Agricultural Learning/Skills Development Opportunities for PEI

Environmental Scan report produced for:
PEI Agricultural Human Resources Development Council (AHRDC)

Version 2.4
October 12, 2003
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Table of Contents

1 Executive Summary

The agricultural community in PEI continues to face many challenges: economic, social, and environmental. One set of challenges relates to the current and future availability of an agricultural workforce—primarily farmers and farm workers—sufficiently skilled to ensure that farming on PEI remains viable.

Education and training initiatives will play a role in any program of support for PEI's sustainable agriculture. Within that context, the objective of this research was to:

- identify the needs of PEI's agricultural community with regard to education and training
- catalogue the education and training opportunities available to PEI's agricultural community
- highlight gaps, barriers and hypotheses when comparing the needs to the opportunities.

There are concerns about the skills and training of PEI's agricultural workforce, indicating that more skills and more skilled workers may be needed. Skills development initiatives, possibly including certification or apprenticeship schemes, may be required. Background factors that influence farm skills needs and learning options include increasing farm size; global markets and competition; the need for excellent financial and managerial skills; increasing use of technology; the requirements of food safety, and the gap between education levels versus the skills needed.

The needs of farmers

The needs of farmers from any skills development initiative centre around labour and skills shortages and the changing skill needs as farming undergoes technological, demographic, and managerial changes. An aging farm population means that a whole new generation of farmers must become skilled in surviving in a competitive global economy.

> *"…over 70 per cent of farm assets are due to be transferred in the next 15 years"*[1]

> *"A decade ago, farm managers were being told that… they would have to become experts at marketing; financial planning and analysis; and incorporating new technologies… But… we can't possibly be experts in all these areas…the challenge isn't to be an expert at everything — but to be an expert at acquiring expertise."*[2]

The needs of farm workers

The learning needs of farm workers centre around how farm skills are best transferred—where, when, by whom, and in what form. A farm is a skilled workplace requiring ongoing training. In order to support farm workers in their development, farmers will need development as mentors and coaches, and will require support and training in those roles. Farm workers need a place to learn practical farming lessons, and prefer to learn on farms or from other farmers. They seek out

[1] *The Challenge Ahead* CBC editorial by Anne Forbes, Nova Scotia Farmer and Canadian Farm Business Management Council Chair http://www.cfbmc.com/cfm-eng/april2000/Page_8/page_8.html
[2] *See Footnote 1*

learning by multiple methods, and from support networks. They cannot afford a lot of time off the farm during the five- to seven-month peak season, and need to see the immediate and longer-term benefits of education.

Learning opportunities

We created a catalogue of learning opportunities significant to farm education and training. Each entry describes the program or course, the location, duration, dates, and pre-requisites. Close to 55% of the opportunities catalogued are non-specific in nature with considerable overlap in the animal husbandry programs (beef, dairy and hog). In general, there appears to be recognition that training for a farming career requires a lot of generalist information and skills.

Currently, distance education opportunities that would permit students to continue working on the farm are limited. Organic farming has the highest percentage of courses available. Interestingly, we did not find much mention of hybrid approaches that combine face-to-face and hands-on instruction with continuing training maintained remotely. When students go for on-the-job training they become disconnected from the training institution. It would appear that more distance education, flexible schedules, or on-the-job training closer to home could all benefit PEI future farmers and farm workers. Some innovative approaches we found included customizable curricula, self-paced learning blended with classroom or seminars, a day-release method, teleconference small-groups, and a blended approach of classroom, practical, and mentoring. The catalogue entries are included in ***Appendix B***.

Gaps, barriers and hypotheses

Comparing the needs with the opportunities, we identified some key gaps and barriers, which we categorized in this report by the key questions they raise:

- Do trained farmers make better farmers?
- Do trained workers make for a more efficient workforce?
- Can a generalist approach fill the need for specialties?
- Is there a limit to blending classroom with practical methods?
- What other roles are necessary for a skills development program?
- Will better defined career paths raise the image of farm occupations?

As expected, farmers are central to the whole training issue. With regard to apprenticeship, we were told:

"If the employer doesn't support apprenticeship, the employee won't go."

The farmer makes the business-case decisions on where time and money are invested. There is evidence that education and training improves farm profitability through direct and indirect mechanisms. However, this evidence is inconclusive and certainly not communicated strongly in business terms to the farming community in general. Farmers may need to be better-informed about the labour market outside agriculture to fully recognise the implications of skills investment decisions they are making now.

But farmers are key in other ways – as master farmers, as coaches and mentors, farmers will be critical to any community-supported skills development initiative. For these roles, farmers themselves will require training.

One key industry barrier is the relative positions of farmers and agri-businesses in the value chain. A small number of companies dominate agri-business, compared to the many players in the PEI farm community. This results in economic pressure on farmers, and a mis-match in the objectives of educational institutions with farmers' needs for education and training. This relationship perpetuates educational institutions' inability to provide the mix of practical and theoretical skills required by farmers and farm workers, in a timely fashion, in the appropriate environments for learning, and in ways that support well-understood principles of (adult) education:

> *"…For political and economic reasons, public universities have redirected their research efforts to address the commercial interests of large agri-businesses."*[3]

In our research we discovered some innovative approaches to tackling these issues, and a handful of people with valuable experience from initiatives in Canada and the U.S. (notably Manitoba, New England, and Minnesota). Their work suggests that the social and community aspects of skills development programs could lead to increased innovation in farm communities, and that there are other valuable side-effects of well-designed initiatives that generate opportunities for farmers and workers to share and adopting new ideas.

Two key barriers relate to a lack of information that would allow farmers to cost-justify an investment-based approach to skills development. Firstly, there is no clear definition of what farmers need from the labour market. Farmers have reported labour shortages, but did not make use of programs put in place to address these. We need to understand how farmers dealt with these problems, why the proposed solutions were not adopted, and what the underlying skills shortages really are.

In addition, occupational analysis activities in the agricultural community are not well advanced, and their results tend to be project-specific. With few exceptions, they do not yet form the good foundation needed for an industry-wide acceptance of 'core' and 'specialization' skills. Occupational analysis activities in PEI will need to be carefully managed in order not to have the same weaknesses.

We hypothesize that farmers will need two separate strands to a skills development program; subsidized basic training in the classroom for labourers during periods of unemployment; and a more investment-oriented program of advanced skills training, mixing classroom and on-the-job learning. Information on current skills, projected skills shortages and farmers' labour needs will be targeted in the next stage of this project, as well as other relevant information, when we plan and pilot interviews with farmers and other stakeholders in the PEI agricultural community.

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[3] *Kerr Center Policy Report 2003* - Education and Research
http://www.kerrcenter.com/kerrweb/publications/policyreport/education_research.pdf

2 Acknowledgements

We would like to thank everyone who helped with our research for this project, in particular the PEI AHRDC Steering Committee who provided direction, contacts and feedback on this report:

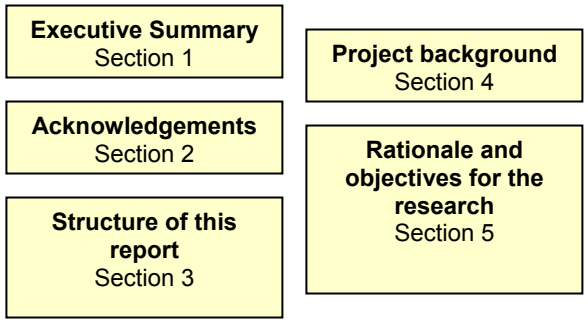
Martha Burka
Shirlee Hogan
Wilhelmina Murphy
Craig Norton
Chris Reaman
Wendy Weatherbie

One of our findings in this research was a relative lack of research and published data on the subject of agricultural training, education and apprenticeship that we could apply to the PEI context. Our best sources turned out to be a handful of good people in PEI, Manitoba, Nova Scotia and Ontario with valuable experience. A primary recommendation to anyone taking our findings forward would be to talk to these people, learn from their experience and work together with them on strategy and inter-Provincial and Federal relationship issues.

The full list of contributors is given in ***Appendix A.***

3 Structure of this report

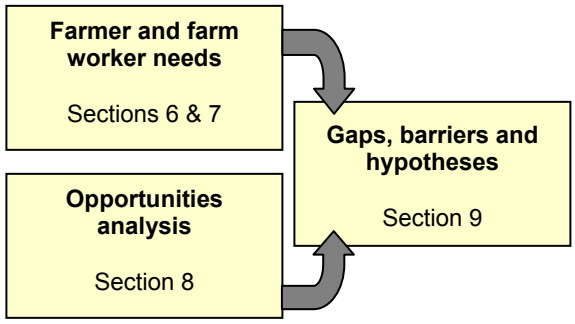
In the first 5 sections of this report we provide summaries and background material.



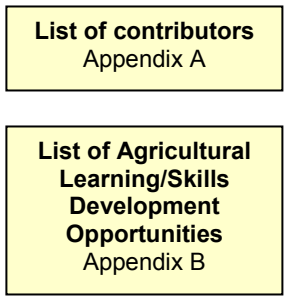
In ***Sections 6*** and *7* we review the needs of farmers and of farm workers, respectively.

In ***Section 8*** we analyze the learning opportunities we documented.

In ***Section 9***, we analyze the gaps and barriers we found as a result of comparing the needs against the opportunities, and present hypotheses designed to help collect further data.



The ***Appendices*** to this report contain the full list of contributors, and the catalogue of learning opportunities.



4 Project background

To introduce our study, this section discusses some background factors that influence farm skills needs and learning options. The factors discussed are:

- Farm labour and skills are in demand
- Farms are increasing in size
- Capital-intensive methods require increasing financial savvy
- Increasing use of technology
- Food safety requires new tools and processes
- The gap between needed skills and educational levels

4.1 Farm labour and skills are in demand

> *February 2001: "As farming becomes more complex… training, skills and education will become more important"*[4]
>
> *September 2003: "As part of the rationale for relaxing immigration requirements, Immigration Minister Denis Coderre noted that Canada is 'facing a serious shortage of skilled workers for the next five years.'"*[5]

The agricultural community on PEI faces a number of challenges. More is spent on Research and Development (R&D) by the food manufacturing industry in the U.S. than in Canada. Canada gets pressure to spend more on R&D.[6] Research and thus educational options in the Maritimes are more and more dependent on agri-business for funding and priorities, as food processing and distribution have become major industries.

A smaller number of companies dominate agri-business, as compared to the many players in the PEI farm community, so farmers must creatively cooperate to exert influence on the overall agri-business value chain. Yet, farmers are naturally competitive with each other, and competing for skilled labour is just one result. Some of the labour market factors farmers face are labour shortages, seasonal needs, competition with other industries for skills in short supply, the price of skilled labour, and pressures on profits. Farmers are also concerned that the labour force's current skill levels are not keeping pace with their operations. The value of a skilled workforce is understood, especially on larger farms. However, many of the farmers who can transfer skills to the next generation will retire in the next decade, so the opportunity for knowledge and skills transfer is limited.

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[4] *Understanding the Agri-food Sector…A Success Story to Grow On* Presentation to Deputy Ministers by Agriculture and Agri-Food Canada February 2001

[5] *Immigration rules eased* Alison Dunfield, Globe and Mail.com September 18, 2003 http://www.globeandmail.com/servlet/story/RTGAM.20030918.wimmi0918/BNStory/National/

[6] *OECD Science and Technology Outlook 2000*

A recent study for PEI AHRDC found that *"...there is an opportunity to introduce a career training pilot program e.g. Crop Production Worker Apprenticeship."* The study recommends the skills be trained in a twenty week apprenticeship training program spread over four years. The author says that this could provide a larger pool of workers. It would address a need for workers that can operate farm equipment and do basic repairs and maintenance. ."[7]

Farmers have expressed interest in better availability of workers. The Nova Scotia Agricultural College (NSAC) has voiced concern over declining numbers of PEI students. The agricultural industry has expressed the need to raise the image of working on a farm. All parties want a full understanding of what the industry needs, and how government and industry might realistically support those needs.

Certainly, there seems to be concern about the skills and training of PEI's agricultural workforce, evidence that more skills and more skilled workers may be needed; that future skills required are not clearly defined; and that skills development initiatives are required to address these issues and fill in missing data.

The research reported here is one piece of a coordinated initiative addressing these problems of labour and training/skills shortages in PEI's farming industry at a time when it is undergoing significant change. We investigated training needs, skills development opportunities available to PEI's agricultural community, and the gaps and barriers between them, developing hypotheses which demand further data.

The complexity of farming is increasing. Farmers have to deal with increasing amounts of information and numbers of documents, with increasing regulation, and with more complex business and marketing issues. Farmers are challenged to improve the ways they manage people, market their produce, invest in changing technology, control costs, and increase the precision of their production. As farming complexity increases, training and skills development becomes more important.

We recognize below just some of the trends which will impact this work into the future—especially changes in farm work which will drive the future labour and skills needs of farmers and farm workers. These trends will have a more or less predictable effect on PEI's agricultural community. Some of these changes may tend to de-skill farm workers, while others may demand greater skills, flexibility, or education in the workforce. It seems that many of these trends are inevitable, and almost all demand more precise application skills, be they scientific, managerial, or practical. In the remainder of this section we discuss the most important trends.

4.2 Farms are increasing in size

According to the Canadian Federation of Agriculture, Canadian farms are, on average, 22% larger today than 20 years ago.[8] PEI is following this trend—the percentage of large farms continues to rise on PEI, and family farms are expected to become less common:

[7] *Skills Shortage Needs Assessment*, page 36, Fred Anderson, ABS Ventures, July 31, 2002
[8] *Agriculture in Canada – The Canadian Farm* Canadian Federation of Agriculture http://www.cfa-fca.ca/english/agriculture_in_canada/farm_structure_and_finance.html

> *"… corporate farms will become the norm and the family farm will disappear… many feel there will be very large farms, and small farms supported by farm family members working off the farm."*[9]

Family farm values may persist, but the family farm may not.

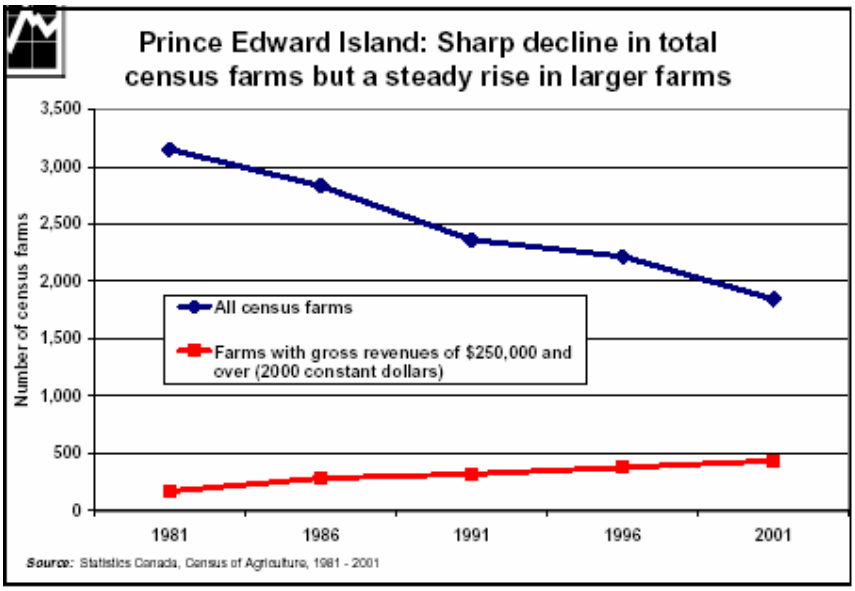

Figure 1: The increase in large farms on PEI 1981 - 2001

What is off-trend is that some evidence suggests that large farms do better if they diversify, rather than specializing in production.

> *"Larger, more diversified farms have been more successful in earning income from the marketplace than have medium size farms."*[10]

It seems that conventional diversification works as well in dealing with risk on large farms as it did for the small farms of the past.

4.3 Capital-intensive methods require increasing financial savvy

The continuation of economic pressure on farmers at all levels suggests that strong management and financial skills will continue to be a fundamental requirement for survival, especially as a very capital-intensive business. The increasing level of incorporation and business formation is one indication of that pressure. Although 98% of farms are still family-owned businesses, many

[9] *Study of Canadian farm family work* conducted by the National Farmers Union and the Centre for Rural Studies and Enrichment at Muenster, Sask., 2001-02.
http://www.producer.com/articles/20030508/farm_living/20030508fl01.html
[10] *Understanding the Agri-food Sector…A Success Story to Grow On* Presentation to Deputy Ministers by Agriculture and Agri-Food Canada February 2001

of those are small in volume and even smaller in earnings. "*An increasing number of farms (37% in 1996) were registered as partnerships or family corporations."*[11]

The same economic pressures have given rise to 'precision farming' skills, where tight economic margins mean that margins of error in inputs or pesticides, for example, are small, and where technology is often used in gauging requirements, measuring application, and monitoring progress in fine detail.

4.4 Farms are using more technology

Tools and technologies have steadily been replacing hard labour on farms for centuries and enabling a smaller workforce to manage larger acreage. This progression continues in PEI. Farmers adopt technology to run their operation. Recently, information and computing technologies (I&CT) have been increasingly adopted on farms:

> *"Farming has become a business that requires a working knowledge of computer and other high-tech equipment. According to the 1996 census, more than 21% of Canadian farm households own one or more personal computers."*[12]

On PEI, a survey by the Department of Agriculture, Forestry and Aquaculture in 2002 found that 26.2% of farms were using email. However, I&CT may not be replacing labour so much as augmenting the decision-making, marketing, financial and planning skills which are becoming increasing necessary on the farm.

Technology on the farm in general will continue to displace some of the workforce demand. We heard confirmation that larger farms need more employees, but that the decrease in the number of farms combined with the increasing use of technology may lead to an overall decreased demand for farm workers. Although the amount of land under production remained fairly constant between 1991 and 2001, the Island's agricultural workforce declined 25% to 4,900 during this time.[13]

It was pointed out to us that this may in turn lead to decreased employment opportunities in agri-business roles off the farm, although the relationship is not direct:

> *"I'm even concerned about agri-business, how many people you'll need..."*

4.5 Food safety requires new tools and processes

Food safety is bringing a whole new set of challenges to the farm. New skills are needed to anticipate issues. Retailers, consumers and other stakeholders demand assurances of food

[11] *Agriculture in Canada – The Canadian Farm* Canadian Federation of Agriculture http://www.cfa-fca.ca/english/agriculture_in_canada/farm_structure_and_finance.html
[12] *Agriculture in Canada – The Canadian Farm* Canadian Federation of Agriculture http://www.cfa-fca.ca/english/agriculture_in_canada/farm_structure_and_finance.html
[13] *Seasonal agricultural labour issues in Prince Edward Island* Matheson Consulting, February 2003.

safety.[14] In response, PEI's ADAPT (Adaptation Development Agricultural Production Technology) Council has set itself these objectives:[15]

- To accelerate the adoption of tools, processes, or procedures such as traceability, in a food safety and quality system. (e.g. through Food Quality and Safety and HACCP Training)
- To aid in the implementation of measures to ensure responsibility of quality and safety of food products
- To develop innovative processes or procedures for traceability and verification systems for locally produced food products

4.6 There is a gap between educational levels and skills required

Though many PEI farmers are seeking more education, there are pockets of skill shortages. Levels of education within rural and farming communities are traditionally lower than in urban populations. The 1996 Census found that half of producers under 34 do not go beyond high-school (See Figure 2 below).

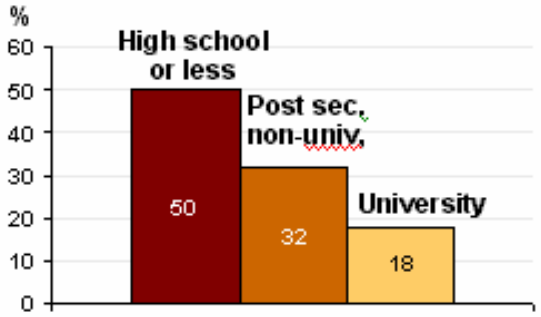

Figure 2: Education profile of Farmers less than 34 years old[16]

The general trend across Canada is summarized by the Canadian Federation of Agriculture:

> *"Over the last two decades, a positive shift in the level of education of farm operators can be seen. In general, the trend to higher education being observed in Canadian society is also obvious in the farm community."*[17]

In line with this trend, we also heard: *"Most young farmers [on PEI] have degrees."* However, on PEI, the LMDI (Labour Market Development Initiative) estimate that:

[14] *LMDI Management Plan for PEI – Priority Sectors: Agriculture* http://www.lmda.pe.ca/priorities3.php
[15] *ADAPT Council Industry Newsletter* Vol 1 No 3 September 2002.
[16] *Understanding the Agri-food Sector…A Success Story to Grow On* Presentation to Deputy Ministers by Agriculture and Agri-Food Canada February 2001
[17] *Agriculture in Canada – The Canadian Farm* Canadian Federation of Agriculture http://www.cfa-fca.ca/english/agriculture_in_canada/farm_structure_and_finance.html

> *"…40% of Islanders face literacy issues that may impact on their ability to integrate and progress in the labour market."*[18]

They conclude that:

> *"With 50-59% of farmers having reached Grade 12 or less, the gap is widening between needed skills and educational levels."*[19]

We include below the main points of one slide from an Agriculture and Agri-Food Canada presentation in 2001, *Understanding the Agri-food Sector…A Success Story to Grow On*. Almost every point illustrates specific skills development challenges faced by the PEI agricultural community.

Business Oriented Producers know what it takes to be Successful...

- Assume responsibility for risk
- Use marketing tools
- Use risk management tools (private and public)
- Take training courses to improve skills
- Among first to try new technology
- Expanding operation to remain competitive
- Use resource people and consultant services
- Willing to adapt to change
- Calculate ROI prior to investing
- Work with processors
- Have a written business plan
- Use a computer for managing farm business

[18] *LMDI Management Plan for PEI – Priority Sectors: Cross Cutting Labour Market Issues* http://www.lmda.pe.ca/priorities2.php
[19] *LMDI Management Plan for PEI – Priority Sectors: Agriculture* http://www.lmda.pe.ca/priorities3.php

5 Rationale and Objectives for the research

The Steering Committee for this project outlined research parameters in the RFP. We worked with them to define the scope of each, in order to manage and focus the research, to simplify analysis, and to help ensure recommendations were actionable. The scope of each RFP requirement is described below.

Current and Future Needs and Opportunities
This report addresses only those needs of the PEI agricultural community relevant to the issue of learning and skills development – for example, skills shortages. We also identified trends which would have an impact on the future needs of the island – for example, changes in farming practices. The catalogue of current educational opportunities available to the island was also augmented by a review of the educational trends which would impact future opportunities.

Opportunity descriptions
The key requirements in describing learning opportunities were defined as:

- Outcomes - such as degrees, certificates, diplomas
- Pre-requisites
    - Including how the college or institution assesses previous experience or other qualifications
- Availability
    - Recognized as typically a significant barrier to rural learning opportunities
    - To include access, distance, and cost
    - Including match to seasonal needs
- Delivery channels - for example, on-farm, classroom, web, CD, book
- Agencies and institutions - to include private as well as public sources

Farm commodity groups
The requirement was to provide a "statistical profile" of needs and opportunities for each identified commodity group, and to identify areas where we lacked data, in preparation for the Learning Study phase. The commodity groups were identified as: Hog, Beef, Dairy, Potato, Organic and Other.

Roles on the farm
Although a number of farm roles were identified, the priority roles to be addressed were agreed to be: Farm Owner, Future Farmer, Farm Worker and Related Agricultural Worker.

