteristics	Education -Training*	Employment Requirements
8611 – Harvesting Labourers	Harvesting labourers assist other farm workers to harvest, sort and pack crops.	<p>General learning ability to assist other farm workers to harvest, sort and pack crops.</p> <p>Motor co-ordination and manual dexterity to transplant seedlings, thin row crops, pick berries and prepare produce for market, and to bag grain, pull vegetables and connect irrigation piping; and to clean up racks, trays, growing and packaging areas.</p> <p>Methodical interest in comparing information to sort, weigh and pack fruit and vegetables at farms, and to pick row and orchard crops.</p> <p>Objective interest in handling, loading, unloading and transferring crates, supplies, farm produce, livestock and poultry.</p> <p>Innovative interest in preparing vegetable produce for market.</p>	Levels - 1	There are no specific education or training requirements.
8613.1 Aquaculture Support Workers	Aquaculture support workers assist aquaculture technicians with the operations of aquatic farms.	<p>General learning ability to assist aquaculture technicians in the operations of fish hatcheries and other aquatic farms and to operate boats in marine aquaculture operations.</p> <p>Finger dexterity to vaccinate aquaculture stocks and to perform marking and banding techniques.</p> <p>Methodical interest in comparing information to feed aquaculture stocks, to perform culling techniques and to prepare stocks for market; and in keeping daily records of water flow and fish samples.</p> <p>Objective interest in operating, maintaining and cleaning pumps, filters, tanks and other equipment; in grading and weighing aquaculture stocks; and in cleaning and maintaining aquaculture enclosures.</p> <p>Innovative interest in reporting any observed irregularities in stocks.</p>	Levels - 2	Some secondary school education is usually required.

Source: <http://www5.hrsdc.gc.ca/NOC/English/CH/2001/ClassificationStructure.aspx>, Accessed June 23, 2009



* The numeric rating system used for the education and training indicators is described by HRSDC as reflective of different types of education, training or combinations of these criteria, either required or possible, for entering occupations rather than the amount of time spent in training programs.⁹ The ratings are categorized by ten levels, and one occupation may be assigned more than one level. The ten levels are:

1 - No formal education or training requirements

2 - Some high school education and/or on-the-job training or experience

3 - Completion of high school

4 - Completion of course work, training, workshops and/or experience related to occupation

5 - Apprenticeship, specialized training, vocational school training

6 - College, technical school (certificate, diploma)

7 - Undergraduate degree

8 - Post-graduate or professional degree

* Additional requirements beyond education/training (e.g., extensive experience, demonstrated or creative ability, appointments, etc.)

R - Regulated requirements exist for this group

⁹ <http://www5.hrsdc.gc.ca/NOC/English/CH/2001/RatingMethodology.aspx>, Accessed June 30, 2009.





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