Actionable information for benchmarking

- We focused the research on *actionable* information – i.e. information that would help PEI AHRDC and/or other industry groups to make decisions or to take specific actions
- Information that would also be suitable for long-term monitoring of educational initiatives on the island was also prioritized
- We looked for information relevant to PEI and which might be validated in the interviews during the second stage of this project

6 Needs analysis for farmers

In the next two sections, we focus strictly on the results of our needs analysis. We share the assumptions and hypotheses that drove this research and present the insights resulting from a synthesis of the information obtained from relevant reports, presentations, and telephone interviews with subject matter experts.

In ***Section 8*** we describe our findings regarding the education and training opportunities available to the PEI agricultural community. Then, in ***Section 9*** we identify and discuss any gaps between the needs and opportunities, and remaining hypotheses that demand further data before conclusions may be drawn. We also explore barriers to training and skills development.

The sections are organized around the needs of two key players:

- **Farmers** – Their needs centre on labour and skills shortages—some deriving from the need for succession planning in an aging farm population—and the changing skill needs as farming undergoes technological and managerial changes.
- **Farm workers** – Learning and skills development needs of farm workers derive from the farmers' skill requirements, but then centre around how these skills are best transferred—where, when, by whom, and in what form. Farm workers' needs differ widely, dependent on their situation and objectives.

Another primary need common to both of these stakeholders is to be able to see the outcome of training or education—"What's in it for me?"—and the related ability of either party to cost-justify these activities.

The primary assumption of this research is that there are specific PEI labour needs in agriculture that may be at least partially satisfied by a program of education and training. In our research we tried to identify the nature and scope of these labour issues.

6.1 Aging farmers need to make succession plans

As with the rest of Canada and much of the industrialized world, many of the workforce challenges faced on PEI result from an aging population. In contrast to the decline in population in the other Atlantic Provinces, PEI's overall population has grown at about 0.5% annually, close to the national average. However, the biggest increase in population in PEI has been in the 45-64 year-old age range, reflecting an aging population and workforce.

This demographic is reflected in the farming population. The USDA reports that the average age of US farmers has risen from 50.3 years in 1978 to 54.3 in 1997. The agency expects the trend to continue - as it will without an influx of new entrants. The Canadian figures are similar with an increasing average age (1991 at 47.5 years, 1996 at 48.4) of farm operators.[20]

For Canada as a whole, the Statistics Canada Census of Agriculture reports that:

[20] *A Profile of Alberta Farm Operators and Their Farms – 1996* Lewis, Lauri V., Alberta Agriculture, Food and Rural Development http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/bmi6908

> *"The group of farmers under 35 years old represented 11.5% of all farmers in 2001, compared with 15.8% in 1996 and 19.9% in 1991."*[21]

The PEI workforce profile shows a similar aging trend which is likely to continue. The Statistics Canada figures illustrate that PEI farmers have a slightly different profile than Canada as a whole (Figure 3).

Region	Total No. farmers	Under 35 years		35 – 54 years		55 and over	
Canada	346,195	29,920	8.64%[22]	185,575	53.60%	120,705	34.87%
PEI	2,455	265	10.79%	1,385	56.42%	805	32.81%

Figure 3. Age of PEI's farmers compared to Canada-wide data (Statistics Canada: Census of Agriculture 2001)

Migration to the Island may be countering the aging population to some extent, but the nature of the immigration seems not to bring in skilled workers. The report 'Population and demographic trends on Prince Edward Island'[23] shows data which suggests that skilled workers are leaving the island, to be replaced by immigrants who may be younger, but who bring fewer skills. The data suggests that the immigrant population of PEI is also not as diverse in background as the population being replaced. The report concludes:

> *"... net migration is offsetting the effects of an aging population for PEI by contributing young families; however, it is also reducing the pool of skilled human resources available to the PEI economy and reducing the cultural diversity of PEI's society."*

This aging trend will not continue – at some point, most of the 'baby boom' farming generation will retire and pass on their farm land. A new generation of farmers is taking over the reigns – across Canada, *"...over 70 per cent of farm assets are due to be transferred in the next 15 years"*[24]

This represents both a challenge and an opportunity for any new learning and skills development initiatives. The challenge is not just due to the scale of the changeover, but also because there is evidence that inadequate succession planning has taken place.[25]

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[21] *2001 Census of Agriculture* Statistics Canada Table 4. http://www.statcan.ca/english/freepub/95F0355XIE/tables/pdf/optab04.pdf

[22] We're unsure why this figure of 8.64% does not tally with the Statistics Canada figure of 11.5% in the statement above.

[23] *Population and demographic trends on Prince Edward Island* 1999 http://www.gov.pe.ca/photos/original/population_bkg.pdf

[24] *The Challenge Ahead* CBC editorial by Anne Forbes, Nova Scotia Farmer and Canadian Farm Business Management Council Chair http://www.cfbmc.com/cfm-eng/april2000/Page_8/page_8.html

[25] *LMDI Management Plan for PEI – Priority Sectors: Agriculture* http://www.lmda.pe.ca/priorities3.php

6.2 Farmers need seasonal labour

Farming is traditionally a seasonal occupation, although many modern practices reduce reliance on external conditions. Our hypothesis was that some labour issues will reflect the seasonal nature of farming activities.

Commodities vary in their seasonal needs (e.g. fruit farming versus hog farming), but most seasonal requirements fall in the May through October growing season, with the biggest peaks during harvest time. We were told that *"Many industries on PEI are less seasonal than they once were"* but that PEI farms still depend on seasonal labour at peak periods. In 2002, the PEI agricultural labour force was at 5,500 in May and October, but only 4,400 in December. A recent report suggests that *"While the number of farms is dropping, the use of seasonal workers is increasing on PEI."*[26] The same report also suggests that seasonal workers seem to be more important on PEI farms than generally across Canada. At times of peak demand, unemployment in the agricultural workforce in PEI is around 4% - almost as low as it could be.

6.3 Farmers need to manage the time of employees' educational activities

We heard from those with experience of the Farm Skills program on PEI in the early '90s, and a recent hog farming initiative, that PEI farmers have felt unable to give workers even a day off for training courses. There may well be social and cultural factors leading to this position, but certainly workload on the farm can conflict with needs for day-training. Unexpected events on the farm that demand attention can also cause disruption of training.

Most farming is still particularly dependent on natural cycles—with timescales ranging from hours to seasons to years. Key farm tasks cannot be put on hold for any long period of time. The relative severity of PEI winters, however, has meant that skills development activities taking place during this time may receive more attendance, especially from seasonal workers who are unemployed at that time of year. We heard that many workers in PEI rely on EI (Employment Insurance) during the winter, and on HRDC subsidies for training during this 'down time.'

Whatever the difficulties, the farmers' over-riding need is that farm activities be disrupted as little as possible by skills development activities.

6.4 Farmers and farm worker need shared core skills

It is important for any major skills development initiative to have a clear definition of the skills required. However, we could not find a good definition of the skills that farmers need from their workers, nor of the skills required of the farmer, for that matter. While many trades have standardized occupational descriptions, we found few comparable activities in the agricultural sector, with some notable exceptions in hog farming and other of the more specialized farm commodities. This work remains to be carried out in a well-coordinated way for farming occupations.

[26] *Seasonal agricultural labour issues in Prince Edward Island* Matheson Consulting, February 2003.

There seems to be no generally agreed set of core farming skills, but the few occupational analysis activities we found suggested that there night be a core skill-set shared by farmers and farm workers. Figure 4 below gives two examples of farm skills categorizations produced using the DACUM[27] method, to illustrate commonalities and differences. One set was developed by PEI DAFA (Department of Agriculture, Forestry and Aquaculture), experienced farm managers and owners who could provide input on the needs of the 'Farm Manager' role.[28] The other was produced by Red River College, Manitoba Agriculture Credit Corporation and Manitoba Food and Agriculture, focused on the needs of succession planning[29].

PEI – Farm Manager

- Communication
- Develop Personal Competency
- Plan Business Strategies
- Manage Financial Resources
- Manage Personnel
- Manage Production
- Promote and Market Product
- Manage Physical and Natural Resources
- Develop and Maintain Records
- Interpret and Apply Regulations

Manitoba – Succession Planning

- Marketing
- Financial Management
- Quality of Life
- Manage resources
- Manage production
- Leadership
- Risk Management
- Develop and implement a strategic plan
- Use e-business technology
- Manage human resources
- Use technology
- Farm policy
- Physical environment
- Farm law
- Value-added diversification, secondary processing and home-based business
- Public relations
- Transfer the family farm

Figure 4: Comparison of farming skills categories ('General Areas of Competency') produced by two separate DACUM workshops

6.5 Farmers need employees with generalized skills

The Canadian Federation of Agriculture highlights the adaptability of the modern farmer:

[27] 'DACUM' = 'Develop A Curriculum'
[28] *Future Farmer Program Skills Workbook 2003*, PEI DAF.
[29] *Bridging Generations DACUM Charts* Manitoba Agriculture Credit Corporation and Manitoba Food and Agriculture 2002/2003

> *"More than ever before, the successful Canadian farmer must be adaptable to the different requirements of running a farm business. The farmer must be able to recognize an animal that is ill, fix a malfunctioning combine, and finish off the day by hooking up to the Internet to check the state of world markets."*[30]

We were told that, in line with this statement, the ideal farm worker would be a generalist:

> *"People didn't want major technicians, but more of a generalist who knew a little about equipment, basic stuff, who could also operate the tractor and plough, taking care of cattle, and row crops, as well as equipment."*

The change in skills seems to go beyond having more knowledge about more topics. As farming continues to become more knowledge-based, new ways of integrating fast-changing knowledge must be developed. Anne Forbes, Nova Scotia Farmer and Canadian Farm Business Management Council Chair, describes it this way:

> *"A decade ago, farm managers were being told that to be successful in the future, they would have to become experts at marketing; financial planning and analysis; and incorporating new technologies… But the 1990s have shown us that we can't possibly be experts in all these areas. Everything is changing so fast and there is so much to learn, that no one person can keep up with it all." She concluded: "As we begin a new decade, the challenge isn't to be an expert at everything — but to be an expert at acquiring expertise."*[31]

The initial DACUM charts produced in PEI for farm labourers and farm managers confirmed to some extent that farm workers, as well as farmers, are generalists – the charts show many shared-skill categories, and that differences between the two roles are often a matter of degree, rather than type of knowledge. We also heard that although the increased use of technology on farms demands more technical knowledge and skills, this did not necessarily mean that farms could justify full-time technical (i.e. specialized) employees.

However, we heard that the experience in Manitoba was slightly different. They initiated an apprenticeship scheme believing that farmers wanted general skills of their workers, but discovered that specialization was needed. This may be due in part to the greater degree of specialization of farms in Manitoba. Given the comparatively small size of PEI farms there appears to be less specialization; for example livestock farms often grow their own feed—making them both crop and livestock enterprises. Distance was also a factor in the Manitoba

[30] *Agriculture in Canada – The Canadian Farm* Canadian Federation of Agriculture http://www.cfa-fca.ca/english/agriculture_in_canada/farm_structure_and_finance.html
[31] *The Challenge Ahead* CBC editorial by Anne Forbes, Nova Scotia Farmer and Canadian Farm Business Management Council Chair http://www.cfbmc.com/cfm-eng/april2000/Page_8/page_8.html

experience, in that providing apprentices with a broad range of specific experiences would necessitate traveling long distances and incurring high travel and accommodation costs.

6.6 Farmers themselves need specific skills

Neo Insight's study of PEI farmers in 2002[32] found that skills training is a high priority and that farmers readily identified some of the skills they require:

> *"When we asked farmers to identify other potential services they came up with many suggestions focused around consumer education, farmer education, Communities of Practice, and access to experts. Their needs for information included various time-critical alerts and computer-based farm management and diagnostic tools."*

> *"The list of suggestions clearly demonstrates that farmers are looking for additional resources, tools, and services to make them more profitable, protect the environment, and improve their skills and lifestyle… Information on financial management, including financial planning, for both family and farm was requested."*

The Canadian Federation of Agriculture describes *"…a worrying trend"*[33]:

> *"More than half of an average farm operator's income now comes from off-farm sources. Much of this off-farm income is used to compensate for the income variability of the farming operation."*

They also note that:

> *"…the importance of off-farm income varies not only by type of farming operation, but by province as well."*

We found no statistics to compare PEI with Canada in this, but whether or not this data is seen as a "worrying trend", it suggests that farmers may have some need for education and training to support their off-farm activities or perhaps to allow them to better integrate those activities to the benefit of the farm.

6.7 Farmers and farm workers need ongoing training

As a rapidly-changing industry, a farm is a skilled workplace requiring ongoing training. New techniques are constantly being developed, and farmers and farm workers need to ensure that they are at least aware of them and able to access information about them. Regulation—for example around sustainable farming practices—means that farmers have to understand the regulations as well as the changes in practice that they imply.

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[32] *FarmNet Design Document*, Neo Insight September 2002
[33] *Agriculture in Canada – The Canadian Farm* Canadian Federation of Agriculture http://www.cfa-fca.ca/english/agriculture_in_canada/farm_structure_and_finance.html

At almost any level of worker, it seems that farmers need their employees to have some degree of experience, and almost always provide at least a minimum of training, for example regarding specific equipment or techniques to be used, or as a reminder of safety issues. Training seems to be provided even for short-term labour, at the very least in basic Health and Safety issues, probably as a result of the nature of the farm environment, and increased regulation in this area.

6.8 Farmers need to see the impact of education and training on farm outcomes

The need of the farmer is to have good workers, not to provide training opportunities. Farmers need to see that educational initiatives are providing a better, more stable and cost-effective workforce. An assumption of this project is that education and training will provide improved farm practices. We looked for evidence of this, and investigated one or two areas where we felt we might find significant research relating training to outcomes in more detail.

Experience in Quebec suggests that there may be a direct relationship between formal training in agriculture and farm outcomes:[34]

- Research from the 1980's shows that formal (full-time) training in agriculture (high school, college or university) improves young farmers' chances of succeeding in agriculture, especially during a significant downturn.
- Only 4% of new entrants with formal education abandoned agriculture over the period 1981 to 1986, compared to almost one third (29%) of those without formal training.
- New entrants with full-time training in agriculture were also more likely to take additional training (70% versus 45%), confirming the importance of education for a continual learning strategy and long term viability.

Even outcomes of Health and Safety training are in question

Health and Safety is one area where regulatory requirements have become more stringent, where training—even if informal—already takes place on farms, and where we expected to find research on the impacts of Health and Safety training on the farm.

While there is an abundance of material supporting the need for safety training, and providing training material, we could find no data that related education or training to improved farm safety. Some research even questions the relationship of farmers' and farm workers' attitudes to safety to the number or seriousness of on-farm accidents. This may be partly because there are many other factors beyond training that determine the susceptibility of farm workers to accident:

> *"Although it is difficult to generalize from this limited a survey, a common element among most of the interviewed growers with lower than average on-farm injury rates appeared to be respect and appreciation for their workers… The commitment to worker safety probably indicates an all-round approach of the owner that goes beyond specific issues of safety."*

[34] *Understanding the Agri-food Sector…A Success Story to Grow On* Presentation to Deputy Ministers by Agriculture and Agri-Food Canada February 2001

7 Needs analysis for farm workers and potential farmers

7.1 Different farm workers and potential farmers have different needs

Farm workers and potential farmers are a diverse group, with different needs depending on their ambitions and situation. Although it is impractical to tailor skills development to individuals, we heard that a number of groups of people could be identified and targeted in any initiative aimed at prospective trainees and/or apprentices.

Prospective farmers are unique enough to warrant adjusting training to their specific needs. The New England "Growing New Farmers" initiative has defined a number of distinct needs relating to the 'life stages' of a farmer, with especial focus on 'prospective' and 'beginning' farmers. The initiative suggests that the specific needs of various types of prospective farmers are individual enough to be addressed by different approaches[35].

They also identify some special issues of family farm succession planning:

> *"**Junior farmers**—sons or daughters of aging farmers on family farms—have a related set of issues as they re-strategize and establish themselves. Acquiring new skills, particularly business and current technical skills, while farming is a challenge. Another challenge is smoothing the transfer of decision-making between senior and junior farmers, with all the associated personal and interpersonal, as well as business implications."*

Family farm succession planning involves a number of stakeholders who are involved in the business discussions as well as being members of the same family. All the stakeholders in this situation have different, but related needs, and might benefit from training, education or support targeted at the whole family group and others involved in the planning.

Some Manitoba apprenticeship programs seem to have been initiated primarily by these needs of Succession Planning, involving farm workers as well as farmers. Farm transfer issues may need more attention, particularly the ability of young farmers and their parents to discuss issues and reach compromise.

People we spoke with naturally conceptualize different groups of candidates for an agricultural apprenticeship. Some of the other potential target groups identified to us were:

- High school graduate, not yet working, who wants to start farming
- High school graduate, working on a farm, who wants to increase their skills and chances for a better job
- Student still in high school, who wants experience on a farm, and might consider dropping out ('at risk' student)

[35] *About New Farmers* - Kathryn Z. Ruhf, New England Small Farm Institute, Address to the National Conference on Family Farm Succession, Winnipeg, Manitoba, Canada, May 11, 2002

- Agricultural school student who wants work experience during time of no classes
- Members or relatives of a farm family who need to increase their skill level. Farm families may bring new workers into the industry, not only close relatives but extended family members, and farm families may remain the pool for people that will sustain the industry.
- Immigrant farmers, who often bring new techniques with them, or may decide to farm crops which are traditional in their homeland, to serve niche markets in their new country

Of course, even within these groups, individuals will have personal learning styles and needs which will need to be taken into account by flexibility within particular skills development opportunities, even down to personality clashes between a student and a farmer or mentor, for example.

7.2 People prefer to learn different skills in different environments

> *"The university teaches us how corn grows; we want to learn how to grow corn."*[36]

Academic institutions and farms have very different purposes, view knowledge from different perspectives, and communicate knowledge differently. Practical and tacit knowledge are better learned in different environments than theoretical or conceptual knowledge – *"Fence building needs hands-on instruction, while budgeting may effectively use a workshop or distance learning format."*[37] So certain farming skills—budgeting, planning—may lend themselves more to classroom environments than other more physically-oriented skills.

In comparing the classroom with the farm as learning environments, we were told that in the laboratory *"You don't see the cobwebs"*– in other words that educational and research establishments do not provide students with the experience of the 'reality' of day-to-day farm life. However, in response to this statement, we also heard that students should learn *"…the cutting edge first, the cobwebs later… the priority is sustainable practices…"* In other words, this person's view was that the priority for new apprentices must be to learn the latest techniques and skills, and that learning on farms (especially small farms?) poses the risk of not being exposed to cutting-edge techniques and knowledge.

While a farm has difficulties in providing time, facilities, and money for learning theory, educational institutions have difficulty in providing the breadth of practical experience to complement the theory. Agricultural school students need a place to learn practical farming lessons.

[36] *About New Farmers* - Kathryn Z. Ruhf, New England Small Farm Institute, Address to the National Conference on Family Farm Succession, Winnipeg, Manitoba, Canada, May 11, 2002 http://gnf.bigmindcatalyst.com/cgi/bmcDL.pl/gimmerman/winnipeg_text.pdf

[37] *Listening to New Farmers: Findings from New farmer Focus Groups*, Sue Ellen Johnson-NENFN Coordinator, June 2001

People also have preferences to meet locally, but the cost of holding many classes across PEI might be prohibitive. Work will take priority and unforeseen circumstances will arise that make students unavailable for learning. Some flexibility in development opportunities is needed to address these needs.

7.3 People prefer to learn from peers, farmers, mentors and coaches

Whether from inclination, experience, or both, farmers and farm workers seem to prefer to learn from other farmers.

Focus group research with beginning farmers in New England confirmed a preference to learn farming on the farm from skilled practitioners, and that:

> *"…computers were generally regarded unfavorably as learning tools or information sources."*[38]

This study also reported:

> *"…a desire to learn from experienced farmers and other beginning farmers" and from "…examples of successful farm start-ups. There is clearly a demand for experienced 'farmer mentors', farmer peer networks, and interactive workshops, training and individualized attention."*

So mentors and experts are key to the program, yet their time is valuable too. Perhaps the learners can connect to experts by the web or email, but in-person observation and interaction is essential. It may not be cost-effective to have regional mentors and experts, but a priority must be to provide students with access to these people somehow.

Mentors and coaches need skills development, too

Any expert (including a farmer) can forget what it was like not to have the knowledge that—after years of experience—can seem intuitive. Practical skills are also notoriously difficult to articulate (think of explaining how to drive a car to someone else). The North East New Farmer Network found that:

> *"Apprenticeship experiences are of variable quality, depending on the motives, needs and skills of the host farm and apprentice."*[39]

We were told that farmers can be very impatient with farm workers, because *"things seem so obvious"* after a lifetime of working on the farm.

[38] *Listening to New Farmers: Findings from New farmer Focus Groups*, Sue Ellen Johnson-NENFN Coordinator, June 2001

[39] *Gaps in New Farmer Programs and Services* Sue Ellen Johnson, North East New Farmer Network Coordinator, Kathy Ruhf, Marion Bowlan, Cathy Sheils, Jane McGonigal, NENFN Steering Committee.

Students need support networks to consolidate learning
Community ties naturally develop between people when they share common educational experiences. Sometimes the bonds can be strong and last years. Sometimes the bonds can be loose during the educational experience, but meaningful later in life. Sometimes friendships or business relationships are positively affected by similar educational backgrounds. An educational program could be structured to build community that will enhance life-long learning and personal friendships.

7.4 People will benefit from learning by multiple methods

Educational institutions which provide distance learning courses have the potential of addressing the importance of including social interaction and learning events beyond the formal instruction, however, the specific courses we found in our environmental scan did not really integrate distance learning with community-building and networking techniques.

A program of education will also need to recognize the different learning styles of course attendees and provide appropriate or alternative delivery mechanisms. As has been highlighted in our discussion of new farmers, people will also have different needs at different stages of their farm career.

Unfortunately, supporting multiple teaching styles, locations, and delivery mechanisms can be expensive and an administrative nightmare. Learning centres which blend commercial operations with teaching and research will be expensive to support in any one province.

7.5 Farm workers need to see the benefits of skills development

Employees will need to see that educational initiatives provide them with a more secure, better-paid, improving future. We heard concern that the labour market may be losing workers because farm occupations don't have as high an image as they could. "There is a growing lack of confidence in the primary industries as a viable career option" says the LMDI Management Plan for PEI.

We were also told that Veterinary courses are over-subscribed, and that students see it as a *"challenging and competitive"* occupation to enter. This suggests that the image of farming may be raised in a similar way with high school students, either in their roles as potential employees, or as future consumers of farm produce. Apprentices or trainees need to feel proud of their activities, and to find peer approval. This will extend outside the classroom or learning environment.

If the image of farm occupations can be improved, it might also help kids see why they should stay in school. We were told that *"Kids drop out because they can't connect high school to what they want to do for a living."* If potential farm workers knew why they need basic skills like Math and English, they might feel differently about education. Perhaps schools could do a better job of connecting teaching to the practical applications of learning and the specific career choices of their students.

7.6 Adult learners have unique needs

Adult learning principles include the following important needs. Adult learners:

- bring quite a bit of experience and expertise to the learning environment that must be acknowledged, and we heard that assessing it up front helps the instructor.
- generally prefer hands-on learning
- learn best when they can apply what they are learning to their work situation – must have some measure of control over what they are learning and why
- often learn best from peers

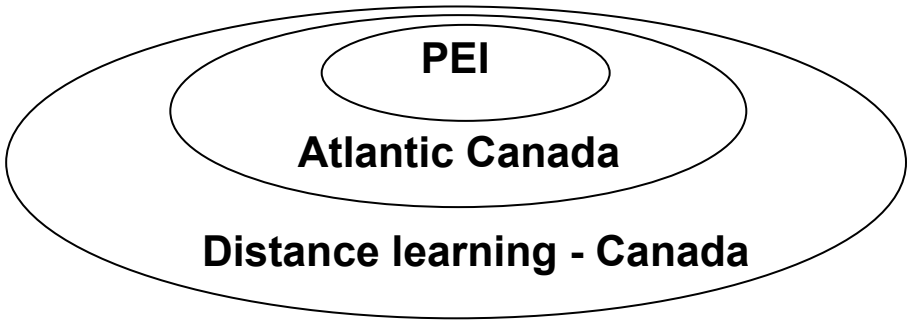
Skills-based training for farmers and farm workers could apply some of these principles by considering that:

- timing must take into account the cycles and seasons of the workplace
- trainers must give recognition of prior experience and learning on the job
- learning must be hands-on where possible
- mixed delivery channels must be employed to address a variety of needs - learning, workplace, timing, etc.
- mentoring and learning from peers is valued, implying more group interaction and specific training for those deemed to be leaders so that they can actually work with others and promote learning.

8 Opportunities analysis

8.1 About the catalogue of opportunities

How the opportunities are prioritized



Early on it was agreed with the Steering Committee that the simplest way to research the learning opportunities was to tackle each educational institution one at a time, starting with PEI, then looking at opportunities in the rest of Atlantic Canada, then distance learning opportunities further afield in Canada. In addition we have included a few comparison institutions outside of Canada—Dordt College in Iowa, the Warmonderhof Training Centre in Holland, and Emerson College in England—which seems to have a special relationships with different families in the PEI farming community.

The opportunities we found varied greatly in scope and duration. Our first priorities were to longer-term education and training (programs first, then courses), and to training with specific outcomes (degrees, diplomas, certificates, etc).

How we decided on capturing the opportunity information

The opportunities were entered into an Excel spreadsheet. The complete catalogue listing can be found in ***Appendix B.***

This database represents a "snapshot in time" and because the course details tend to change significantly from year to year, we targeted only the main comparative dimensions in the Excel spreadsheet, with links to the course descriptions on the educational institutions' own web sites.

We prioritized entries significant to farmers / farm-workers' decision-making, including the description, location, duration, dates, and prerequisites. Costs were not recorded because they were not readily available at the program level.

The data has been split into two somewhat arbitrary sections—one related to longer duration programs aimed at career development and another section for shorter term programs and groupings of courses targeting skills development.

The data fields used in the table of opportunities are defined below, along with an example:

Program Title	**Title of the program as listed with the institution or organization**
Learner Audience	Target learner group is designated as either the Farm Owner, Future Farmer, Farm Worker, or for someone in a related agricultural business
Commodity Group	One or more of Beef, Dairy, Hog, Potato, Organic and Other
Program Category	Category of program or course (e.g. Plant Sciences, Animal Sciences, Organic, etc.)
Program Description	Brief description of the program or course as provided by the institution or organization
Offered by	Name of institution or organization offering the program or course
Province/State	Location in Canada, US, or Europe
Delivery Channels	Training methods such as classroom, lab, practicum, distance education, etc.
Prerequisites	What requirements must be met to register for the program or course
Duration	Length of training in days, weeks, months or years
Starting in	Date or part of year in which training begins
Learning Outcome	Description of what the student will be prepared for as a result of successfully completing the training
Result	Type of recognition provided for completion – e.g. certificate, diploma, degree
Website URL	Hyperlinked web site address of the offering institution or organization
Notes	Additional notes for clarification

Program Title	**BSc Program/Major in Agricultural Business**
Learner Audience	Owner, Future, Related
Commodity Group	All
Program Category	Agri-Business
Program Description	Designed to develop the entrepreneurial skills necessary to allow graduates to run their own business or pursue a career in the agri-food industry, government or education.
Offered by	Nova Scotia Agricultural College (NSAC)/Dalhousie University
Province/State	NS
Delivery Channels	Classroom
Prerequisites	High school diploma or equivalent
Duration	4 years
Starting in	September
Learning Outcome	The focus of this program is on developing problem-solving and decision -making skills. Career possibilities include: Banks and other Financial Institutions, Agri-business Marketing Specialists, Farm and Business Entrepreneurs, Agri-business Management Specialists, Business Consultants
Result	Bachelor's
Website URL	http://www.nsac.ns.ca/academics/agbus.htm
Notes	Courses from the first year of this program can be taken as part of the University College of Cape Breton's "First Year in Agriculture at Home" distance education program.

8.2 Analysis of the opportunities

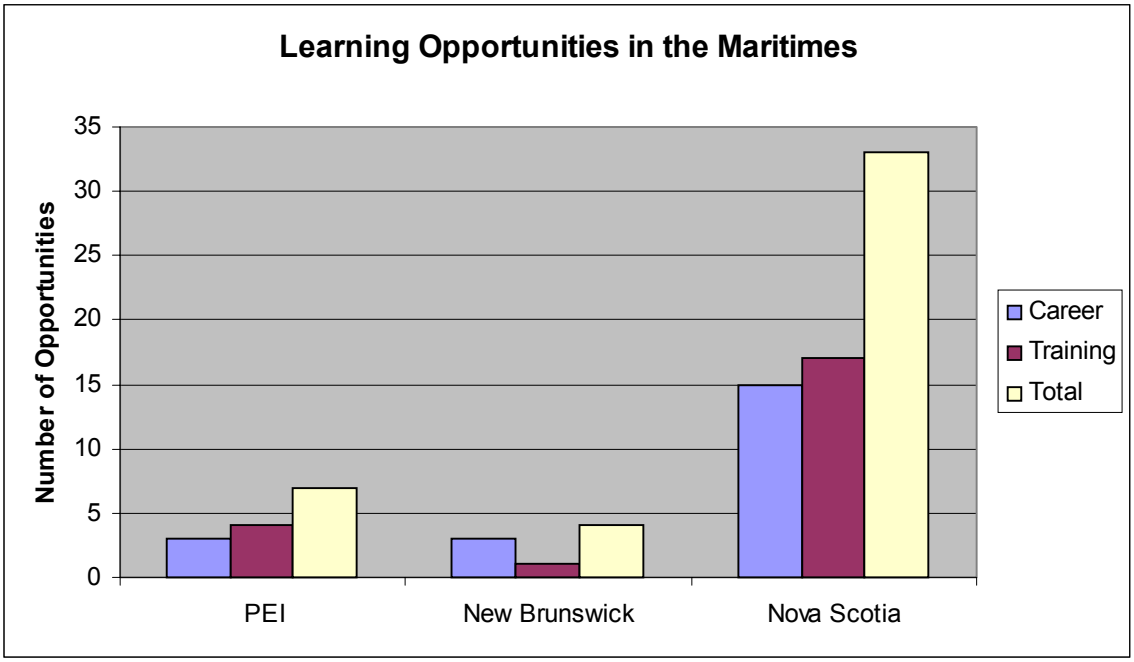
This subsection summarizes some of the data from the catalogue of opportunities detailed in ***Appendix B***. As mentioned earlier, we first researched opportunities available in Atlantic Canada and then explored number of options that exist outside the Maritimes, many of which can provide at least part of their training via distance education. The following table shows the number of opportunities that are captured in the catalogue as a function of geographical regions.

Geographical Area	Number of Opportunities
Maritimes	44
Quebec	14
Ontario	21
Manitoba	4
Alberta	5
USA	4
Europe	4
TOTAL	96

A couple of the programs are offered in two provinces so the total number of unique opportunities catalogued in Appendix B is 94.

Opportunities in the Maritimes

Of the 44 Maritime opportunities, 75% of them are available in Nova Scotia, as shown below.

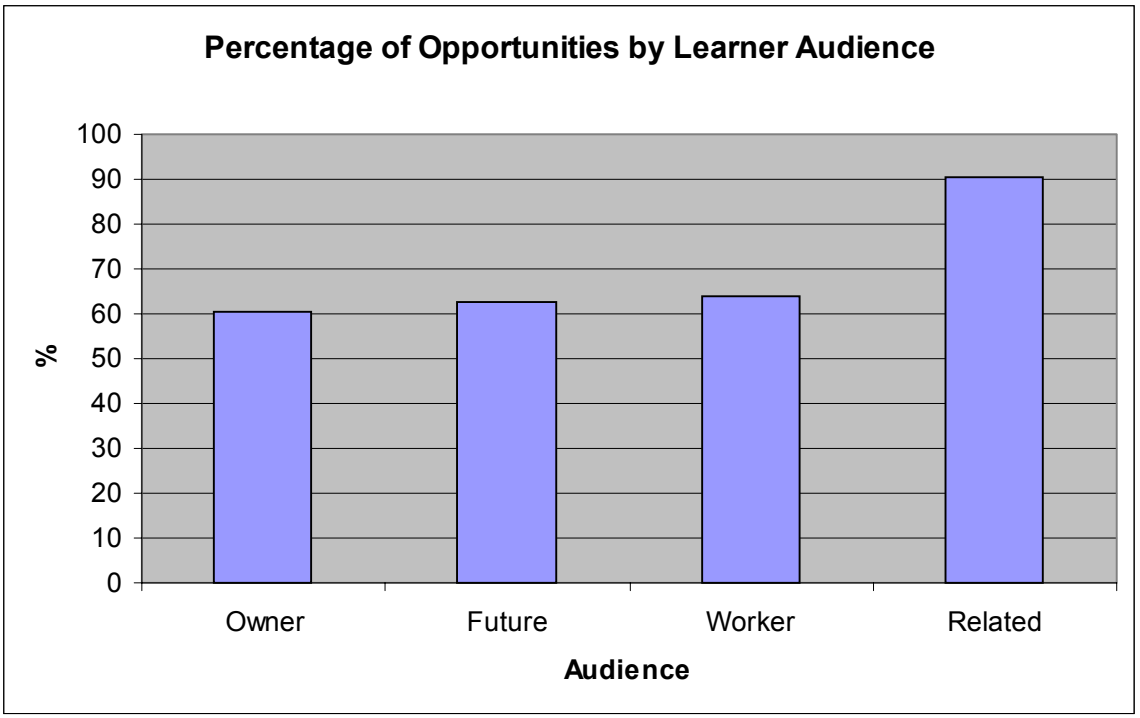


Career and skills training opportunities are about equal in all 3 provinces but the number of opportunities in PEI and New Brunswick are very limited, only 7 and 4 respectively.

Opportunities by learner audience

Many of the learning opportunities are not targeted specifically at one type of audience or another. Almost half, (47.9%) were targeted at all learner audiences with an almost equal number of opportunities available to the Owner Farmer, Future Farmer and Farm Worker. This is indicated in the chart below by the relatively high percentages across the audience groups.

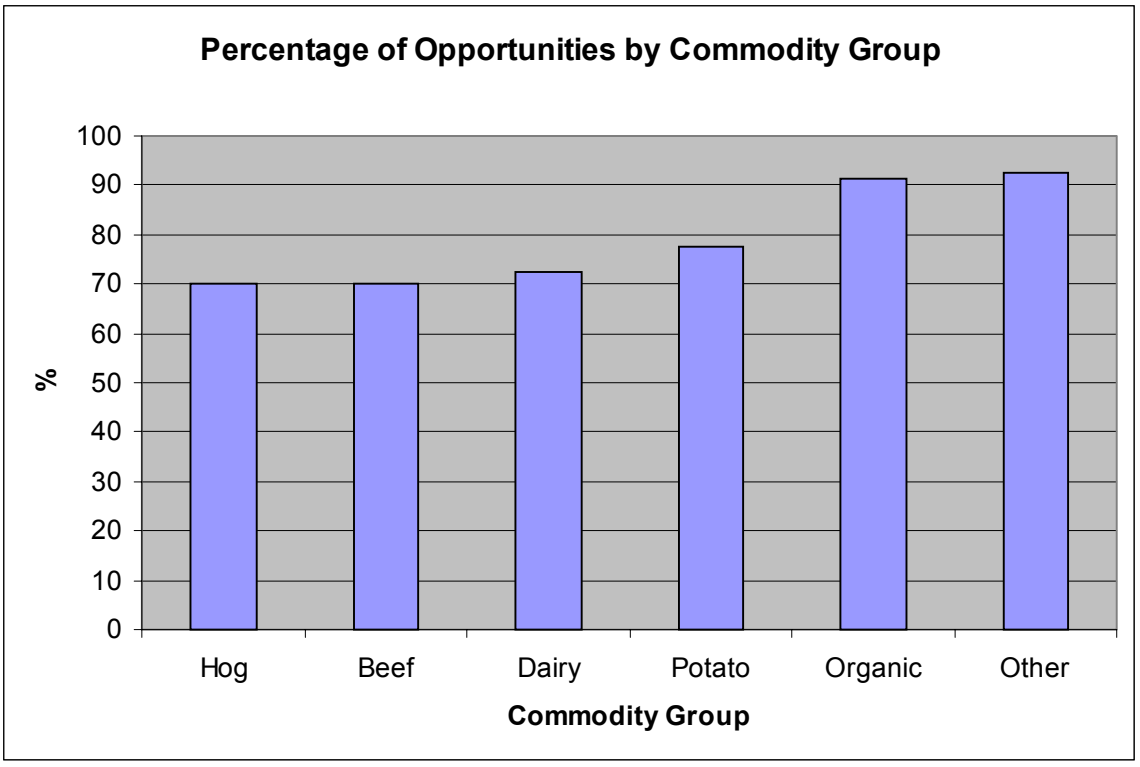
Significantly more opportunities are available for those interested in jobs related to agriculture, such as farm machinery, biotechnology, hydraulic repair, etc. Almost one quarter of the opportunities (23.4%) are specific to related agricultural activities but not directly of interest to farmers or farm workers.



Opportunities by commodity group

The following table shows that close to 55.3% (52/94) of the opportunities catalogued are of a general nature. There appears to be considerable overlap in the animal husbandry programs (beef, dairy and hog) as indicated by the overall total of 119 matches even though only 94 offerings were catalogued—some apply to multiple commodities. With this overlap taken into account, the number of opportunities is fairly evenly split between the animal and plant sciences. There is little indication of any significant specialization, even for farmers interested in organic farming—only 4.3% of catalogued opportunities. In general, there appears to be recognition that training for a farming career requires a lot of generalist information and skills.

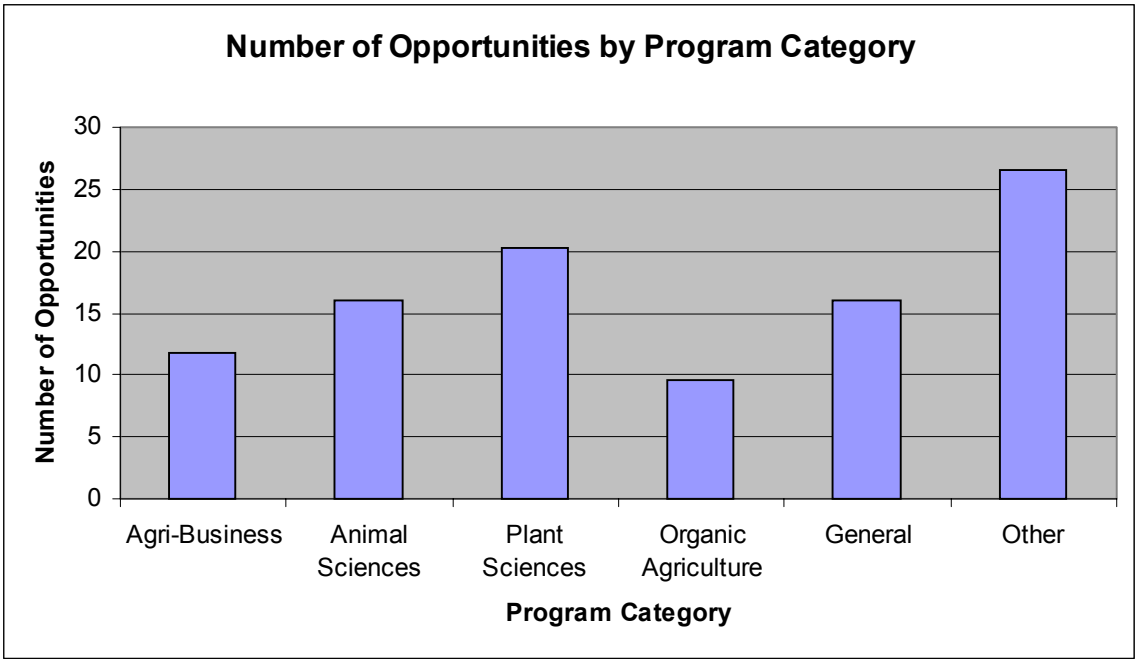
Commodity Group	Program Category	Number of Opportunities
All	Agri-business	11
	Organic Agriculture	2
	General	15
	Other	24
	Total Non-Specific	***52***
Beef	Animal Sciences	14
Dairy	Animal Sciences	13
Hog	Animal Sciences	14
Potato	Plant Sciences	17
Organic	Organic	9
	Overall Total	**119 (94)**



Opportunities by program category
Each of the program or course offerings was assigned to one of the following categories:

- Agri-business
- Animal sciences
- Plant sciences
- Organic agriculture
- General
- Other

When analyzed in this way, the plant sciences offer over 20% more opportunities than the animal sciences, followed by agri-business and organic agriculture. There are also a number of non-specific opportunities represented by the general program category in the chart.

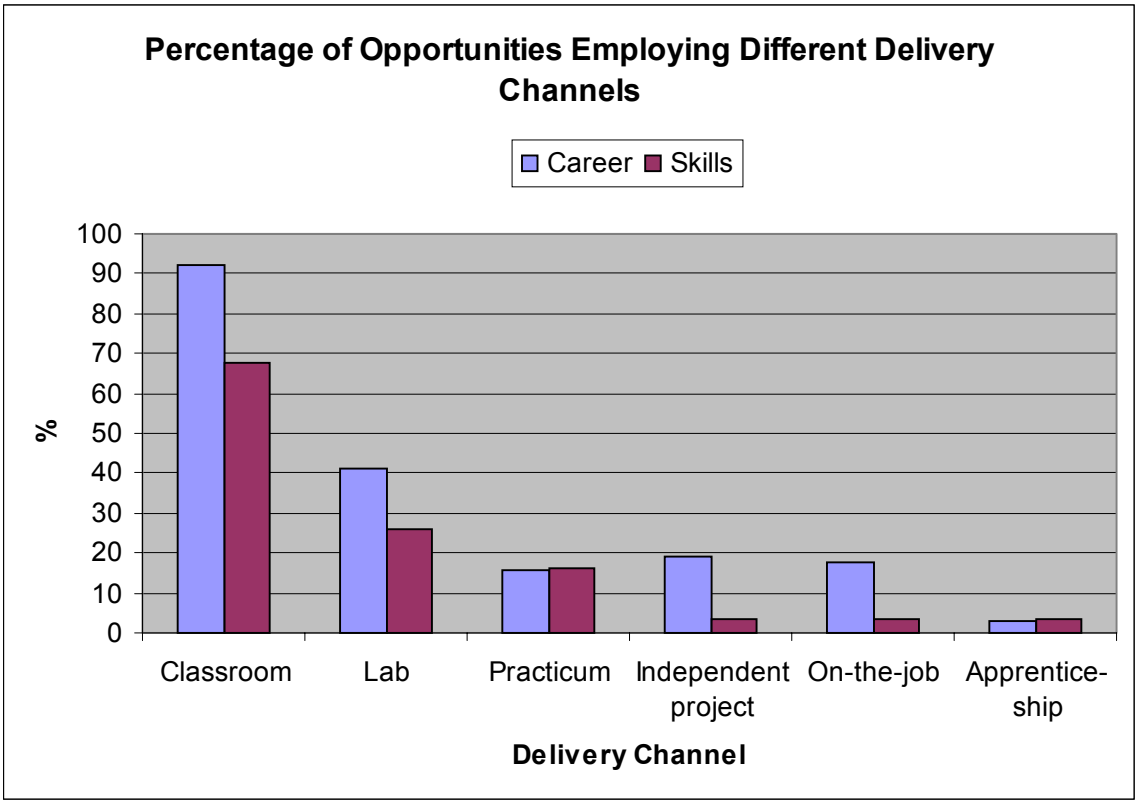


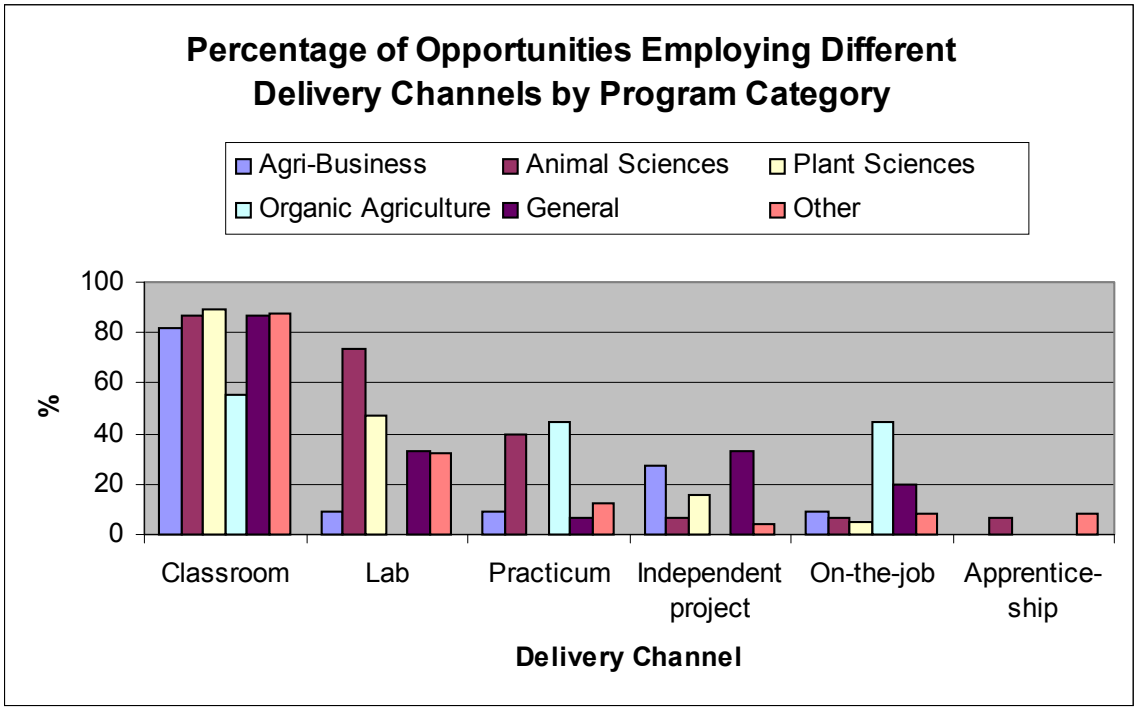
Opportunities employing different delivery channels
There are several delivery channels used for training, including traditional classroom instruction, labs, independent projects, practicum, apprenticeship and on-the-job training. Although the bulk of the programs employ traditional classroom instruction as their primary delivery channel, these are augmented in many cases with more hands-on training, using labs or practicum. On-the-job training is an important part of some programs but probably not at the level required to provide the "real-world" training that many farmers or farm workers need.

It is interesting to note that over one-quarter (26.6%) of the training opportunities rely strictly on classroom instruction, with no hands-on component. This varies a bit depending on whether the program is aimed at career development or skills training. The longer programs tend to have more hands-on activities. Only 23.8% of career oriented opportunities rely solely on classroom instruction versus 32.3% for the shorter skills training offerings.

The following chart shows the high level of reliance still placed on traditional classroom instruction. Techniques for exposing students to "real world" experiences via apprenticeships or on-the-job training are rarely employed.

The second chart explores how different delivery channels are used across the range of program categories. As expected the traditional programs in plant and animal sciences, as well as the more general programs, continue to rely heavily on classroom instruction. The real exception is for organic agriculture where more emphasis seems to be placed on practicum and on-the-job training. Formal apprenticeships are very rare.





Opportunities employing distance learning

At the moment, there are only a limited number of opportunities provided by distance education, especially for career development. Only 12.7% of career training opportunities employ some form of distance education whereas almost one-third (32.3%) of the skills training programs employ these techniques.

Organic farming has the highest percentage of distance education training available, possibly because it is newer, with fewer instructors available. Interestingly, we did not find much mention of hybrid approaches that combine face-to-face instruction with continued training being done at a distance. When students go for on-the-job training they tend to become disconnected from the training institution if there is no means by which they can continue their studies remotely.

Opportunity results vary by Maritime province

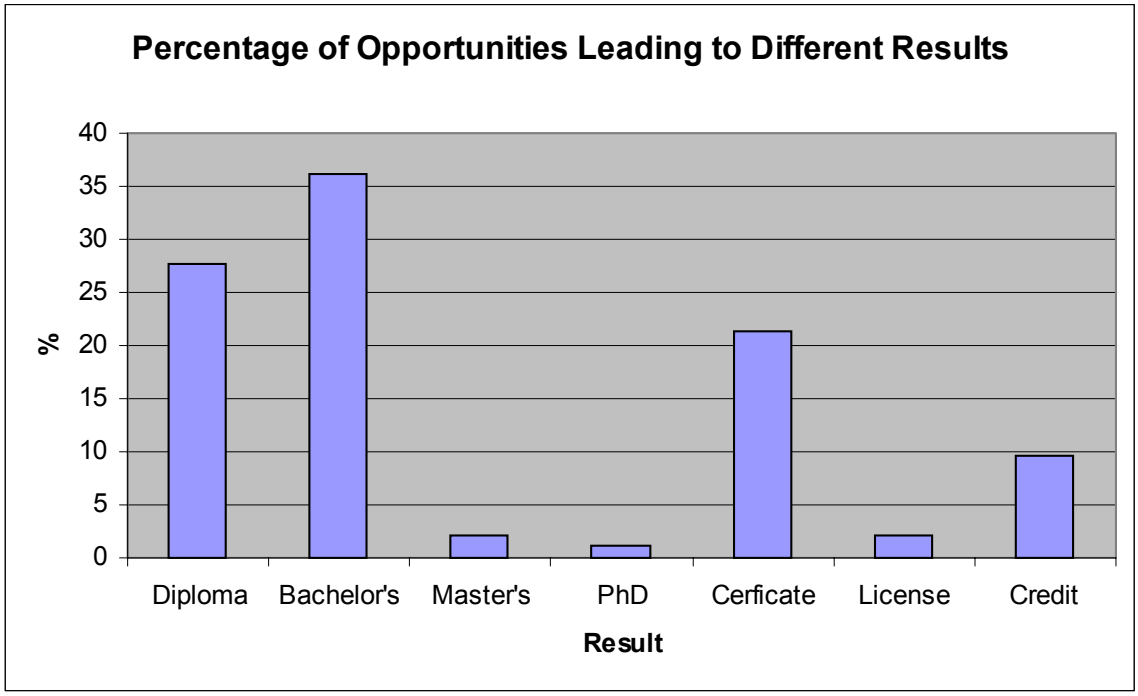
Nova Scotia provides three times the number of opportunities for training and skills development compared with PEI and New Brunswick combined. In addition, the level of training differs. With the exception of PhD training in veterinary medicine at the University of PEI, the remaining training options in PEI are non-degree offerings, resulting in a diploma or certificate.

In contrast, the majority of programs in Nova Scotia result in Bachelor's or Master's degrees. They are more targeted at advanced careers in agriculture or agriculture related industry. New Brunswick has a mixture of diploma and certificate or credit offerings.

Province	Program Category	Results	Opportunities
PEI	Animal Sciences	PhD	1
	Organic Agriculture	Certificate	1
	General	Diploma	1
	Other	Diploma/Certificate/License	4
	TOTAL		***7***
Nova Scotia	Agri-business	Bachelor's/Diploma	3
	Animal Sciences	Diploma/Bachelor's/Certificate	7
	Plant Sciences	Diploma/Bachelor's/Certificate	8
	Organic Agriculture	Credit	2
	General	Diploma/Master's/Credit	5
	Other	Bachelor's/Certificate/Credit	8
	TOTAL		***33***
New Brunswick	Agri-business	Diploma	1
	Plant Sciences	Certificate	1
	General	Bachelor's	1
	Other	Diploma	1
	TOTAL		***4***

The areas outside the Maritimes were not tabulated in the same fashion because we only selected a subset of institutions, either selected universities in Quebec and Ontario or some institutions spread out across Canada that were specifically offering distance education opportunities.

As shown in the following chart, career oriented training generally results in a diploma from a community college or a Bachelor's degree from one of the universities. For skills training, the result is usually either a certificate or a credit towards a higher level of recognition.



Opportunity availability by starting time

As expected, many of the courses begin in either the fall or winter semester despite the fact that the September start time is particularly problematic to crop farmers. There does not appear to be much flexibility in timing, even with the distance education. It is often tied to the regular school year. The table shows the percentage of opportunities starting at different times of the year. The percentages don't add to 100 because some are offered with multiple start times.

Starting Time	Percentage of Opportunities
September	78.8
January	42.5
February	8.8
April	5.0
May	3.8

8.3 Suitability of opportunities to PEI specific needs

The PEI farm community has essentially no access to formal career training on the Island. The Nova Scotia Agricultural College, in partnership with Dalhousie University, provides the only career-oriented training within a few hours drive of PEI. As such, most students are not able to work on their home farm while attending school. This makes it especially difficult for students that come from a crop-oriented farm because the start of the school year conflicts with their

"busy" season. It would appear that more distance education, flexible schedules, or on-the-job training closer to home could all benefit PEI future farmers and farm workers.

8.4 Observations of interest

Some non-Maritime universities balance theory with practical hands-on experience
Over 65% of the catalogued opportunities are categorized as career training. As such they often tend to be more theoretical in content, especially those offered by some of the universities. These programs are targeted at people aspiring to higher education in areas related to agriculture, such as research or policy-making, but not directly to on-farm agriculture. Other universities have taken a more hands-on approach to their training, as seen in the strong co-operative education programs at McGill University and extensive on-campus farm facilities provided at the University of Guelph.

Very few formal apprenticeship opportunities available to farmers
Although many opportunities incorporate some type of hands-on learning via labs, practicum, or on-the-job training, only 3 opportunities provide formal apprenticeships. Apprenticeships are available for Farm Equipment Mechanic, Heavy Duty Equipment Mechanic, and Swine Herdsperson.

People without high school diploma have limited options
The vast majority of the programs catalogued require the applicant to have a high school diploma or equivalent. However, there does not seem to be any training specifically targeted at achieving this equivalency. In the Netherlands, the Warmonderhof Training Centre offers a Junior Craftsman program designed to train farm workers. It advertises "free entry" into the basic level program, which combines on-farm training with in-class modules. Upon successful completion of the Junior Craftsman certificate, they are able to go on to more advanced training. One of these programs is designed to train higher level farm workers, and the other is designed to train future farm managers/owners.

Agricultural studies being introduced in high schools
The Agriculture Certificate program in PEI introduces agricultural studies to students during the completion of their high school degree. It combines both practical and theoretical training and could become an important component in an overall initiative to improve the image of farming as a career and to expose young people to this option.

Environmental issues are driving curriculum
There are a significant number of programs concerned with environmental science and preservation of the environment, both from a research standpoint as well as one of policy-making. Interest in this area definitely seems to be increasing in proportion with the global concern over environmental protectionism and public safety.

Technology courses are becoming more available
Because of the importance of technology in today's farming environment, a number of courses are being offered to teach farmers and farm workers about computers and computer applications relevant to their business.

Organic farmers have access to specialized training
Almost 10% of the learning opportunities are focused on organic agriculture. This is an area showing the most specialization at the moment. The majority of the offerings are provided either through workshops, distance learning, or hands-on experiences on the farm.

8.5 Considerations related to interpretation of the results

In interpreting the results, it is important to remember several factors.

1. Only the Maritimes was thoroughly researched. Other areas of Canada and outside of Canada were only sampled based on recommendations from the steering committee and other subject matter experts.
2. The research was biased towards capturing entire programs as opposed to individual courses so there are a large number of individual courses available to farmers that were not catalogued.
3. Programs may be overly represented because certain Bachelor's programs were divided into 3 or 4 entries, if they had different areas of focus (i.e., Plant Sciences versus Animal Sciences), whereas skills training options were usually aggregated into course groupings.
4. The research was conducted primarily via the Internet so there may be course or program offerings from small, private institutions that are not covered.
5. There may be a more flexibility in terms of start dates and distance education options than represented in the catalogued opportunities. This information was not always readily available or explicit.

8.6 Some innovative approaches

Innovative approaches at NSAC

NSAC offers Distance Education from the campus (see organic farming) in response to areas that want local training. NSAC formerly offered video courses, but moved entirely to the Internet in 1996. This was due to the expense of staff required in the distant sites to maintain video and other equipment. The resulting tuition for video courses became prohibitively expensive. NSAC's Continuing Education offers some courses in other parts of the Maritimes.They have built on their breadth of experience in adult learning, and in providing agriculture courses, for example sheep husbandry.

Some NSAC programs offer considerable flexibility. Superintendents and workers in golf and turf can reach certification either in a one-week course, or nine weeks one night a week, or by self-study and a test. There may be similar models in horticulture. An example of a blended self-study approach is the Atlantic Certified Crop Advisor program, pushed for by industry (e.g. McCain's). Students use NSAC's self-study guide, an optional face-to-face workshop, and a once a year exam.

NSAC can adapt curricula for specific needs. One thirteen week course was created for eleven employees in a first nations operation that recycles water from a greenhouse to use in aquaculture, offering year round employment.

CRAFT Ontario Organic Farm Apprenticeships

Organic farmers have generated a number of creative approaches to farming, perhaps because organic farmers are committed to a specific philosophy of farming, with a need to evangelize and a view of other organic farmers as comrades, rather than competitors. These factors seem to have resulted in the establishment of many cooperatives (although in itself not a new idea), direct marketing and internet-based communications and community development, the codification of knowledge, and various certification schemes for farms, processes, produce, and workers.

One example of an organic farming cooperative specifically tackling issues of skills development is the Collaborative Regional Alliance for Farmer Training (CRAFT) cooperative in Ontario[40]. These 9 farms take on interns as well as apprentices, to receive "…*intensive hands-on training in sustainable small-scale organic farming."* Internships are for 3 or 6 month periods, apprentices stay longer.

The farms themselves appear to be very diverse, providing apprentices with a wide range of experiences, again in part a result of the farming philosophy:

[40] See, e.g.: http://www.agrenv.mcgill.ca/agrecon/ecoagr/pgm/craft.HTM

> *"The [farm]… focuses on providing around 150 households in southern Ontario with fresh vegetables, flowers, culinary and medicinal herbs, and soft fruit…. The farm is 80 acres of small fields with established hedgerows with a creek and about 15 acres of soft and hardwood bush. Our small growing herd of Highland cows, and laying chickens, provide the farm with manure for compost… This, along with other specialty composts for particular plant needs, plus extensive cover cropping and crop rotations, comprise the fertility we need to grow healthy food for people in a sustainable manner…"*

Some of the CRAFT farms offer opportunities to learn related subjects beyond organic farming skills:

> *"The EELC (Everdale Farm & Environmental Learning Centre) offers workshops in sustainable living technology (solar, wind-power, alternative building techniques) and operates a certified organic farm."*

The different farms provide a different mixture of on-farm and classroom activities, plus other related learning events. Some examples include:

> *"…working hands-on internship… complemented by a structured learning program, participation in the CRAFT Ontario program, an intern swap with other parts of the Farm, and participation in the CSA (Community Supported Agriculture) community…"*

> *"Aside from extensive field experience, the… apprenticeship also includes: classroom time; about twenty field trips to regional organic farms (including other CRAFT Ontario farms)… and discounts on EELC public workshops."*

> *"…a one day a month farm tour cycle with other CRAFT Ontario apprentices."*

These organic farms tend to be small and oriented to local niche-markets. There are therefore questions about the learning – apprentices will not necessarily learn techniques suitable to non-organic farms, to large farms, or to mass-production of single produce. The cooperative approach also may not scale up to support very large numbers of apprentices and interns. Nevertheless, the model could be investigated for valuable ideas, and the energy and infrastructure that these kinds of cooperatives have built up could possibly be incorporated into a broader skills development initiative.

Manitoba's Pork Production Technician apprenticeship

Assiniboine Community College uses a "day release" scheme for Manitoba's Pork Production Technician apprentice training. It was chosen to keep employees on the job during apprentice training. The industry wants employees trained, yet needs help in training them. The employer

gets trained people for a minimal investment of time. Students are not out of the barn much, so they continue to earn, without going on unemployment. Application of learning can happen the same day. Classes are organized in towns near many barns, like Steinbach. Students study and do assignments on their own. Teleconferences between classroom times keep students and instructors in touch. Small teleconferences, of about five students, encourage participation. Students report on an assigned topic in the teleconference. Every student is expected to participate and share. The students get to know each other over two years, and continue to meet in small groups afterwards. A high school education is preferred by employers, but is not a pre-requisite. Seven out of sixteen recent graduates were women.

Farm Beginnings equips mentors to teach new farmers

Farm Beginnings is a non-profit program for encouraging new farmers. They provide training for beginning farmers in Minnesota. The program is funded by grants from small private-sector organizations. Though originally focused on dairy, established farmers saw the need for broader skills. The skills taught now include farm finances and marketing. The intent is to encourage small family farms.

The training starts with ten months of classroom instruction, which combines practical assignments as well as seminars on evenings and weekends. Farm Beginnings reinforces a breadth of farm skills, on such visits, as well as in the classroom. Field trips to farms give exposure to practical applications like intensive grazing or Swedish deep-bed hog management. The latter phase of the program pairs students one-to-one with established farmers, arranged by the students and mentors. Graduates can apply for a Livestock Loan from Heifer International. The loan is paid back over five years in-kind, at no interest. The livestock include dairy and beef cattle, swine, poultry, goats, and sheep.

Advisors from Land Stewardship Project visit the farm quarterly during the first year, and periodically thereafter. They bring along two other specialists, one with a specialty in farm finances, and another with a background in the same species. These people take a look through the books, at the animals and the facilities, and answer questions. Though beginning farmers might feel nervous about the scrutiny, they value the interaction and support.

Much of the program's mentoring, support, teaching expertise, and advice come from farmers. But farmers have to really desire to help, because stipends are not paid to the beginning or the established farmer. They have to think through the impact and tradeoffs. Established farmers have begun coming to the Farm Beginnings program to help, providing a valuable network of sustainable farmers. The farmers, along with the specialists that advise them, also need ways to interact with each other, and stay in touch with the classroom content. Farm Beginnings is looking at online ways to build community, since the program is about encouraging and connecting people to learn from each other. [41]

[41] More about Land Stewardship and Farm Beginnings is available at http://www.landstewardshipproject.org/programs.html

9 Gaps, barriers, and hypotheses

Our research for this environmental scan report has drawn on data from 3 sources:

- Interviews with people who have relevant experience in PEI and elsewhere in Canada and the U.S.
- Reports provided by interviewees and others, or accessed via the Internet
- Course information provided by educational institutions

We have focused on the needs of two key stakeholders – farmers and farm workers. In any skills development initiatives, there will be other stakeholders with needs that we have not addressed in this project, for example:

- Educational institutions
- Government
- Industry groups

We have found a relative lack of clear information, especially on commodity-specific needs. But in our interviews, we discovered a number of people across Canada with useful experience and a willingness to help. In looking at the match between the needs of the agricultural community on PEI and the learning opportunities available, we recognize that there are gaps - needs which are not met, or not fully met; and barriers – factors which mean that the match is less than optimal. Gaps and barriers usually need to be addressed in different ways. Where evidence is inconclusive or contradictory, we present hypotheses to indicate data that needs to be collected.

Key questions

Our analysis of learning needs and opportunities resulted in the identification of gaps, barriers and hypotheses described in the rest of this section. The gaps, barriers and hypotheses are grouped under headings summarized as a simple question, but each section contains significant non-trivial dilemmas. Further study is needed in each of these areas.

Throughout this section, we identify hypotheses with which to explore stakeholder opinions later. They are framed to evoke discussion, not to present conclusions. The gaps and barriers that follow centre around the key questions they raise for the program:

- Do trained farmers make better farmers?
- Do trained workers make for a more efficient workforce?
- Can a generalist approach fill the need for specialties?
- Is there a limit to blending classroom with practical methods?
- What other roles are necessary for a skills development program?
- Will better defined career paths raise the image of farm occupations?

Fit with other PEI initiatives

This Environmental Scan is one part of an active sector, along with a number of studies, projects, and other initiatives. It could potentially fit with other related initiatives in PEI. The catalogue of learning opportunities could fit with any number of job-related web-sites for PEI workers. At a minimum, it is the reference point for future snapshots of educational opportunities for PEI farmers and farm workers. Other initiatives that could be informed by this Environmental Scan are the Future Farmer Skills Workbook, the DACUM Farmer and Farm-Worker charts, and the Leadership Chart. This report recognizes the existing effort in these skill-based initiatives, and tries to avoid duplication of their effort.

The second phase of this project involves collecting farmers' reactions. Employing a behavioural-based approach, Neo Insight will create the stimulus materials needed to present alternative views of potential training and skills development programs to PEI farmers and gather their input. Their feedback will be used to identify the most promising options and to better understand their specific needs and issues.

9.1 Do trained farmers make better farmers?

Hypothesis: Education will impact farm outcomes directly and indirectly.
Farmers may have instinctive feelings about training and education, but they need to see clear benefits. There is evidence from various sources that education impacts profitability through direct and indirect mechanisms. We presented some of this evidence in ***Section 6.8***. This connection could be explored further in the PEI context, both in terms of the perceptions of farmers and others in the agricultural community (e.g. attitudes to training, innovation, etc) , and in terms of longer-term monitoring of outcomes – profitability, yield, responses to down-turns, etc.

An article in The Journal of Agricultural Education and Extension suggests that:

> *"Education and training enhance farmers' ability and willingness to make successful changes to their management practice."*

Gap: There is a lack of data connecting skills development to farm outcomes.
Farming success is dependent on so many external factors that the relationship between education or skills and farming outcomes is very difficult to assess. Some evidence of a relationship exists, but there are many confounding factors which prevent easy conclusions. The same article notes that:

> *"The training program is generally only one of several factors which influence participants to make changes in their practice."*[42]

Hypothesis: Farmers will determine whether or not farm workers take up training.
No matter what experience we find off the farm, the farmer remains central to the whole apprenticeship issue. Their own experience will determine many things: what skills are needed, how to recognize competency, how prior learning relates to theory and value for money. Farmers recognize they aren't getting the skills they need, yet feel unable to justify spending time or money on training, or paying higher wages.

> *"If the employer is committed, it is never a problem with the apprentice. If the employer doesn't support apprenticeship, the employee won't go."*

Throughout our data gathering and conversations, it is evident that attitudes and perceptions will play a central role at many levels, not the least being in setting expectations and norms. Educators, farmers, experts, and government staff will need feedback about one another's attitudes, and a means of communicating with one another. One gap to bridge is that education levels may vary widely amongst these stakeholders. It is common for instance, that farmers have no diploma or degree beyond high school.

[42] *Education and Training: Impacts on Farm Management Practice* Sue Kilpatrick, J Agr Educ Ext 2000, Vol 7, No. 2, pp 105-116 See: http://www.bib.wau.nl/ejae/v7n2t.html

> *"Younger producers and those who have attended courses, technical schools and university are more knowledgeable about soil conservation technology. However, among East Prince potato producers surveyed, only 33 per cent had technical or university training."* [43]

Barrier: Providing farmers with data to relate skills development to farm outcomes will be costly.
Collecting sufficiently detailed and convincing evidence of the impact of skills development on farm outcomes may be difficult to cost-justify. The inter-relatedness of factors and the changing farm context will always make it difficult to draw clear conclusions.

However, we can hypothesize that continued economic pressures will create a greater demand for more knowledge and for new knowledge to be applied as quickly as possible (i.e. 'Just-in-Time' knowledge). From the trends towards 'precision farming', and the position of producers in the agri-business value chain, we will make an assumption: *Farming will continue to become more precision-oriented, involving an increased use of technology and the rapid application of scientific knowledge.*

From this assumption, we can suggest that the relationship between skills development and outcomes will become clearer. Declining numbers in Agricultural Colleges plus anecdotal evidence that more farmers are taking business degrees suggest that farmers may already be changing their behaviour to focus more on business rather than production skills.

Although there may be too many confounding factors to relate education directly to profitability, we can suggest a new hypothesis from the data:

Hypothesis: Education and training will increase the likelihood of farmers making "successful changes" to their business in response to changing circumstances.
The data suggest that skills development results in farmers making more successful *changes* to their practices. It may therefore be meaningful to measure the *differences* in response to changing circumstances by those farmers with more training or more skilled workers compared to those with less training or with less skilled farm workers.

Sue Kilpatrick[44] also refers to other sources (e.g. Welch, 1970)[45] which investigate the means by which education may lead to improved profitability. Monitoring of these connections between skills and outcome will be critical to the justification of any long-term educational initiative.

Hypothesis: Education leads to greater awareness and adoption of innovation by stimulating increased use of mass media and contact with experts.
Welch also suggests that one indirect relationship of education to profitability is that:

[43] http://www.gov.pe.ca/roundtable/index.php3?number=69405
[44] See Footnote 44
[45] E.g. *Education in production* Welch, F. (1970) Journal of Political Economy, 78, pp. 37-59.

> *"The better educated are aware of a greater number of possible innovations through the use of the mass media and contact with expert advisers."*

Although this statement addresses only an *awareness* of innovation, we hypothesize that awareness may lead to greater adoption. Note that education alone is not the only way to increase farmers' access to media and experts, although it may be the critical determinant of the quality of that interaction and the generation and selection of innovations to pursue. So we might propose another weaker hypothesis: *Greater access to media and experts will generate innovation on farms.* Information and Communication Technology (I&CT) training may be of value to the entire farming community by providing a channel for discovering agricultural innovations. Additionally, increased contact between the expert mentors/trainers and farmers may also lead to increased adoption of new practices on the farm.

Hypothesis: Skills development initiatives will support off-farm as well as on-farm activities.
The instability of farm income has led increasing numbers of farmers to rely on off-farm income, and for off-farm income to provide an increasing portion of farmers' overall income. Skills development initiatives may support off-farm as well as on-farm activities, or provide the means for farmers to integrate these activities to the benefit of each. The relationship between on-farm and off-farm activities, and the barriers and opportunities the relationship represents, needs to be better understood.

Barrier: One potential barrier to establishing educational partners may be a mismatch of educational institutions' needs with those of farmers.
Educational institutions need to maintain good reputations—and to secure funding—for research and formal education. Farmers face the dominance of a small number of processors, distributors and retailers in the value chain. In the U.S. it seems that agri-business needs are stronger determinants of agricultural colleges' curricula than are farm needs:

> *"Independent farming enterprises rely less and less on the current research and education system to provide products relevant to their lives and farming enterprises. For political and economic reasons, public universities have redirected their research efforts to address the commercial interests of large agri-businesses."*[46]

Hypothesis: New knowledge will bring in new farmers and new learning opportunities.
We've seen innovation, formal knowledge-sharing, and new kinds of farmers in certain skill areas – organics, sustainability, precision farming. These areas are bringing in new knowledge. New skill areas are also a source of ongoing learning needs. Hog farming has been reinvented as pork production, resulting in specific needs for training. Farmers seek out training in topics such as organic farming methods and niche marketing. *Gap: New types of farming—such as organic*

[46] *Kerr Center Policy Report 2003 - Education and Research*
http://www.kerrcenter.com/kerrweb/publications/policyreport/education_research.pdf

farming—may attract new types of farmer, with needs that are not typical of the traditional farm worker population. Similarly, retirees and 'second career' farmers will also have different outlooks, ambitions, and needs than traditional farm skills students.

Gap: Farmers entering training will need to see recognition of their experience.
Farmers who already have some experience may decide to 'go back to school' for short- or long-term training, for whatever reasons. These farmers will need to see that the training they will receive will be as complementary as possible to their current experience, and that that experience has been taken into account in designing the course for them. This necessitates some Prior Learning Assessment and Recognition (PLAR) activity as part of the course design and enrolment process.

Hypothesis: A competencies-based approach will ease Prior Learning Assessment.
For apprentices and students Prior Learning Assessment and Recognition represents a minimal barrier – some initiatives assess prior learning from résumés, educational qualifications, and a single interview. For experienced farmers, however, recognition of prior experience is more fraught with difficulties. Experienced farmers may well be unwilling to be assessed or evaluated. A skilled farmer may also find it difficult to describe well-honed, complex skills. A competencies-based approach may smooth the introduction and implementation of PLAR by providing farmers with a formal recognition of the extensive nature of their skills, and a graded yet categorical (rather than scored) measure of level of each skill.

Hypothesis: Experienced farmers will need to see the benefits of becoming master farmers, mentors or coaches.
Experienced farmers who are also good communicators and instructors will need to be encouraged to become 'master' farmers within an apprenticeship program. Even in a less formalized training program master farmers or mentors would benefit from refining their coaching skills. It may attract farm workers to know that a master farmer receives training. Farmers will need to see such benefits for themselves, not just long-term change for the industry, to justify taking up training in coaching and mentoring.

9.2 Do trained workers make for a more efficient workforce?

Gap: Educational outcomes are not matched to farmers' willingness to pay wages for those skills.
Students who choose to take a diploma or degree program invest significant time and money in their education. For students with ambitions to work on a farm, their hope is that an education increases their value on the farm. However, there is some disconnection between farming and the outcomes and results of the formal education programs we scanned.

This may be because the needs of agri-food businesses drive training, rather than the needs of farmers. *Hypothesis: It might solve skills shortages if farming-oriented training programs were offered to workers who would otherwise pursue agri-business jobs.* Labour market skill shortages could also be reduced if training programs were available for which farmers valued the skills being taught and were willing to pay more to acquire people with these skills.

Gap: Better career paths will mean a more mobile workforce, yet this will benefit the labour pool more than the farm employer.
Although farmers may fear the mobility of their workforce, it is happening outside their control. Workforce mobility may ultimately provide better PEI farm labourers, if it makes a larger pool of skilled labour available for farmers to choose from. PEI should work for consistency with other provinces, NGOs (e.g. Atlantic Apprenticeship Council), and educational institutions to refine core competencies and curriculum definitions that are standardized and accepted across Canada. A better understanding of broader labour force mobility issues may allow farmers to make better-informed decisions about competitive wages and training for their workers.

Barrier: Help farmers see the real competition for labour.
Farmers find it hard to cost-justify wage increases or training. If younger potential employees are more mobile than previous generations, then the farmers will be competing not with other farmers offering low-wage jobs, but higher-paid positions in more profitable industries:

> *"The farmers haven't realized they're not competing with each other".*

Hypothesis: Apprenticeship will succeed if workers can earn more or find jobs more easily.
The industry has voiced a need for a skilled labour supply. At certain times and places this labour supply may be in critical shortage. Thus, it should be possible to gather evidence of the cost of attracting labourers. Increasing the size of the skilled labour pool, for example with qualified apprentices, will help farmers prioritize which skilled labourers to retain on the farm. It may also make recruiting less time consuming, and thus less costly. Minimizing these costs for farmers could result in raising the image of the farm worker occupation. But it remains to be seen whether the cost savings will result in higher wages.

Gap: Anecdotal statements about labour shortages are not necessarily reflected in farmers' behaviour.
Trying to go beyond farmers' opinions to understand how they will actually *react* to an apprenticeship program will be particularly important. Two recent cases on PEI highlight the

potential differences between opinions and behaviour. We were told that, having recognised the problem of seasonal labour shortages in crop farming, a 'migrant workers' program was introduced in PEI, but that very few farmers took advantage of it. In May 2003, a Standing Committee reported to the General Assembly that, despite frequent reported labour shortages in PEI's construction industry, many Holland College industry apprentices could not find employment.[47] Both anecdotes suggest that reported labour shortages must be backed up with rigorous investigation of the real shortages, and of the industry's ways of coping with the problem.

Hypothesis: Farmers will seek out cost-effective ways to find the skill levels they need.
It needs to be determined whether farmers are willing to pay more to hire somebody with an apprenticeship or other recognized accreditation. And although farmers may have difficulty attracting labour, hiring practices need to demonstrate whether apprenticing is a way to solve that. *Gap: It will be necessary to identify commodities where specific needs are not being addressed… potato harvester, herdsman, etc.*

Hypothesis: Technologies will continue to be cost-effective replacements of farm labour.
Demographics and current farm trends suggest that skilled labour will become increasingly difficult to find. Counter to this trend, we heard confirmation that larger farms need more employees, but not proportionately so. Similar technological change may even lead to decreased employment opportunities in agri-business off the farm. *Gap: Long-term educational plans must model future requirements in ways that take into account some of these competing trends.*

Hypothesis: Farmers need two separate strands to a skills development program; subsidized basic training in the classroom for unemployed labourers, and a more investment-oriented program of advanced skills training, mixing classroom and on-the-job learning, for employees.
We were told that trades on PEI are becoming less seasonal and that training programs are changing as a result. Farming is still naturally seasonal, and farmers will continue to need seasonal unskilled labour for the foreseeable future. Employment Insurance (EI) is seen as a natural part of the cycle. Many workers rely on EI during the winter and on HRDC subsidies for training. This cycle of subsidized training is convenient for farmers and seasonal workers alike, but is probably less optimal in generating the higher-value employees and trades that farmers need. This cycle sets expectations that training is a low-cost exercise for unemployed labourers rather than for employees, is not paid for by the farmer, and is heavily subsidized by government.

An advantage of trainees or apprentices being in full-time employment is that students can go back to the farm and apply their learning immediately. The advantage of trainees or apprentices being on EI is that training costs will be subsidized. *Hypothesis: Farmers will be more concerned about the net cost of training, and less concerned about which government department might subsidize it (e.g. HRDC or Department of Education).*

[47] *Attracting New Workers to the Trades Sector* Standing committee on Community Affairs and Economic Development First Report of the Fourth Session Sixty-First General Assembly May 21, 2003

9.3 Can a generalist approach fill the need for specialties?

Hypothesis: People will benefit from learning by multiple methods, and a blended approach could combine the best of face-to-face, on-the-job, and distance learning.
We heard from several sources that farmers and farm workers prefer face-to-face training, rather than books or computer-based training, but also that different skills are best delivered by different means. A blended approach could be applied to use the best of several methods, using on-the-job learning, distance learning, and occasional trips to school or central places. Farm workers cannot afford a lot of time off the farm during the five- to seven-month peak season.

Gap: Theory and practice are too often separated by too much time, and take place in separate locations.
Learning is retained better when theory learned in the classroom is followed quickly by practice on the farm, yet if classroom training is in winter, then practical application might be months away. There are many factors to consider in blended curricula approaches: how local should courses be; what skills are better taught on the farm; how specific training has to be to a given skill-set; when to use conference calls, email, or the web; and when is the best time to provide the training. The skill-sets and audience should drive the way the training is delivered. The principle is that location and timing should support a rapid cycle of theory, followed by practice.

Hypothesis: It seems likely that a blended approach could combine theory and practical learning by adapting existing curricula for on-the-job application.
Existing graduate and diploma programs may be adaptable to suit apprenticeship or other educational initiatives. From our scan of innovative methods, it seems likely that self-study materials could also augment classroom time and could help solve the difficulty of taking time away from the farm.

Barrier: How to make decisions, not just "how to farm", are not emphasized enough.
Farm labourers work in an increasingly complex environment. Farms are getting bigger, and workers will need to develop the kinds of skills – for example, managerial skills – that will be required on larger farms. If apprentices know the reasons *why* they're doing a task they're more likely to do the task well. So, they will need some understanding to precede practical learning situations.

In any discussion of skills training it is important to include soft skills such as decision-making, communications and relationship management. We heard that farm workers "…are never too young" to become aware of soft skills they might need later on. *Hypothesis: In addition to basic skills, apprentices need to learn about the approaches farmers take to facing tough problems, finding solutions, comparing alternatives, and tracking past experience.* The scope of these soft skills needs to be determined by the industry.

Gap: Formalization and modularization of skills will replace old barriers with new ones.
Many Canadian apprenticeship initiatives in agriculture and elsewhere are taking a competencies-based approach to create a more mobile work force:

"We must move away from job titles to competency-based descriptions."

This may help lead to industry-accepted standards, and the ability to modularize training so that the demands can be tailored more closely to fit individuals or local needs. We heard that modularization may also help to address the relatively high drop-out rates found in long apprenticeship courses. However, we also heard some resistance to the consequences of formalizing farming skills, especially if classification leads to increased regulation and administration, higher statutory wage costs, and "inflexible" Workers Compensation and Insurance requirements. However, even apprenticeship does not have to be tied to employment insurance or workers compensation. We also heard that resistance can be based on a belief that a competencies-based approach may reduce farm wages.

Gap: Competency definitions need to ensure sustainable farming for the future, but farms tend to focus more on the past than the future. If a core set of farming skills is to be defined, then there are a number of existing sources to draw on: existing DACUM charts in PEI and elsewhere, and the structure of educational institutions' curricula. The farming community should be involved in any occupational analysis, although it was pointed out to us that *"change can be slow if employees own the job definitions."*

Hypothesis: Cutting edge 'leadership' farms, as well as educational and research establishments, must be involved in competency definitions.
In addition, we were told that DACUM charts are probably better at capturing existing practice than for defining new or emerging practices. Farm practice will not always include cutting-edge techniques, and competency descriptions derived from existing practice will suffer from the same weakness. This suggests that 'cutting-edge' groups should be involved in occupational analyses aimed at tackling future skills needs, and that such analyses will need to be regularly maintained. Trainers and mentors will also need to keep up-to-date and use the latest information and techniques.

Gap: Defining a set of skills for one role will require the investigation of related roles.
Definition of a *core* set of farming skills will benefit from an occupational analysis of a number of roles, skills and performance levels on the farm. Any educational scheme targeted at one particular level or role will benefit from the analysis of related levels or roles. For example, the definition of content and training for a 'farm labourer' course will benefit from an analysis of the 'farm manager' role, as this will refine the understanding of the farm labourer role, provide the ability to teach the farm worker the context of the skill, and help set performance goals. Analysis of multiple roles on multiple farms will make commonalities and differences clearer, and help distinguish core skills from local specializations.

Hypothesis: Training on a commodity-specific farm will provide students with the specializations they need.
Needs differ from farm to farm, and there is no doubt that some specialization would be valued on most PEI farms. When core skills training is provided, working on a commodity-specific farm will naturally add specialization to a student's skills. After an initial pilot targeting general farm workers, the second most valuable pilot might be commodity-specific. Some commodities are undergoing rapid and extreme change – hog farming is an example where methods have changed

drastically over the last 20 years. Those commodities with rapidly-changing methods are prime candidates for apprenticeship and training schemes.

So, as an apprenticeship scheme is rolled out, it will be easier to gather the specific skills needs of different commodity groups, evaluate the economic viability of such a scheme, and pilot an apprenticeship program. Then, curriculum can be defined for the individual commodity occupation. Specializations for other commodities can be added later.

Gap: Limits on the number of specialties that can be learned mean that students must be given choices.
Students will gain some level of specialization through an apprenticeship, and it may differ from student to student. It will be difficult to support multiple specialized learning experiences with qualified instructors. It will be difficult over 2000-4000 hours to fit these experiences in as well. But farming as an industry is a combination of many specialties. To ensure that apprentices are exposed to a broad enough sample of them, and to honour the fact that specializations require depth of study and practice, the apprenticeship might allow a number of electives.

Hypothesis: Apprenticeships will consist of mandatory and elective learning.
An apprenticeship of a certain level may consist of some mandatory, and some of elective subjects. The electives could be accumulated and assessed individually, as though ticked off a card. Once electives have been gathered to a specified level, the student could apply for the overall apprenticeship. The nature of the electives will determine the type of apprenticeship the person has attained.

The modularization of specialties would draw on a breadth of academic disciplines, as well as a broad variety of farms on PEI. Once the program is in place, a flexible system allowing many specialties could adapt naturally to those in demand by farmers and apprentices. Each apprentice could tick off electives on their profile.

Gap: PEI has a unique farm community, yet other provinces could give valuable practical perspectives to farm workers.
Canada has invested in barns and farms that combine research with commercial operations. These could be used as resources for practical ways to teach cutting-edge, sustainable methods. The Prairie Swine Centre is one such place. *Hypothesis: Short stays on research farms could have a lasting impact on apprentices, and engender the broad skill set PEI farmers need in workers.* It would also share the load amongst provinces.

Hypothesis: PEI will share the learning with other provinces by developing what has not been developed elsewhere.
PEI may want to share the load by complementing the learning developed elsewhere or that is required specifically for the PEI context. In a reciprocal arrangement, PEI could choose to send students to certain educational experiences outside of PEI while at the same time providing specialized training for students from other parts of Canada. A better understanding of the labour market impact of apprenticeship education will help share the load and manage labour market issues.

9.4 Is there a limit to blending classroom with practical methods?

Gap: There is a disconnection between blended learning ideals and opportunities.
While a farm has difficulties in providing time, facilities, and money for learning theory, educational institutions have difficulty in providing the breadth of practical experience to complement the theory. Agricultural school students need a place to learn practical farming lessons. These difficulties may explain in part why we found a disconnection between distance learning opportunities and practicum. Very few educational institutions seem to offer well-structured 'blended learning' opportunities.

Hypothesis: A skills development program with a mix of classroom and farm learning will need to include appropriate Prior Learning Assessment and Recognition.
Once a set of core skills has been defined for teaching students or apprentices, there will need to be a means of assessing prior learning. Assessment and recognition of prior learning will require an approach sanctioned by many institutions. Because of NSAC's regional responsibility, they would like to play a role in these functions. Perhaps other institutions in the Maritimes and across Canada feel the same. *Gap: Many educational institutions could be involved, but must accept labour market determination of which institutions are the most appropriate.* It needs to be determined who will implement these functions, and agreed ways of assessing prior learning. It needs to be determined which institutions will be included in adapting curricula to the needs of the apprenticeship. Once the practical skills-assessment and curricula are in place, questions remain about the student's ongoing learning. Institutions will need to decide whether the apprenticeship will be recognized toward further diploma or degree programs.

Gap: Training fails when students don't attend, but people need to learn in their own time.
One challenge with a blended approach is that farm workers will find it difficult to make time for classroom portions. Farm cycles and academic cycles sometimes conflict. Training and development initiatives for agricultural communities must take into account the natural events on the farm, and be flexible enough to provide access for farmers and farm workers.

We heard this might be addressed by doing classroom portions during 5-6 weeks in winter, or possibly two blocks of six weeks during a year. While this may be handy for the employer, it may not be the best way to teach on-the-job. Farm workers need development opportunities to match their own 'down-times'. Farm workers may need to see a farm go through at least a whole cycle of seasons to gain the full range of experience required for learning. Plus, farm work can get busy unexpectedly, and doesn't always fit well with regularly scheduled training.

Hypothesis: Students would benefit from flexible and modular learning methods that fit their busy farm schedule.
Thus, some people suggested scheduling short and well-timed classes throughout the year. Planning activities for rainy days might help ease the burden on farmers of releasing employees from work. Scheduling must also take into account the worker's needs, such as needs of young families, including day care and off-farm employment for themselves or their spouse. We heard that maybe an evening per week might solve some problems of 'making time', and also provide continuity, improve retention, and generate short intervals between learning and application.

Gap: Apprentices need to see family farms, but large farms will be more likely to train labourers.
Large farms are likely to provide most students with the experience required for apprenticeship and training programs. However, students could also benefit from experience of family farms. Unfortunately, the smaller farms may not be able to provide the necessary facilities.

One resolution may be to encourage apprentices to move around farms. There will be additional benefits, since farmers say they want workers with broad skill-sets. However, educators and mentors will need to balance needs for workplace- and supervisor-continuity.

Another side benefit of allowing apprentices to gain experience on a number of farms is that small farms might borrow apprentices for peak times. *Hypothesis: To address the needs of all parties involved, some independent job and worker registry might be developed to connect trained apprentices with farmers requiring their skills.* The net effect would be to make the apprentices an Island asset, not just an employee of one farm.

Barrier: Farming skills have been built into farm tools and practice, and are not often written down.
As well as being intensely practical, farming historically has been taught by example, and thousands of years of knowledge and experience are built into the design of tools and into farm practices, rather than being written into text-books. This is probably one of the reasons why traditional farming knowledge has neither been systematically taught, nor the subject of academic research. This characteristic may present a continuing barrier to the provision of good agricultural courses by educational institutions.

Hypothesis: Farm education will remain unprofitable.
We were given the opinion:

> *"Ontario has been burned… expecting the private sector to take over things that government steps away from. They won't do it if it's unprofitable."*

We were told that some programs with as few as 12 students are viable, but that a farm skills development initiative might require 20-25 students each year to remain viable, and will need to show sustained enrolment.

Government will need to look closely at the inability of farmers to pay for training, and trade off the needs of farmers against the costs of supporting those needs. If training remains unprofitable and unsupported by government, then training will continue to move off the farm.

Gap: Specific skills are needed by PEI commodities, but a generalist program is more likely to attract sufficient students to be viable.
Farm workers probably represent the most likely apprenticeship group that could sustain a long-term program on PEI. However, the business rationale may not be obvious or rely on one single area of government to solve. It may be that anything beyond a core farm worker training program will be unprofitable to the institutions carrying out the training due to an insufficient

number of apprentices being required in any one specialized area. However, decisions about direct profitability would need to be weighed against the costs of doing nothing, and against any potential new wealth generated for the agricultural sector.

Hypothesis: Core farming competencies will be shared by other professions.
Core farming skills such as Human Resource Management, Financial Planning, Communication, and Decision-making, will probably be shared with other professions. This may allow parts of courses—and the costs—to be shared with these other professions, and the ability to take advantage of courses which already exist.

9.5 What other roles are necessary for a skills development program?

Educational theorists working in agriculture suggest that education and training is able to influence change in three broadly defined ways[48], by:

1. delivering new knowledge and skills
2. providing interaction with 'experts' (that is, facilitators, trainers or teachers)
3. providing opportunities for interaction with peers (mainly fellow participants)

The New England "Growing New Farmers" initiative[49] concluded:

> *"There is clearly a demand for experienced 'farmer mentors', farmer peer networks, and interactive workshops, training and individualized attention."*

Gap: Mentors and experts are key to an apprenticeship program, yet their time is valuable too.
It may not be viable to have regional mentors and experts, yet greater distances will limit interaction. Mentoring is a specific relationship-oriented skill; the question of quality of mentoring arises, and the issue of who will choose the mentors. Mentors from educational institutions will also need to keep their knowledge current and balance educational activities – lecturing, research, with mentoring activities – farm visits, seminars, etc.

Gap: Farmers and farm managers are key to the practical training of workers, yet they will need some guidance and peer support to become effective coaches and mentors.
In on-farm skills development, farmers and some farm workers will become coaches, mentors, and 'master farmers.' Experience in Manitoba suggests that short "train the trainer" sessions are well-received, and act in part to socialize new learning programs with farmers. Such sessions therefore might also be offered to farmers who do not (yet) have workers in the program, but who might wish to improve their on-farm teaching skills. Such sessions are also opportunities to communicate new ideas to farmers, and help support new attitudes to farm skills and to the training program:

> *"As we begin a new decade, the challenge isn't to be an expert at everything — but to be an expert at acquiring expertise."*[50]

Opportunities that also allow apprentices, trainers and mentors to mix with farmers, whether or not those farmers have workers in a learning scheme, may be integrated into a program. Mentors and coaches will have to understand the student's situation, and be good communicators.

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[48] *Education and Training: Impacts on Farm Management Practice* Sue Kilpatrick, J Agr Educ Ext (2000, 7, 2, pp 105-116) See: http://www.bib.wau.nl/ejae/v7n2t.html
[49] *Listening to New Farmers: Findings from New farmer Focus Groups*, Sue Ellen Johnson-NENFN Coordinator, June 2001
[50] *The Challenge Ahead* CBC editorial by Anne Forbes, Nova Scotia Farmer and Canadian Farm Business Management Council Chair http://www.cfbmc.com/cfm-eng/april2000/Page_8/page_8.html

Hypothesis: Farmer mentors and coaches will be more likely to develop their skills if they know what knowledge and skills are expected of them. Gerhard Gedies recommends the following key areas of professional development of workplace mentors and coaches (WMC)[51]:

- Communicating, people handling, relating
- Organizing, planning and preparing
- Problem solving, decision making
- Leading, team building, projecting professionalism
- Task and overall performance evaluating
- Information searching, networking
- Practicing self-development, ethics[52]

Gap: Farmers, mentors, coaches, farms, produce, and processes will need to be qualified.
One implication of these roles is that the government or some other body may need to qualify farms, farmers, mentors, and apprenticeship fulfillment. Graduates may wish to qualify as Master Farmers, and other certifications may qualify for partial fulfillment of the Apprenticeship requirements. For instance, if a Certified Horticultural Technician wants to become an apprentice, would a farm apprenticeship program recognize their prior learning? Agricultural schools and community colleges certainly need to market their curricula to bolster declining enrolment, and recognition of previous relevant learning may assist this. As one example we found, the Agricultural Certificate (K12) counts toward one credit at NSAC. The Certificate requires 240 hours of farm work—perhaps it could also count towards any new Apprenticeship or other educational certifications.

Barrier: Farmer mentors and coaches need to develop their own skills, but may not be used to creating and following a development plan.
In Gedies' study of the dynamics of good apprenticeship training, he found that, across the trades, apprentices spend 16-40 weeks in school[53]. They average about four years in the workplace, or about 90% of the apprentice's training time. The trades that deal with increasing complexity place an increasing emphasis on developing mentors and coaches. He also points to European success with mandatory trade certification beyond journey-person status.
Professional development for on-the-job trainers is of great importance to the quality of skills-training received, and yet experienced practitioners are often not used to formalizing their own learning plans. This is not limited to apprenticeship, of course.

Gap: Opportunities for skills transfer will decrease as farmers retire.
Gedies warns that time is short for many trades to take advantage of the years of experience soon to retire. The practical knowledge apprentices need is available from the boomer generation, now

[51] *Workplace mentor/coach (WMC) lessons from trades in automotive trades* Gerhard Gedies http://www.caf-fca.org/files/CAF%20Gerhard.pdf
[52] Gedies is working with Durham College to develop training for workplace trainers, possibly by distance education methods, but we were unable to track down further information.
[53] See footnote 51.

in their fifties. *Hypothesis: Retiring farmers, agri-business and government employees will provide many coaches and trainers in the next 2 decades.*

Hypothesis: Apprenticeship programs provide the opportunity of leveraging the social aspects of learning with other people.
As we discussed earlier, farmers prefer to learn from peers, farmers, mentors and coaches, rather than from books or computers. The New England studies showed that new farmers in particular wanted to meet others like them to share experiences. Farm apprentices will also benefit from support networks, especially other apprentices. These networks can be developed during apprenticeship classroom interaction, or through other means like teleconferences or Internet discussion groups.

Barrier: Social activities during learning can be important to success of the program, yet benefits can be intangible.
Education and training presents opportunities for interaction with other farmers and with facilitators (who are also 'experts'), as well as opportunities for receiving new information.

> *"Opportunity for interaction is likely to be especially important in fostering changes in complex practices such as financial management and land management."*[54]

The interaction between participants which takes place during training time, before and after sessions and at breaks allows individual farmers to compare their values and attitudes with group norms. Or as one instructor told us, no matter how much they are taught in class, they always learn more over coffee later. Interaction with fellow participants and expert trainers or facilitators allows information to be gathered from a number of sources. Social qualities of learning represent opportunities to be exploited by a program of change. The opportunity to alter values and attitudes in these ways increases the probability of a change in practice.

Hypothesis: An educational program whose objectives go beyond just providing knowledge to its students by providing social opportunities for augmenting the learning activities will be more valuable.
We heard that these activities require administrative foresight. These social learning activities could include the following:

- Flexible ways for apprentices to meet regularly
- Many opportunities to interact with experts / mentors
- Frequent opportunities to interact with other apprentices
- Ways to continue interaction while working on the farm

[54] *Education and Training: Impacts on Farm Management Practice* Sue Kilpatrick, J Agr Educ Ext 2000, 7, 2, pp 105-116 See: http://www.bib.wau.nl/ejae/v7n2t.html

9.6 Will better defined career paths raise the image of farm occupations?

If apprenticeship is shown to be a viable option for the industry, some choices will need to be made by the industry. The occupation of farm labourer may take on characteristics of being a trade, as with other apprenticeships. It may become classified on the Ellis Chart, it may gain status as a Red Seal apprenticeship, it may require safety and health standards, or it may require other labour standards. These paths pose some questions for the industry to think about, but not enough is known yet to determine the specific questions. Looking beyond the boundaries of this project, a PEI training or apprenticeship program will need to be supported by policy reviews elsewhere, dealing with taxes, grants, incentives, loans, EI and other issues which represent barriers or opportunities to meeting the needs of the PEI agricultural community.

Barrier: Potential students will eventually judge a skills development program by its track record, but there are currently few comparable farm-worker models.
PEI is leading the way in investigating a farm-worker apprenticeship. Apprentices will need a realistic view of what to expect once they graduate, but this will only be able to be tracked once the program is under way. Apprenticeship alone does not mean that wages will improve or recruitment costs will fall. Some construction industry trades face a paradox that apprenticeship does not raise wages, yet find sufficient other benefits to perpetuate apprenticeship.

Hypothesis: It will be necessary to monitor apprentices' career progress, to show candidates how apprenticeship might affect their job prospects.
We have heard that apprenticeship in other trades enhances the image and credibility of the occupation. It is the hope of some that farm apprenticeship will raise the image of farm occupations. To ensure that apprentices are attracted, the program must show candidates what they can expect, and show apprentices what is realistic after graduation. Job-placement activities will therefore be important to the sector council or other industry group most aligned with apprentices. Some of these metrics may include speed of finding a new job, changes in job responsibilities, income level, unique achievements, and entrepreneurialism.

Hypothesis: Clear outcomes and improved opportunities will encourage more apprentices.
Apprentices will need to see that educational initiatives provide them with a more secure, better-paid, or improving future. Apart from labour-market statistics, some of this communication will be accomplished by helping people spread word-of-mouth comments about the benefits they see. Students are affected by their peers' educational experiences and attitudes.

The quality of the recruits entering a program will largely determine the value they add to the job. More importantly from a communications standpoint, it is necessary to determine which achievement levels in which skills add the most value to a farm, so that this can be communicated to candidate apprentices and farm employers. *Hypothesis: The image of farming will be raised if the value of apprenticeship can be easily communicated.*

Apprentices or trainees need to feel proud of their activities, and to find peer approval. This will extend outside the classroom or learning environment. Partners in agricultural training programs

may wish to promote those programs to new recruits, and may leverage the apprentice's need to promote their status in the program. By providing merchandise, apparel, and other collateral, these partners may not only promote the occupation but also promote pride in the apprentice's work.

Hypothesis: Any educational program needs to provide flexible paths for entry, flexible options within the program, flexibility on exit, and flexibility subsequent to exit.
The path into apprenticeship is important to consider carefully. Many farm workers will already be skilled, and proud of their achievements on the job. Instructors told us it is critical to understand the students' prior learning, to make sure appropriate credit is given for a number of related high school or 4H courses or activities, or for informal prior learning. After completion of any recognized course(s), students may also need to keep their status current, renew credentials, or learn new specialties as they emerge.

Students sometimes revise their plans soon after entering a course, and any program should be designed with this possibility in mind. Courses may need to meet the needs of students entering with differing aspirations. For example, 'farming core skills' may be suitable for students planning to engage in a number of agri-business activities. We know that NSAC students often want to work in non-farm occupations, or to manage farms, and not necessarily be farm workers.

Gap: Apprenticeship and training experiences need to be linked.
Career paths after apprenticeship are equally as important. The North East New Farmers Network concluded that:

> *"With few exceptions (such as the newly established Pennsylvania Farm Apprenticeship Program which is registered with the PA Dept of Labor) there are no formal mechanisms linking one apprenticeship experience to the next, and no formal system that leads from apprenticeship to employment (actual farm jobs) and that develop farmers as 'professionals'."*[55]

We heard a concern that learning programs that take students away from the farm for any extended length of time may attract them away from farming. For example, we were told that *"NSAC students don't become farmers"* rather, that they become agri-business workers.

We also heard that when distance learning or continuing education students don't live amongst their peers, they have less commitment to an overall education program. This may have advantages as well as disadvantages for the overall community. Some young people seem to see a University degree taken in a distant location as a stepping stone away from the farm. Some of this upward mobility will be healthy for the labour force, although farmers will not wish to lose valuable workers.

[55] *Gaps in New Farmer Programs and Services* Sue Ellen Johnson, North East New Farmer Network Coordinator, Kathy Ruhf, Marion Bowlan, Cathy Sheils, Jane McGonigal, NENFN Steering Committee

The apprenticeship program will need to strike a balance between providing a number of viable careers for the apprentice while attracting enough of them to stay on the farm to address labour and succession needs. *Hypothesis: An apprenticeship program may later consider higher certifications of achievement, such as lead-hand or farm supervisor, to engender lifelong learning within the occupation.*

Hypothesis: People who are not traditionally farm workers might bring the learning from an apprenticeship back to their own occupation, if the opportunity existed.
In addition to students intending to work on the farm, we heard that there could be other groups who might take advantage of skills development opportunities. Many types of people might utilize educational programs to gain credentials, exposure, and to add value to the workforce. Agri-business people or people in agri-food value chains could benefit from first-hand exposure to farming methods, complexities, values, and decisions.

Teachers, professors, and publishers could gain experience that might enhance their ability to lead others into farming. Relatives could expand the base of future farmers by apprenticing on the farms of their extended families. Workers who have for generations learned by working under a distant farmer could now formalize their creative methods, and gain recognition for prior learning. In the Farm Beginnings program in Minnesota, new farmers come from a variety of occupations. They enhance the learning experience through classroom participation and in later networking. **Hypothesis: Non-traditional farm workers may add to the apprenticeship learning experience, as well as benefit the labour force.**

Appendices

A. List of contributors

PEI HRDC Steering Committee

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Scott Stothers	Manager, Farm Management Section, Marketing and Farm Business Management Branch, Manitoba Agriculture and Food

B. List of Agricultural Learning/Skills Development Opportunities

The following tables list the various opportunities gathered and analyzed for this report. There are two sections. The first section describes programs that typically take a year or more and that have been classified as career oriented. The second section covers shorter programs or course groupings that typically are shorter than a year and have been classified as skills development. These divisions are a bit arbitrary in some cases but it does help to separate the data and make comparisons easier.

Within each of the two sections, the opportunities are ordered by program categories. General refers to opportunities that are non-specific to a particular commodity and teach general skills. The Other category is reserved for a variety of program areas that don't have enough opportunities to treat them separately. These include areas such as biotechnology, agricultural environmental studies, agricultural mechanization, etc.

Index to catalogue of learning and skills development opportunities

Career oriented opportunities

Skills development oriented opportunities

Career oriented opportunities begin on the next page…

Program Title	Bachelor of Arts in Agriculture/Major in Agri-Business	Agriculture Studies Certificate	Agri-Business Program	Agricultural Business Technician Program
Learner Audience	Owner, Future, Worker, Related	Owner, Future	Owner, Future	Future, Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	Agri-Business	Agri-Business	Agri-Business	Agri-Business
Program Description	Students take a core of courses in agriculture along with courses in the business department. The school emphasizes education with a firm foundation in Christian values.	Designed for the Agricultural producer to enhance general management, marketing, financial, production and human resource management skills.	Designed for people interested in working in Agriculture or an Agriculture-related business	Designed for those interested in becoming a farm manager, farm supervisor, or a manager in a farm-related or agri-food business.
Offered by	Dordt College	Assiniboine Community College	New Brunswick Community College	Nova Scotia Agricultural College (NSAC)
Province/State	Iowa, USA	MB	NB	NS
Delivery Channels	Classroom, Independent project, Lab	Distance education*	Classroom, On-the-job	Classroom
Prerequisites	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	4 years	5 years (part-time study)	10-16 months*	2 years
Starting in	September	Monthly	September	September
Learning Outcome	Students are prepared for a business career in the agriculture industry, in farm management, or in other business fields. Students acquire expert skills as Agricultural Technicians and tackle important issues in Agriculture from a Christian point of view.	Students complete 9 of the following credits (incomplete list*): Agriculture and the Internet, Beef Marketing Analysis, Database Applications for Farm, Intro to Computers, Financial Accounting 1(2 credits), Grain Market Analysis, Human Resource Management, Organic Crop Techniques, Swine Record Keeping and Sector Analysis	Broad-based, with emphasis on business skill development and introduction to knowledge-based industries of our economy. Graduates of this program may find employment in agriculture businesses requiring an entry-level employee.	Graduates find work as Greenhouse Managers, Fertilizer and Chemical Company Associates, Farm Supply Sales Representatives, Government workers, Farm and Agribusiness Managers, Agricultural Entrepreneurs (Own business), Farm Assistants (Herdsperson), Farm Supervisors.
Result	Bachelor's	Diploma - Certificate	Diploma	Diploma
Website URL	http://www.dordt.edu/academics/departments/agriculture/program.shtml	http://www.assiniboine.net/public/old/distance/files/debrochure.PDF	http://www.woodstock.nbcc.nb.ca/Agri-Business.pdf	http://www.nsac.ns.ca/academics/agribusiness.htm
Notes	Associate, Minor, and Continuing Education options available.	See Assiniboine website for full list of credit courses offered. *Different courses will use a combination of media-- Internet, print-based course package or text, teleconference, tutorial support, audio and video.	*Students finish in June or can take a practicum and finish 2 or 6 months later	

Program Title	Farming Technology Program	Bachelor of Science Program/Major in Agricultural Business	Associate Diploma in Agriculture	Associate Diploma in Agriculture
Learner Audience	Owner, Future, Worker, Related	Owner, Future, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	Agri-Business	Agri-Business	Agri-Business	Agri-Business
Program Description	Designed to prepare graduates for a career as a farm decision maker on a self employed basis or as a manager on a commercial farm.	Designed to develop the entrepreneurial skills necessary to allow graduates to run their own business or pursue a career in the agrifood industry, government or education.	This program provides a practical, skills-oriented approach to agricultural production systems and affords its students an opportunity to improve their business and managerial skills.	Students integrate practical experiences in agricultural production with the technical and scientific information that is required to successfully operate modern food production enterprises.
Offered by	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)/Dalhousie University	Kemptville College/University of Guelph	Ridgetown College/University of Guelph
Province/State	NS	NS	ON	ON
Delivery Channels	Classroom, Practicums	Classroom	Classroom, Independent projects	Classroom
Prerequisites	Completion of 1st year of NSAC Agricultural Business, Animal Science, or Plant Science Technician programs or equivalent.	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	2 years	4 years	2 years	2 years
Starting in	September	September	September/January	September
Learning Outcome	Career areas include: Agricultural Entrepreneurs (Own business), Farm Assistants (Herdsperson), Farm Supervisors, Farm and Agribusiness Managers, Greenhouse Managers, Fertilizer and Chemical Company Associates, Farm Supply Sales Representatives, Government.	The focus of this program is on developing problem-solving and decision -making skills. Career areas include: Banks and other Financial Institutions, Agri-business Marketing Specialists, Farm and Business Entrepreneurs, Agri-business Management Specialists, Business Consultants.	Business management, computer skills, and problem solving activities provide students with the abilities they require as self-employed managers of production systems, and as technical/ sales employees of agri-business firms, commodity boards, and other agencies related to the agri-food system.	Business management, computer skills and problem-solving provide students with what they require as self-employed managers of production systems and as technical/sales employees of Agri-Business firms, or other agencies related to the agri-food system. Graduates find work with farms, farm supply dealerships, pest control product sales, animal health, and farm safety.
Result	Diploma	Bachelor's	Diploma	Diploma
Website URL	http://www.nsac.ns.ca/academics/farming.htm	http://www.nsac.ns.ca/academics/agbus.htm	http://www.kemptvillec.uoguelph.ca/edu2/agdip.htm	http://www.ridgetownc.on.ca/education/diploma/agd.cfm
Notes		Courses from the first year of this program can be taken as part of the University College of Cape Breton's “First Year in Agriculture at Home” distance education program.	Equine Specialization option available.	Students in the Agriculture Program may have the opportunity to participate in a Work Placement in Holland between their Junior and Senior year of study.

Program Title	Online MBA: Agriculture Specialization	Agricultural Economics Major/Agricultural Business Option	Bachelor of Arts in Agriculture/Major in Animal Science	Animal Sciences Technician Diploma
Learner Audience	Owner, Future, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Organic, Other	Hog, Beef, Dairy, Other
Program Category	Agri-Business	Agri-Business	Animal Sciences	Animal Sciences
Program Description	This is the world's first electronically delivered MBA in Agriculture. Students study with a wide network of producers and Agri-Business professionals through an online network.	On top of a core curriculum in Agricultural Economics theory, this option includes training in the functional areas of business: marketing, finance, management, and accounting.	The Animal Science emphasis provides training in animal nutrition, anatomy, production, physiology and breeding, and health. The school emphasizes education with a firm foundation in Christian values.	Teaches principles of livestock production providing theoretical and practical (hands-on) knowledge in animal agriculture
Offered by	University of Guelph/Athabasca University	McGill University	Dordt College	Nova Scotia Agriculture College
Province/State	ON, AB	QC	Iowa, USA	NS
Delivery Channels	Classroom*, Distance education, Independent project	Classroom	Classroom, Independent project, Lab	Classroom, Distance education*, Lab, Practicums
Prerequisites	4 year Bachelor's degree or substantive Agri-Business or management experience	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	2.5 years (deadline of 6 years from registration)	3 years	4 years	2 years
Starting in	September/January/May	September/January	September	September/January
Learning Outcome	The program is conducted in 3 phases: Phase 1: Graduate Diploma in Management; Phase 2: Learn skills and concepts of Agri-Business, 1 week residency at University of Guelph; Phase 3: Directed Research Project	The development of commercial agriculture is characterized by a large supporting sector of manufacturing and service companies involved in the supply of inputs to farming and the transportation, processing, and marketing of agricultural products. Career areas include management, finance, and marketing positions in the agri-food industry.	This is a common major for students in the pre-veterinary program, those going to graduate school, and students planning careers in livestock production or related services. Students acquire expert skills as Agricultural Technicians and tackle important issues in Agriculture from a Christian point of view.	Preparation for a career on a farm as an animal husbandry specialist, or as an animal science technician in an agricultural service or industry.
Result	Master's	Bachelor's	Bachelor's	Diploma
Website URL	http://www.mbaagri.uoguelph.ca/index.html	http://www.agrenv.mcgill.ca/agrecon/agribus.htm	http://www.dordt.edu/academics/departments/agriculture/program.shtml	http://www.nsac.ns.ca/pas/animal_science_diploma.htm
Notes	*Students must spend 1 week on campus		Associate, Minor, and Continuing Education options available.	*Only one course available as distance education (web, CD, discussion groups)

Program Title	Animal Health Technology Program	Veterinary Assistant Program	Bachelor of Science Program/Major in Animal Science	Associate Diploma in Veterinary Technology (Conventional Delivery)
Learner Audience	Worker, Related	Related	Owner, Future, Worker, Related	Worker, Related
Commodity Group	Hog, Beef, Dairy	Hog, Beef, Dairy, Organic, Other	Hog, Beef, Dairy, Organic, Other	Hog, Beef, Dairy, Organic, Other
Program Category	Animal Sciences	Animal Sciences	Animal Sciences	Animal Sciences
Program Description	Designed to prepare students to function as technical assistants to practicing veterinarians, researchers, and other persons who deal with animals.	Designed for those wishing to become a Veterinary Assistant, managing the front office of a veterinary hospital, as well as providing valuable veterinary assistance to staff.	Technical and business training in areas of animal agriculture, companion animals, biomedical research, wildlife parks and zoos. Acquire a solid science background, a broad knowledge of agriculture and modern animal systems, and practical hands-on experience.	The program is designed to provide the technical knowledge required to become a veterinary technician working in association with practising veterinarians.
Offered by	Nova Scotia Agricultural College (NSAC)	Maritime Business College	Nova Scotia Agricultural College (NSAC)/Dalhousie University	Ridgetown College/University of Guelph
Province/State	NS	NS	NS	ON
Delivery Channels	Classroom, Lab, On-the-job	Classroom, Practicums	Classroom, Lab	Classroom, Lab, Practicums
Prerequisites	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent, 40 hours experience in a veterinary clinic
Duration	3 years	1 year	4 years	2 years
Starting in	September	September	September	September
Learning Outcome	The limited livestock component is designed for graduates who choose to work in mixed practices or to develop their clinical skills in farm animal medicine.	Students acquire knowledge of veterinary medical terminology, office procedures, clinical practices, veterinary nutrition, animal behaviour, veterinary nursing and occupational health and safety regulations.	Training in animal production systems, animal breeding, nutrition, behaviour, and physiology. Job opportunities in technical, sales, research, consultant, managerial fields. Potential to develop an animal business of one's own or to continue professional training as a researcher, educator or veterinarian.	Students take a comprehensive range of courses and training related to the care of large, small and laboratory animals, as well as companion and sports animals. Career areas include: Artificial Insemination (A.I.) Facilities, Equine Facilities, Farm Operations, Large and Small Animal Care, Livestock Managers, Research Facilities, Swine Herdsperson, Veterinary Clinics/Hospitals.
Result	Diploma	Diploma	Bachelor's	Diploma
Website URL	http://www.nsac.ns.ca/pas/programs/aht/index.htm	http://www.maritimebusinesscollege.ca/courses/veterinary.htm	http://www.nsac.ns.ca/academics/bsc_animal.htm	http://www.ridgetownc.on.ca/education/diploma/vtd.cfm
Notes	Thrust of program is towards small animal veterinary practice with a modest large animal component and some flexibility.		Courses from the first year of this program can be taken as part of the University College of Cape Breton's “First Year in Agriculture at Home” distance education program.	*Students complete a four-week externship at a veterinary clinic or equivalent during the final semester.

Program Title	Associate Diploma in Veterinary Technology (Alternative Delivery)	Swine Herdsperson Apprenticeship Program	Bachelor of Science in Agriculture/Major in Animal Science	Bachelor of Science/Major in Animal Biology
Learner Audience	Worker, Related	Worker, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related
Commodity Group	Hog, Beef, Dairy, Organic, Other	Hog, Organic	Hog, Beef, Dairy, Organic, Other	Hog, Beef, Dairy, Organic, Other
Program Category	Animal Sciences	Animal Sciences	Animal Sciences	Animal Sciences
Program Description	The program is designed to provide the technical knowledge required to become a veterinary technician working in association with practising veterinarians.	This program allows students to "earn while they learn". Students fulfill the training standards as developed by the Ministry of Training, Colleges and Universities.	The study of Animal Science within the Agriculture program provides a holistic entrepreneurial approach to animal agriculture.	This program explores the science underlying the practical husbandry of animals, primarily those used for food products but also companion and captive species.
Offered by	Ridgetown College/University of Guelph	Ridgetown College/University of Guelph	Ontario Agricultural College/University of Guelph	Ontario Agricultural College/University of Guelph
Province/State	ON	ON	ON	ON
Delivery Channels	Classroom*, Distance education, Lab*	Apprenticeship, Classroom	Classroom, Lab	Classroom, Lab
Prerequisites	High school diploma or equivalent, 40 hours experience in a veterinary clinic	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	3 years	2-2.5 years*	4 years	4 years
Starting in	September	Contact institution for information	September/January	September
Learning Outcome	Students take a comprehensive range of courses and training related to the care of large, small and laboratory animals, as well as companion and sports animals. Career areas include: Artificial Insemination (A.I.) Facilities, Equine Facilities, Farm Operations, Large and Small Animal Care, Livestock Managers, Research Facilities, Swine Herdsperson, Veterinary Clinics/Hospitals.	Career Opportunities on Swine Farms: Production Manager, Breeding Manager, Farrowing Manager, Breeding Technician, Nursery Stock Manager, Artificial Insemination Manager; In the Pork Industry: Breeding Technician, Pharmaceutical Representative, Genetics Technician, Agricultural Finance Representative, Agribusiness Retail Manager, Swine Research Technician/Assistant.	Students gain an understanding of the science underlying the practical husbandry of animals, primarily those used for food production, but also of companion and captive species. Career areas include: feed, meat, livestock improvement & pharmaceutical industries sales, government & overseas agencies, Agri-Business administration, and research.	Students acquire an overview of animal production systems and an understanding of their reliance on genetics, molecular biology, reproductive technology, nutrition, environmental physiology, behaviour and welfare. Career areas include: animal breeding and animal feed industries, animal health/veterinary pharmaceutical industries, biotechnology, animal care/welfare, education, technical liaison, research.
Result	Diploma	Diploma	Bachelor's	Bachelor's
Website URL	http://www.ridgetownc.on.ca/education/diploma/vtd.cfm	http://www.ridgetownc.on.ca/education/Apprenticeships/sh.cfm	http://www.uoguelph.ca/liaison/majors/ansc.shtml	http://www.uoguelph.ca/liaison/majors/anbi.shtml
Notes	*Students complete 3 summer semesters on campus	*4000 hours on-farm training, 480 hours in-class training	This program is similar to the Bachelor of Science in Animal Biology offered at the University of Guelph, but emphasizes a broad-based study of Agriculture.	

Program Title	Doctor of Veterinary Medicine	Agricultural Fieldman Certificate	Bachelor of Arts in Agriculture/Major in Agriculture	Bachelor of Science (Agriculture) First Year at Home Program
Learner Audience	Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related
Commodity Group	Hog, Beef, Dairy, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	Animal Sciences	General	General	General
Program Description	The Atlantic Veterinary College offers Atlantic Canada's only Doctor of Veterinary Medicine program.	This is a web-enhanced, on-line program designed primarily to meet the training needs of individuals working for Agricultural Service Boards in rural municipal governments.	This program is designed to give students flexibility in pursuing specific interests and goals within a four year study of Agriculture. The school emphasizes education with a firm foundation in Christian values.	Designed to allow NSAC Bachelor of Science in Agriculture students to study in New Brunswick for their first year.
Offered by	Atlantic Veterinary College (University of Prince Edward Island)	Olds College	Dordt College	University of New Brunswick (UNB)/Nova Scotia Agricultural College (NSAC)
Province/State	PEI	AB	Iowa, USA	NB
Delivery Channels	Classroom, Lab, Practicums	Distance education	Classroom, Independent project, Lab	Classroom, Distance education*
Prerequisites	15 semester hours credit at an undergraduate level, and 2 veterinary-related experiences of at least 40 hours each.	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	4 years	6 ten week courses	4 years	1 year
Starting in	September	Contact institution for information	September	September
Learning Outcome	Students will receive the necessary training to practice veterinary medicine in a small classroom context, lab practicums, and 30 weeks in clinical rotation postings.	The six courses are: Communications and Labour Relations; Weeds, Pests, and Livestock Diseases; Crops Management; Environmentally Sustainable Agriculture; Legislation and Program Administration; Office Management and Administration. Participants spend a minimum of 6-8 hours a week online. Group activities include writing responses in threaded discussion, and searching the Internet.	Students acquire expert skills as Agricultural Technicians and tackle important issues in Agriculture from a Christian point of view, for example, Stewardship, Agricultural policy, sustainability, soil quality, environmental health, rural community vitality, and animal welfare.	Students continue their studies at the Nova Scotia Agricultural College in Truro. The required NSAC courses are: Agricultural Ecosystems, Food Security, and Agricultural Economics.
Result	PhD	Diploma - Certificate	Bachelor's	Bachelor's - Credit**
Website URL	http://www.upei.ca/registrar/html/veterinary.html	http://www.oldscollege.ca/extension/ExtensionCalendar/Distance_AgFieldman.asp	http://www.dordt.edu/academics/departments/agriculture/program.shtml	http://www.unb.ca/prospective/sp08.html
Notes		These courses can also be taken individually for interest.	Associate, Minor, and Continuing Education options available.	Non-Agriculture majors may also take the program and use the credits received as elective courses towards their degree. *Via Internet. **Completion of first year of an NSAC BSc (Agriculture) degree.

Program Title	Agricultural Technology Diploma	Master of Science in Agriculture	Bachelor of Science in Agriculture/Experience Agriculture Program	Bachelor of Science/Major in Food Science
Learner Audience	Owner, Future, Worker, Related	Related	Owner, Future, Worker, Related	Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	General	General	General	General
Program Description	Designed for people to upgrade their NSAC Technician Diploma (or equivalent) to a Diploma of Technology in Agricultural Technology.	Graduate studies in the areas of Agribiology, Agricultural Chemistry, Animal Science, Plant Science, and Soil Science.	This is a work experience program option for students pursuing a Bachelor of Science in Agriculture at the University of Guelph.	Students gain expertise in Food Engineering, Food Chemistry, Food Microbiology, Food Processing, Food Analysis and Food Product Development.
Offered by	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)/Dalhousie University	Ontario Agricultural College/University of Guelph	Ontario Agricultural College/University of Guelph
Province/State	NS	NS	ON	ON
Delivery Channels	Classroom, Independent project	Classroom, Independent project	Classroom, On-the-job*	Classroom, Lab
Prerequisites	NSAC Technician Diploma or equivalent	Bachelor's with Honours in relevant field of study.	High school diploma or equivalent	High school diploma or equivalent
Duration	12 courses	1-2 years	4 years	4 years
Starting in	September	September/January/May	September	September
Learning Outcome	Diploma of Technology in Agricultural Technology with Honours options	Completion of a thesis project in one's chosen specialization. Increased proficiency in communication and research skills	Students take one in-class module workshop per semester, and get work experience in the summer months. There is also an option to study for a semester at another faculty of agriculture in Canada or abroad. Module workshops: Managing Self 1 & 2, Managing People and Tasks 1 & 2, Labour Market Skills, Mobilizing Innovation/Change, Labour Market Innovation, World of Work Readiness.	Food Science students are part of the Honours B.Sc. Program. After completing the first two semesters of the general science program, six additional semesters are required. Career areas include: Management of food processing operations, Quality control and product development within food companies, Research, Plant inspection, Technical sales of ingredients.
Result	Diploma	Master's	Bachelor's**	Bachelor's
Website URL	http://www.nsac.ns.ca/reg/cal/ty/at.htm	http://www.nsac.ns.ca/rgs/graduate/index.htm	http://www.oac.uoguelph.ca/docs/program_planning_guide.pdf	http://www.oac.uoguelph.ca/learning/learn_bscfs.asp
Notes		*1 or 2 year Residency	*Study Abroad option available. **The Experience Agriculture Program gives you work experience and a portfolio on top of your degree.	Co-operative education and international opportunities available.

Program Title	Agriculture Certificate Program	Farm Management and Technology Progr	Agricultural Sciences Major/General Option	Agricultural Sciences Major/International Option
Learner Audience	Future, Worker, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related	Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	General	General	General	General
Program Description	Students complete this program during their grade 10, 11, and 12 years, combining a regular high school curriculum with a "specialization" in agriculture.	This program combines a three year academic program with on-farm practicums and internships in the agri-food sector.	The Agricultural Sciences program provides the general scientific and applied background for modern agriculture, with an emphasis on agriculture in its on-farm environment.	The International Option focuses on International Development Studies in Agriculture.
Offered by	PEI Agricultural Human Resources Council/Kensington Intermediate Senior High School/Kinkora Regional High School	McGill University	McGill University	McGill University
Province/State	PEI	QC	QC	QC
Delivery Channels	Classroom, On-the-job	Classroom, On-the-job, Practicums	Classroom, Independent project, Lab	Classroom, Independent project, Lab
Prerequisites	Successful completion of grade 9.	High school diploma or equivalent, 4 months to 1 year farm experience, and successful interview.	High school diploma or equivalent	High school diploma or equivalent
Duration	3 years	3 years	3 years	3 years
Starting in	September	September	September/January	September/January
Learning Outcome	Students make valuable contacts in the agricultural industry, increase their self esteem or self worth, and bridge the transition between school and work in the agricultural field. Workshops include: First Aid/CPR, Workplace Hazardous Materials, Information System (WHMIS), Farm Safety, and Pesticide Use Certification.	Students take 6 academic semesters of courses in soils, plant science, animal science, engineering, economics and management. The first summer of the program is spent on a farm other than the home farm*. During the second summer, students will be encouraged to acquire additional farm experience away from the home farm.	Graduates are prepared for diverse careers in Agriculture and Agri-Business, including Agricultural extension and communications.	Students study Agriculture in the context of international development. Offered courses include: Economics of International Agricultural Development, Development and Underdevelopment, Tropical Food Systems Field Course, Nutrition in Developing Countries.
Result	Diploma - Certificate	Diploma	Bachelor's	Bachelor's
Website URL	http://www.edu.pe.ca/agriculture/certificate.html	http://www.mcgill.ca/fmt/proginfo/	http://www.mcgill.ca/plant/undergraduate/general/	http://www.mcgill.ca/plant/undergraduate/general/
Notes	Piloted in the year 2000 at Kensington Intermediate Senior High School and Kinkora Regional High School.	*Students will prepare for this 13-week practicum through a one-week internship during both academic semesters of Year 1.	Internship Major option available: two internships offered during the summer: the first in industry and the second under the supervision of an agrologist.	Panama Field Study Option available

Program Title	Bachelor of Science/Major in Food Science	Level JC: Junior Craftsman in Biodynamic Agriculture	Level IC: Independent Craftsman in Biodynamic Agriculture	Level EW: Executive Worker in Biodynamic Agriculture
Learner Audience	Related	Worker	Worker	Owner, Future, Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Dairy, Potato, Organic, Other	Dairy, Potato, Organic, Other	Dairy, Potato, Organic, Other
Program Category	General	Organic Agriculture	Organic Agriculture	Organic Agriculture
Program Description	The courses are integrated to acquaint the student with food processing, food chemistry, quality assurance, analytical procedures, food products, standards and regulations.	This program provides training to become a farm worker using biodynamic practices.	An Independent Craftsman is capable of carrying out jobs on a biodynamic farm independently, like supervision of dairy farming or of arable crops.	An executive worker is capable of managing a biodynamic farm, or taking a responsible role in advisory service or in Agri-Business.
Offered by	McGill University	Warmonderhof Training Centre	Warmonderhof Training Centre	Warmonderhof Training Centre
Province/State	QC	Dronten, Holland	Dronten, Holland	Dronten, Holland
Delivery Channels	Classroom, Lab	Classroom, Practicums, On-the-job	Classroom, Practicums, On-the-job	Classroom, Practicums, On-the-job
Prerequisites	High school diploma or equivalent	None	High school diploma or equivalent, or Junior Craftsman certificate	High school diploma or equivalent, or Junior Craftsman certificate
Duration	3 years	2 years	3 years	4 years
Starting in	September/January	Contact institution for information	Contact institution for information	Contact institution for information
Learning Outcome	Students receive a grounding in the physical sciences, study Food chemistry and analysis with special emphasis on Post Harvest Fruit and Vegetable Technology, Food Processing and Food Engineering, and look at industry special interest areas such as Food Packaging, Flavor Chemistry, Product Development, Hydrocolloids and Food Biotechnology.	The curriculum is taught in 3-4 week modules which result in certificates in areas such as: soil science, vegetable production or livestock welfare. During 2nd year, students complete a five-month external work-placement on a biodynamic farm. Many students take the opportunity to gain experience abroad.	During 1st and 2nd year, students become acquainted with the work in practical agriculture and horticulture on the Warmonderhofstede farm. During 2nd year, students commence a 5 month external work-placement on a biodynamic farm. In the 3rd year students supervise first and second-year students on the Warmonderhofstede farm.	During 1st and 2nd year, students become acquainted with the work in practical agriculture and horticulture on the Warmonderhofstede farm. During 2nd year, students commence a 5 month external work-placement on a biodynamic farm. In the 3rd and 4th years students supervise first and second-year students on the Warmonderhofstede farm.
Result	Bachelor's	Diploma*	Diploma*	Diploma*
Website URL	http://www.agrenv.mcgill.ca/foodscience/ugrad1.htm	http://www.warmonderhof.nl/warmhof/english.htm	http://www.warmonderhof.nl/warmhof/english.htm	http://www.warmonderhof.nl/warmhof/english.htm
Notes		*Internationally recognized	*Internationally recognized	*Internationally recognized

Program Title	Biodynamic Organic Agriculture Training	Organic Inspectors Certificate	Organic Agriculture Certificate	Biotechnology (Co-op) Program
Learner Audience	Owner, Future	Related	Owner, Future, Worker, Related	Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Organic	Organic	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	Organic Agriculture	Organic Agriculture	Organic Agriculture	Other
Program Description	The three-year training to become a biodynamic farmer combines both theoretical and practical work. The aim is to prepare students to be able to run their own economically viable, biodynamic farm.	This program offers professional development skills training to organic farm and processing facility inspectors or evaluators of organic certifying bodies.	This program is designed for those interested in studying organic production, processing and marketing according to nationally developed organic standards.	The biotechnology program provides students with the fundamentals of knowledge in biology and chemistry as they apply to biotechnology.
Offered by	Emerson College	Assiniboine Community College	Assiniboine Community College/Organic Producers Association of Manitoba Co-op Inc.	Center of Excellence in Agricultural and Biotechnological Sciences (CESAB)
Province/State	East Sussex, England	MB	MB	NB
Delivery Channels	Classroom, Practicums, On-the-job	Distance education*	Distance education*	Classroom, Lab, On-the-job
Prerequisites	Medical exam*	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	3 years	Deadline for completion: 8 years from registration date	Deadline for completion: 8 years from registration date	2 years
Starting in	September/January/February/April	Contact institution for information	Contact institution for information	September
Learning Outcome	Academic curriculum combines Agriculture,General Sciences and Artistic Subjects, Study of anthroposophy and the Biodynamic Agriculture Course, Technology, and Agri-Business. Practical components include a 5 month work placement, specialization in either animal husbandry/arable agriculture or fruit/vegetable growing, and in upper years, the supervision of first year students.	This program is recommended for organic inspector trainees, certification agency personnel, certification committee members, regulatory agency staff, organic processors and industry activists who want to better understand the inspection and certification process.	Required courses include: Organic Crop Techniques, Organic Livestock Techniques, and either Organic Value-Added Processing, or Organic Product Marketing Strategies, plus other courses according to chosen specialization.	Career areas include: research and development in government, university, or private research facilities, production facilities of private companies; pharmaceuticals, bio-processing, agriculture, environment, genomics, forestry, aquaculture, and nutraceuticals.
Result	Diploma**	Diploma - Certificate	Diploma - Certificate	Diploma
Website URL	http://www.emerson.org.uk/fulltimecourses/bio.htm	http://www.assiniboine.net/public/old/distance/files/debrochure.PDF	http://www.assiniboine.net/public/old/distance/files/debrochure.PDF	http://www.cesab.org/EN/biotech.cfm
Notes	*Ensuring that applicant is in good physical health **level 4 vocational diploma recognized throughout the European Union.	The program is delivered on a course-by-course basis. Students must complete 48 Continuing Education Units of study to receive the certificate. *Different courses will use a combination of media-- Internet, print-based course package or text, teleconference, tutorial support, audio and video.	The program is delivered on a course-by-course basis. Students must complete 48 Continuing Education Units of study to receive the certificate. *Different courses will use a combination of media-- Internet, print-based course package or text, teleconference, tutorial support, audio and video.	Specializations offered: biotechnology methods relating to molecular biology, instrumental analyses, biofermentation, microbiology, immunology and applied biotechnology

Program Title	Bachelor of Science Program/Major in Agricultural Economics	Bachelor of Science Program/Major in Agricultural Environmental Studies	Bachelor of Science Program/Major in Agricultural Mechanization	Associate Diploma in Environmental Management
Learner Audience	Owner, Future, Related	Owner, Future, Worker, Related	Owner, Future, Related	Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Potato, Organic, Other
Program Category	Other	Other	Other	Other
Program Description	Designed to help students develop professional decision making skills which can be applied to various levels of economic management in the agriculture and food industry, government and teaching.	This program uses a multidisciplinary approach to address environmental issues according to their biological, chemical, and socioeconomic aspects with an emphasis in agricultural issues.	Designed to provide training for future managers of agricultural and related production and processing systems.	This program is designed to train sewage and water plant operators as well as personnel to assist growers in nutrient management.
Offered by	Nova Scotia Agricultural College (NSAC)/Dalhousie University	Nova Scotia Agricultural College (NSAC)/Dalhousie University	Nova Scotia Agricultural College (NSAC)/Dalhousie University	Ridgetown College/University of Guelph
Province/State	NS	NS	NS	ON
Delivery Channels	Classroom	Classroom	Classroom	Classroom
Prerequisites	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	4 years	4 years	4 years	2 years
Starting in	September	September	September	September
Learning Outcome	Career areas include: Banks and other Financial Institutions, Agri-business Specialists, Government Policy Advisors, Teachers and University Professors, Farm Production Entrepreneurs.	Further specialization possible in environmental biology, environmental chemistry, waste management, environmental soil science, pest management, and environmental economics. Employment opportunities with government agencies and private industry or entry into graduate programs.	Graduates have an understanding of these processes and of their mechanization and operation, business management practices, environmental issues and how to monitor & control them. They will also have received training and practice in effective communicating skills.	This program applies technical and practical skills training in two streams: municipal/industrial and rural/agricultural. Career areas include*: Compliance Officer, ISO 14000 Developer, Waste Water Assistant, Certified Sewage Treatment Office, Nutrient Management Assessment Consultant, Sales Representative, Environmental Farm Plans Consultant.
Result	Bachelor's	Bachelor's	Bachelor's	Diploma
Website URL	http://www.nsac.ns.ca/academics/ageco.htm	http://www.nsac.ns.ca/academics/agenviron.htm	http://www.nsac.ns.ca/academics/agmech.htm	http://www.ridgetownc.on.ca/education/diploma/emd.cfm
Notes	Courses from the first year of this program can be taken as part of the University College of Cape Breton's “First Year in Agriculture at Home” distance education program.	Courses from the first year of this program can be taken as part of the University College of Cape Breton's “First Year in Agriculture at Home” distance education program.	Courses from the first year of this program can be taken as part of the University College of Cape Breton's “First Year in Agriculture at Home” distance education program.	*Careers in Environmental Management are in high demand.

Program Title	Bachelor of Arts/Major in Agricultural Economics	Bachelor of Commerce/Major in Agricultural Business	Bachelor of Science in Agriculture/Major in Agricultural Economics	Bachelor of Science in Agriculture/Major in Agroecosystem Management
Learner Audience	Owner, Future, Worker, Related	Related	Owner, Future, Worker, Related	Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	Other	Other	Other	Other
Program Description	The BA degree provides a liberal education combined with practical training, which leads to jobs in all types of business firms and prepares students for a range of careers in the agriculture industry.	This degree explores all aspects of business, including marketing, accounting, finance, and managing human resources, in the context of the agrifood system.	Agricultural Economics prepares students for careers as economic analysts in the agri-food sector and in public agencies.	This program will help you develop the ability to optimize agricultural production within sustainable agroecosystems.
Offered by	Ontario Agricultural College/University of Guelph	Ontario Agricultural College/University of Guelph	Ontario Agricultural College/University of Guelph	Ontario Agricultural College/University of Guelph
Province/State	ON	ON	ON	ON
Delivery Channels	Classroom	Classroom	Classroom	Classroom
Prerequisites	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	4 years	4 years	4 years	4 years
Starting in	September/January	September/January	September/January	September/January
Learning Outcome	Career areas include: public and private sector economic analysis, Agri-Business management, market research, banking or credit service, commodity brokers, entrepreneurship in the agri-food industry.	On top of their studies in Commerce, Agri-Business Majors look at issues of perishability, health and sanitary regulations, government policies and international trade agreements. Agri-Business graduates find careers in: marketing and research, banking, commodity brokerage, business analysis or management, finance, policy advising, and account management.	This program provides strong training in farm management and in agricultural science for those wishing to work on the farm or in the agri-food sector. Career areas include: public and private sector economic analysts, extension officers, resource economists, commodity analysts, farm credit advisors, managers and entrepreneurs in the agri-food industry.	In Agroecosystem Management, students learn how agricultural practices affect the ecosystem and how to use natural resources in a manner that protects the environment. Career areas include: government agriculture and environment ministries, agriculture industry, ecological consultation, international development.
Result	Bachelor's	Bachelor's	Bachelor's	Bachelor's
Website URL	http://www.uoguelph.ca/liaison/majors/agec.shtml	http://www.uoguelph.ca/liaison/majors/agbu.shtml	http://www.uoguelph.ca/liaison/majors/agec.shtml	http://www.uoguelph.ca/liaison/majors/agma.shtml
Notes		Co-operative Education option available. Students can receive a Certificate of Achievement for their work experiences.		

Program Title	Bachelor of Science/Major in Environmental Biology	Heavy Duty Equipment Mechanics	Agricultural Economics Major/Agricultural Systems Option	Agricultural Economics Major/Natural Resource Economics Option
Learner Audience	Related	Related	Owner, Future, Worker, Related	Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	Other	Other	Other	Other
Program Description	In Environmental Biology, students will gain an integrated knowledge of environmental biosciences that will prepare them for further academic studies and careers in public and private sectors.	Apprentices are employed in dealerships that sell and service off-road equipment, or construction companies and government departments that service and repair their own equipment.	This option is designed to provide students with a broad understanding of the issues and problems in the Quebec, Canadian, and world food, agriculture and environment systems.	This option integrates the biological sciences and resource economics to evaluate environmental policies and resource management.
Offered by	Ontario Agricultural College/University of Guelph	Prince Edward Island Department of Education	McGill University	McGill University
Province/State	ON	PEI	QC	QC
Delivery Channels	Classroom, Lab	Apprenticeship	Classroom	Classroom
Prerequisites	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	4 years	6000 hours	3 years	3 years
Starting in	September	By agreement with employer	September/January	September/January
Learning Outcome	Students achieve an awareness of the social and economic implications of environmental biosciences and be prepared to initiate solutions for a diversity of environmental problems. Career areas include: government, industry or university, research and education, graduate studies, integrated pest management, environmental biotechnology, impact or environmental diagnostics studies.	Certification and apprenticeship training increases the employability of a heavy duty equipment mechanic in PEI. Mechanics learn proper equipment inspection procedures, how to diagnose equipment malfunction, and how to repair, test, clean and maintain equipment.	The agricultural systems orientation is intended to provide students with a broad understanding of the many dimensions of agriculture and food systems, including economic development, international agriculture, and food and agricultural policy.	The natural resource economics option is intended to prepare students for careers in the management of natural resources and the analysis of natural resource problems and policies.
Result	Bachelor's	Diploma - Certificate	Bachelor's	Bachelor's
Website URL	http://www.uoguelph.ca/OAC/env/ugprog.htm	http://www.pei.jobfutures.org/en/frames/OCCS/F1/7312ef_1.html	http://www.agrenv.mcgill.ca/agrecon/agrisys.htm	http://www.agrenv.mcgill.ca/agrecon/agribus.htm
Notes				

Program Title	Bachelor of Science/Major in Agricultural Engineering	Bachelor of Arts in Agriculture/Major in Plant Science	Plant Science Program	Bachelor of Science Program/Major in Plant Science
Learner Audience	Owner, Future, Worker, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Potato, Organic, Other	Potato, Organic, Other	Potato, Organic, Other
Program Category	Other	Plant Sciences	Plant Sciences	Plant Sciences
Program Description	This program integrates engineering fundamentals and branch specialties with the agricultural, biological and environmental sciences.	Plant Science Majors examine soils, soil fertility, botany, field crop production, forage crops, entomology, plant pathology, horticulture, weed science, and plant physiology. The school emphasizes education with a firm foundation in Christian values.	Students are trained in plant production techniques and small business practices in their first year and pursue a specialization in ornamental horticulture, edible horticulture or agronomy in their second year.	Designed to provide graduates with comprehension of methods and ideas of the biological, physical and economic sciences related to plants and crop production.
Offered by	McGill University	Dordt College	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)/Dalhousie University
Province/State	QC	Iowa, USA	NS	NS
Delivery Channels	Classroom, Lab	Classroom, Independent project, Lab	Classroom, On-the-job	Classroom, Lab
Prerequisites	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	4.5 years (for those outside of Quebec*)	4 years	2 years	4 years
Starting in	September/January	September	September	September
Learning Outcome	Academic advisors can help students shape their program to one of the following specialties: Agro-Environmental, Irrigation and Drainage, Information and Computing Technologies, Agricultural Machinery and Buildings, Food and Bio-Processing. Graduates are accredited by the Canadian Engineering Accreditation Board (CEAB).	Plant Science graduates are prepared for further graduate study or for careers in agronomy, pest management, or horticulture. Students acquire expert skills as Agricultural Technicians and tackle important issues in Agriculture from a Christian point of view.	Students will be skilled in problem-solving, diagnostics and whole-system analysis. After completion of the first year, students may apply for the Farming Technology Program. After completion of the second year, students may apply for the Agricultural Technology Program.	Comprehensive skills in all aspects of plant culture including laboratory, greenhouse, nursery and farm, with a major focus on food production.
Result	Bachelor's	Bachelor's	Diploma	Bachelor's
Website URL	http://www.mcgill.ca/agreng/programs/	http://www.dordt.edu/academics/departments/agriculture/program.shtml	http://www.nsac.ns.ca/reg/cal/ty/ps.htm	http://www.nsac.ns.ca/academics/plant.htm
Notes	*Those students entering the program from a high school outside of Quebec must complete the 1 year Freshman program.	Associate, Minor, and Continuing Education options available.		Courses from the first year of this program can be taken as part of the University College of Cape Breton's “First Year in Agriculture at Home” distance education program.

Program Title	Bachelor of Technology (Environmental Horticulture)	Bachelor of Science in Agriculture/Major in Agronomy	Bachelor of Science in Agriculture/Major in Horticultural Science	Bachelor of Science/Major in Plant Biology
Learner Audience	Owner, Future, Worker, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related	Related
Commodity Group	Potato, Organic, Other	Potato, Organic, Other	Potato, Organic, Other	Potato, Organic, Other
Program Category	Plant Sciences	Plant Sciences	Plant Sciences	Plant Sciences
Program Description	Designed for people interested in a combination of technical and advanced level studies in the area of Environmental Horticulture.	The study of agronomy teaches students the balance between the production of safe food and the preservation of the environment.	Core courses deliver a broad background in plant science to prepare the student for in-depth courses involving financial, managerial and physiological aspects of high value crops such as ornamentals, fruits and vegetables produced in a field or controlled environment setting.	This is a science-intensive undergraduate program in Plant Science. Students selecting this program are interested in botanical sciences, applied plant biology or plant biotechnology.
Offered by	Nova Scotia Agricultural College (NSAC)/Dalhousie University	Ontario Agricultural College/University of Guelph	Ontario Agricultural College/University of Guelph	Ontario Agricultural College/University of Guelph
Province/State	NS	ON	ON	ON
Delivery Channels	Classroom	Classroom, Lab	Classroom, Lab	Classroom, Lab
Prerequisites	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	4 years	4 years	4 years	4 years
Starting in	September	September/January	September/January	September
Learning Outcome	Provides students with a sound undergraduate education in environmental horticulture.	Students learn about advances in crop management, agroecology, soil conservation, biotechnology, sustainable agrifood production methods, agricultural ecosystems, and regional and international markets for field crops. Career areas include: crop production and protection, soil and water conservation, product development, crop insurance, sales and marketing, and research.	Career areas include: horticultural product production and marketing, research, technology transfer and consulting, landscaping, technical sales, and greenhouse management. This major is designed to allow students great flexibility to specialize in an area of Horticultural Science or remain broadly focused.	This program allows students to combine courses in basic plant biology with courses in applied plant sciences, including ecology, environmental studies, horticulture and crop science. Career areas include: Plant ecology and management of the environment, Specialized agriculture and food industries, Government regulatory agencies, Nurseries, Parks consulting, Research, Overseas development.
Result	Bachelor's	Bachelor's	Bachelor's	Bachelor's
Website URL	http://www.nsac.ns.ca/academics/programs.htm#btech	http://www.plant.uoguelph.ca/courses/index.html#agronomy	http://www.uoguelph.ca/liaison/majors/hosc.shtml	http://www.oac.uoguelph.ca/learning/learn_bscpb.asp
Notes				

Program Title	Agricultural Sciences Major/Ecological Option	Agricultural Sciences Major/Soils Option	Bachelor of Science/Major in Plant Science
Learner Audience	Owner, Future, Worker, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related
Commodity Group	Potato, Organic, Other	Potato, Organic, Other	Potato, Organic, Other
Program Category	Plant Sciences	Plant Sciences	Plant Sciences
Program Description	The Agricultural Sciences program provides the general scientific and applied background for modern agriculture, with an emphasis on agriculture in its on-farm environment.	The Agricultural Sciences program provides the general scientific and applied background for modern agriculture, with an emphasis on agriculture in its on-farm environment.	The Plant Science Major focuses on plants grown on a field scale (Crop Science) or on a more intensive scale (Horticulture).
Offered by	McGill University	McGill University	McGill University
Province/State	QC	QC	QC
Delivery Channels	Classroom, Independent project, Lab	Classroom, Independent project, Lab	Classroom, Lab
Prerequisites	High school diploma or equivalent	High school diploma or equivalent	High school diploma or equivalent
Duration	3 years	3 years	3 years
Starting in	September/January	September/January	September/January
Learning Outcome	Graduates are prepared for diverse careers in Agriculture and Agri-Business, including Agricultural extension and communications. Students taking the Ecological Option take 18-21 credits in their specialization. Courses include: Principles of Ecology, Soil and Water Quality Management, Weed Biology and Control, and Resource Economics.	The Soils Option is structured differently from the other Agricultural Sciences options. Elective courses include: Soil and Water Quality Management, Hydrology and Drainage, Introduction to Earth Science, Soil Ecology and Management, Soil Genesis and Classification, Soil Physics, Soil Chemistry, Soil Microbiology and Biochemistry.	This program combines comprehensive studies of physiology, production practices and genetic improvements of economically important plants that comprise the major sources of food and environmental beautification today. It involves intensive training in both the basic and applied sciences as they relate to plant science.
Result	Bachelor's	Bachelor's	Bachelor's
Website URL	http://www.agrenv.mcgill.ca/agrecon/ecoagr/	http://www.mcgill.ca/plant/undergraduate/general/	http://www.mcgill.ca/plant/undergraduate/plant/
Notes	Internship Major option available: two internships offered during the summer: the first in industry and the second under the supervision of an agrologist.	Internship Major option available: two internships offered during the summer: the first in industry and the second under the supervision of an agrologist.	

Skills development opportunities begin on the next page…

Program Title	Agricultural Finance Certificate	Animal Care Certificate	Bovine Artificial Insemination	Meat Cutting Certificate Program
Learner Audience	Related	Worker, Related	Owner, Future, Worker	Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Organic, Other	Beef, Dairy	Hog, Beef, Other
Program Category	Agri-Business	Animal Sciences	Animal Sciences	Animal Sciences
Program Description	This program provides training through distance education for those in the agricultural finance and credit management industry.	This self-study certificate program consists of four courses and is intended for people who want to work with companion animals.	This course will develop participants' artificial insemination techniques as well as provide them with a firm basis in herd reproductive management.	This course prepares graduates to enter the wholesale and retail sector of the meat industry.
Offered by	Olds College	Olds College	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)
Province/State	AB	AB	NS	NS
Delivery Channels	Distance education	Distance education	Classroom, Lab	Lab, Practicums
Prerequisites	High school diploma or equivalent	High school diploma or equivalent	None	None
Duration	Contact institution for information	4 courses	4 days	Contact institution for information
Starting in	Contact institution for information	Any date	Last held: February, 2003	Contact institution for information
Learning Outcome	Students must complete a series of courses within the program to receive the certificate. These courses are also open to non-certificate students. The last offered course was the Agriculture Lender's Workshop offered June 2-6, 2003.	This program is designed for animal trainers/handlers, veterinary assistants, office personnel and those working in animal shelters and livestock enterprises. The certificate covers veterinary procedures, anatomy/physiology of farm/companion animals, emergency care, livestock nutritional practices, nutrient deficiencies, feeds and covers, animal diseases and parasites.	This combination of knowledge and skill development will assist participants in optimizing either their own or their employer's on-farm breeding program.	Emphasis is placed on both skill development and increasing speed and efficiency in performing a multitude of tasks.
Result	Certificate	Certificate	Certificate	Certificate
Website URL	http://www.oldscollege.ab.ca/extension/ExtensionCalendar/Distance_AFC.asp	http://www.oldscollege.ab.ca/extension/ExtensionCalendar/Distance_AnimalCare.asp	http://www.nsac.ns.ca/cde/coursedes.htm#noncred	http://www.nsac.ns.ca/cde/coursedes.htm#cert
Notes		The four courses are: Pet/Animal Care; Animal Nutrition; Animal Physiology; and Animal Diseases & Parasites.		

Program Title	Pre-Veterinary Program	Introductory Studies Program	Intersessional Courses	Agricultural Ecosystems
Learner Audience	Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related
Commodity Group	Hog, Beef, Dairy, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	Animal Sciences	General	General	General
Program Description	This program prepares students to apply to a Doctor of Veterinary Medicine program. It provides an emphasis on animals used by people, namely, the animal industries of Atlantic Canada.	The Introductory Studies Program acts as a bridge for students who would like to enter one of NSAC 's programs but lack one or more requirements for admission.	These courses, offered in the summer session, offer students in an academic program the opportunity to obtain credits for courses.	This course is an introduction to agriculture and food systems.
Offered by	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)
Province/State	NS	NS	NS	NS
Delivery Channels	Classroom, Practicums	Classroom	Classroom	Distance education
Prerequisites	High school diploma or equivalent	Evaluation of previous studies and student's maturity.	Enrollment in a degree program	High school diploma or equivalent
Duration	2 years	4-8 months*	Contact institution for information	4 months
Starting in	September	September/January	April-August	September
Learning Outcome	Meet requirements for application to 3rd year of a 4 year Bachelor of Science(with a major in Animal Science or Aquaculture) degree, or to a Doctor of Veterinary Medicine Program.	Courses include pre-university Chemistry, pre-university Physics, pre-Calculus, English and a Resources course, designed to improve academic skills.	Courses offered are dependent on demand, but usually include: Calculus and Analytic Geometry I & II, Introduction to Planned Studies: Surveys and Experiments, and Arboriculture.	The principles of agricultural production as studied in the disciplines of animal science, plant science, agricultural engineering and soil science will be integrated to give a comprehensive view of agricultural ecosystems.
Result	Credit	Credit**	Credit	Credit
Website URL	http://www.nsac.ns.ca/pas/programs/prevet/index.htm	http://www.nsac.ns.ca/cde/coursedes.htm#acad	http://www.nsac.ns.ca/cde/summer_courses.htm	http://www.nsac.ns.ca/cde/dist
Notes	The NSAC boasts a working college farm.	*1-2 semesters **Qualification for an NSAC credit program, does not count as an actual credit towards said program.		This course will not be offered in the 2003/2004 year.

Program Title	Organic Agriculture Courses	Organic Agriculture Courses	Organic Agriculture: Principles and Practices	Basic Farm Welding
Learner Audience	Owner, Future, Worker, Related	Owner, Future, Worker, Related	Owner	Worker, Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Organic	Organic	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	Organic Agriculture	Organic Agriculture	Organic Agriculture	Other
Program Description	Four credit and non-credit web-based courses providing high-level, scientific training in Organic Agriculture.	These courses can be taken for credit or non-credit. Courses offered include: Transition to Organic Farming, Basic Composting Skills, Organic Field Crop Management, Organic Livestock Production.	Designed for those farmers wishing to transition into organic agriculture.	This course teaches practical basic welding skills and provides opportunities for practice.
Offered by	Nova Scotia Agriculture College (NSAC)	Nova Scotia Agricultural College (NSAC)	Institute for Bioregional Studies Ltd./PEI Agricultural Human Resources Council	Nova Scotia Agricultural College (NSAC)
Province/State	NS	NS	PEI	NS
Delivery Channels	Distance education*	Distance education*	Classroom	Classroom, Lab
Prerequisites	High school diploma or equivalent**	For credit students must have a high school diploma or equivalent. Non-credit students need no requirements.	None	None
Duration	4 months***	4 months	6 weeks	2 weeks
Starting in	September/January	September/January	Last held: Tuesday evenings, January-March 2003	Last held: November 2002, February 2003
Learning Outcome	Valuable support for those considering transition to organic production. Learners from varying backgrounds and perspectives will benefit from creative, on-line discussions, current research, and hands-on activities that allow them to practice vital skills.	Students will acquire a broad-based understanding of Organic farming practices through various mediums.	Receive an introduction to organic agriculture, learn about criteria to be certified organic, transition to organic agriculture, ecological practices of organic agriculture, and participate in an evaluation of farm practices according to organic standards.	Participants will be able to do basic welding repairs, fabrication and maintenance work.
Result	Credit	Credit	Certificate	Certificate
Website URL	http://www.nsac.ns.ca/cde/courses/oacc/organicindex.htm	http://www.nsac.ns.ca/cde/courses/oacc/organicindex.htm	http://www.gov.pe.ca/af/agweb/hr_dev_council/aghrdccourse.php3	http://www.nsac.ns.ca/cde/coursedes.htm#noncred
Notes	*Via Internet. **Per course. ***Non-credit courses have no entrance requirements and no grades are issued.	Students must have technical requirements (computer and internet access) to register. *Via Internet, Video, Practicums, Manuals.		

Program Title	Repair and Maintenance of Hydraulic Systems	Farm Equipment Mechanic Apprenticeship Program	Food Security	Agricultural Economics
Learner Audience	Owner, Future, Worker, Related	Worker, Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	Other	Other	Other	Other
Program Description	This four-day practical course prepares participants to make basic repairs and complete preventative maintenance on hydraulics systems of farm, forestry and ground maintenance equipment.	This four-year, block-release program is a nationally recognized Red Seal Inter-Provincial Certificate Program. Apprentices attend a five week institutional training program each year.	This course is designed to provide students with a knowledge of the application of science to agriculture, with a focus on food security and recycling resources.	A comprehensive, principles of microeconomic theory course with emphasis on the economics of the agri-food industry and resources in an international context.
Offered by	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)
Province/State	NS	NS	NS	NS
Delivery Channels	Classroom, Practicums	Apprenticeship, Classroom, Lab	Distance education	Distance education
Prerequisites	None	Completion of previous block.	High school diploma or equivalent	High school diploma or equivalent
Duration	4 days	4 five week blocks (1 per year)	4 months	4 months
Starting in	Contact institution for information	Last held: February-March 2003	January	September
Learning Outcome	Experience with hands-on shop work in making basic repairs and preventative maintenance.	Program content for Year I includes mathematical calculations, workplace safety issues, general operation of tools and equipment, basic hydraulic and engine systems, and maintenance & repair of cultivating equipment.	Students will have a greater understanding of the integrated nature of agriculture and food systems in both regional and global contexts. Topics will include global population, food production and distribution; globalization of agricultural trade; agricultural ethics; and rural sustainability.	Microeconomic theory studied will consist of: the market system, producer and consumer theory, environmental and resource policy, agricultural and international trade policy.
Result	Certificate	Certificate	Credit	Credit
Website URL	http://www.nsac.ns.ca/cde/coursedes.htm#noncred	http://www.nsac.ns.ca/cde/coursedes.htm#cert	http://www.nsac.ns.ca/cde/dist	http://www.nsac.ns.ca/cde/dist
Notes				

Program Title	GIS Applications Post-Diploma Certificate Program	Welding Levels I & II	Agriculture Industry Computer Training Courses	Farm Vehicle Training Courses
Learner Audience	Worker, Related	Worker, Related	Owner, Future, Worker, Related	Worker
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other
Program Category	Other	Other	Other	Other
Program Description	Using the latest in GIS technology graduates will collect, store, and manipulate geographic information from a variety of diversified field examples.	Learn to use basic hand and power tools, and perform gas, metal, and arc welding.	Designed for those in the agriculture industry wishing to acquire basic computer and Internet navigation skills.	Aimed at those interested in driving Farm Trucks or attending Air Brake Clinics.
Offered by	Ridgetown College/University of Guelph	Holland College/PEI Agricultural Human Resources Council	Student Connection Program (Holland College)/PEI Agricultural Human Resources Council	PEI Agricultural Human Resources Council/Commercial Safety College
Province/State	ON	PEI	PEI	PEI
Delivery Channels	Classroom, Independent Project**	Classroom, Lab	Classroom, Distance education, Lab	Classroom, Practicums
Prerequisites	Diploma or Bachelor's*	Must successfully complete Welding Level I to register for Welding Level II, or have prior experience.	None	Pre-screening and medical certification may be required.
Duration	8 months	6 weeks (Level I), 5 weeks, (Level II)	3 hours (per course)	3 weeks (Class 3A), 1 day (Airbrake Clinics)
Starting in	September	Last held: January-February 2003 (Level I), February-March 2003 (Level II)	Last held: January, 2003	Last held: January, February, March 2003
Learning Outcome	This program will teach the GIS tools needed to succeed in an information age in the agricultural, environmental and government sectors, utilizing data to produce specialized reports and recommendations. Career areas include: GIS Field Technician, GPS Specialist, GIS Analyst, GIS Field Data Specialist, Precision Ag Specialist, Site Specific Farming Manager.	Know how to perform gas, metal and arc welding (GMAW) using carbon steel. Learn to cut, gouge, braze, and solder. Learn about design of welding units, positional welding, and welding environmental issues.	Courses offered include: Buying a Computer, Computer Basics, Introduction to the Internet, Electronic Mail, Dissecting the World Wide Web, and Microsoft Excel Introduction. Students acquire the technical know-how to remain competitive in an increasingly computer and Internet reliant market.	Class 3A/Straight Truck Upgrading: qualification to take the Class 3A Driving exam. Airbrake Clinics: proficiency in using farm vehicles with air brakes.
Result	Certificate	Certificate	Certificate	License*
Website URL	http://www.ridgetownc.on.ca/education/post_diploma/gis.cfm	http://www.hollandcollege.com/ContinuingEducation/ContinuingEd.htm	http://www.gov.pe.ca/af/agweb/hr_dev_council/aghrdccourse.php3	http://www.gov.pe.ca/af/agweb/hr_dev_council/aghrdccourse.php3
Notes	*Work experience and/or a portfolio may be required. **Work experience opportunities available.	Funding may be available through skills development or part time student loan.		Funding may be available through skills development or part time student loan. *License is only for the Class 3A, not for the Air Brake Clinic.

Program Title	Environmental Impact Assessment (EIA)	Food Processing Technology	Farmer Pesticide Certificate Home Study Course	Pesticide Applicators and Dispensers Certification
Learner Audience	Related	Related	Owner, Future, Worker, Related	Owner, Future, Worker, Related
Commodity Group	Hog, Beef, Dairy, Potato, Organic, Other	Hog, Beef, Dairy, Potato, Organic, Other	Potato, Organic, Other	Potato, Other
Program Category	Other	Other	Plant Sciences	Plant Sciences
Program Description	This program is aimed at enhancing the knowledge and effectiveness of decision makers and managers who in their professional lives deal with various aspects of environmental impact assessment.	This program combines practical understanding of food processing with the technical and scientific information that is required to successfully operate modern food processing plants.	This course teaches the proper safety precautions of using potentially harmful chemical pesticides.	Designed for those wishing to acquire a Pesticide Applicator/Dispenser licence or re-licence.
Offered by	University of McGill	University of McGill	Olds College	Assiniboine Community College/Manitoba Agriculture
Province/State	QC	QC	AB	MB
Delivery Channels	Classroom	Classroom, Lab, On-the-job, Practicums	Distance education	Distance education*
Prerequisites	None	High school diploma or equivalent	None	High school diploma or equivalent
Duration	10 days	8 months	Contact institution for information	Contact institution for information
Starting in	Last held: May 26-June 6, 2003	January	Any date	Contact institution for information
Learning Outcome	By exploring topics linked to the real world issues in EIA in detail through keynote speakers, guided seminars, and case study practice and analysis, those individuals participating in the EIA executive development program will be exposed to the latest developments in the field.	Collège d'Alfred guarantees at least a job offer upon the completion of the certificate or will reimburse tuition fees. Career areas include: Production Supervisor, Quality Control Technician, Production Coordinator, Raw Material Inspector, HACCP Coordinator, Sanitation Coordinator, Formulation Assistant, Quality Control Inspector, Sales Representative, Inspector, Laboratory Assistant.	This homestudy course contains a course manual, study guide and videotape and is available anytime throughout the year.	Pesticide certification is offered in the following areas (incomplete list*): seed treatment, stored agricultural products, agricultural ground, structural, livestock products. All candidates must pass a Pesticide Core certification exam (customized for the specific type of work) to be eligible for a license.
Result	Certificate	Certificate	Certificate	License
Website URL	http://www.agrenv.mcgill.ca/conted/eia/	http://www.tta.alfredc.uoguelph.ca/english.html	http://www.oldscollege.ab.ca/extension/ExtensionCalendar/Distance_FPC.asp	http://www.assiniboine.net/public/old/distance/files/debrochure.PDF
Notes				*Different courses will use a combination of media-- Internet, print-based course package or text, teleconference, tutorial support, audio and video.

Program Title	Arboriculture	Atlantic Certified Crop Advisor's (ACCA) Training	Pesticide Certification Courses	Weed ID & Management in Agricultural Systems
Learner Audience	Future, Worker	Owner, Future, Related	Owner, Future, Worker, Related	Owner, Future, Related
Commodity Group	Organic, Other	Potato, Organic, Other	Potato, Other	Potato, Organic, Other
Program Category	Plant Sciences	Plant Sciences	Plant Sciences	Plant Sciences
Program Description	This is a modular course on arboriculture theory and practice. Theory topics include the growth and anatomy of trees, principles and standards of pruning, tree assessment and maintenance.	This course is intended as intensive training for those undertaking to write the ACCA exam, but is of interest to anyone incorporating better management practices into crop production.	This series of courses provides the necessary training for obtaining certification and re-certification as a Pesticide Applicator in Nova Scotia.	This course, intended for producers and agricultural advisors in the Atlantic region, provides an update on weed control techniques in various crops as well as an opportunity to improve weed scouting abilities.
Offered by	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)	Nova Scotia Agricultural College (NSAC)
Province/State	NS	NS	NS	NS
Delivery Channels	Classroom, Lab	Classroom	Classroom	Classroom
Prerequisites	None	None	None	None
Duration	Tues throughout September season	2 days	1-4 days	3 days
Starting in	September	January	Pesticide Certification was last held: November 2002, April 2003	Last held: February 2003
Learning Outcome	Participants will receive valuable theoretical knowledge as well as practical training in tree climbing, equipment and techniques, safety and aerial rescue, pruning, rigging and large limb removal.	The course will cover four major areas of competency: Soil Fertility, Soil & Water Quality, Integrated Pest Management, and Crop Production.	Knowledge of the safe use, handling and storage of pesticides, information on the current legislation, the ability to do calculations, information on pesticide types, integrated pest management techniques, and up-to-date refreshers on current trends in pesticide management.	Prepares producers and agricultural advisors with up-to-date weed management information.
Result	Certificate	Certificate*	Certificate*	Certificate
Website URL	http://www.nsac.ns.ca/cde/coursedes.htm	http://www.nsac.ns.ca/cde/courses/acca/index.htm	http://www.nsac.ns.ca/cde/coursedes.htm#noncred	http://www.nsac.ns.ca/cde/coursedes.htm#noncred
Notes	Participants will be taking the course along with students from the Environmental Horticulture program at NSAC.	*Upon successful completion of ACCA exam.	Courses include: Pesticide Application Technology for Farmers, Pesticide Certification, and Pesticide Management Update for Farmers. *Or Re-Certification points.	

Program Title	Nutrient Management Planning Course	Seed and Grain Technology Post-Diploma Certificate Program	Continuing Education Units for Certified Crop Advisors
Learner Audience	Owner, Future, Worker, Related	Related	Related
Commodity Group	Potato, Organic, Other	Other	Potato, Organic, Other
Program Category	Plant Sciences	Plant Sciences	Plant Sciences
Program Description	The course will teach the basic concepts of Nutrient Management Planning in a lecture format, and address local applications and issues within the Atlantic region.	Build on your agriculture diploma in this new program that offers specialized training in the production, quality assessment and marketing of seed and grain.	This is a series of short Professional Development courses for Certified Crop Advisors
Offered by	Nova Scotia Agricultural College (NSAC)/Eastern Canada Soil and Water Conservation Centre	Ridgetown College/University of Guelph	University of McGill
Province/State	NS, NB	ON	QC
Delivery Channels	Classroom	Classroom	Classroom
Prerequisites	Bachelor's in Science or equivalent	Diploma or Bachelor's in Agriculture, or 5 years work experience	None
Duration	5 days	4 months*	1-4 days
Starting in	Last held: March-April 2003, Fall 2003	January	September/January
Learning Outcome	Part of an initiative to implement environmental farm planning across the country through the development of formal nutrient management frameworks and standardized training of nutrient management planners.	Course curriculum focuses on the seed and grain industry, grain processing and handling, pedigreed seed production, and seed analysis and conditioning. Career areas include: Seed Cleaning Plant Operator, Farm Service Centre Assistant, Seed Company Representative, Field Research Technician, Field Inspector, Seed Producer.	Courses consist of a series of lectures by experts in the field. Courses offered are: Advanced Soybean Production, Weed Seedling Identification, Weed Management, Disease & Insect Management, Certified Crop Advisor Pre-Exam.
Result	Certificate	Certificate	Credit
Website URL	http://www.nsac.ns.ca/cde/NMPBrochure.pdf	http://www.ridgetownc.on.ca/education/post_diploma/sgt.cfm	http://www.ridgetownc.on.ca/education/Professional/index.cfm
Notes		*This program can also be taken on a part-time basis for up to several years	