PART III

Report of the Preliminary Farmer Survey and Statistical Review

Agriculture in Kings County:
Real Values and Real Progress

Kings County Soils and Agriculture Committee and GPI Atlantic

Report of the Preliminary Farmer Survey and Statistical Review

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1. Preface

Economic Growth -- an inadequate measurement of well-being

Our growth rates make no distinction between economic activity that creates benefit and that which causes harm. More crime, more pollution, more accidents, more sickness, more natural disasters all make the economy grow, simply because more money is being spent. In fact, sickness is far better for the economy than health, because sick people cause more money to be spent on doctors, drugs and hospitals. The *Exxon Valdez* contributed far more to the U.S. GDP by spilling its oil than if it had delivered its oil safely to port. And the Littleton Colorado massacre fueled the economy by forcing schools to invest heavily in video surveillance equipment and security guards.

While our economic growth measures count many harmful things as "progress," they completely ignore genuine contributions to well-being, like voluntary work, simply because money is not exchanged. If we hire a stranger to look after our child, the economy grows. If we care for our own child, it has no value in our current measures of progress.

The economy can also grow even while inequality and poverty increase. It grows if we work longer hours: free time has no value in measures of progress based on the GDP. The economy even grows if we produce shoddy goods that have to be replaced more often; and it grows if we produce more waste. Scientists warn that the only biological organism that shares the economic dogma of limitless growth is the cancer cell.

Genuine Progress Index -- a people-centred measurement of well-being

Economic growth rates are an inadequate and misleading measure of well-being and prosperity. Fortunately, there are better ways of measuring progress. The Genuine Progress Index (GPI) assesses the health of our natural resources and environmental quality; it assigns explicit value to *unpaid* as well as to paid work; and it counts sickness, crime, pollution, and greenhouse gas emissions as costs not gains to the economy. Unlike the GDP, in which "more" is always "better," less crime and less pollution make the GPI go up. Greater equity and more free time make the GPI go up, as does greater livelihood security, better health, and improved educational opportunities.

The Genuine Progress Index can be a more accurate and comprehensive measure of progress than we currently have. It has the potential to change the policy agenda to reflect social, environmental, and long-term concerns.

At present we have no way of knowing whether we are really leaving the world a better place for our children or not, or of knowing whether we are better off now than we were 20 years ago. Certainly we have more "stuff," -- more cars, more home entertainment equipment, bigger houses. But if we are concerned about the natural world our children will inherit, about the strength of their communities, about their health and security, we need better measures of progress. The GPI is dedicated to that task.

GPI in Kings County Agriculture

We currently gauge our well-being and prosperity according to economic growth rates. The more we buy and sell, the more rapidly the economy will grow, and the "better off" we are assumed to be. The more fish we catch, the more fossil fuels we burn, the more rapidly we deplete our natural resources, the faster the economy will grow. The question is, are we as a society "better off" in the long run?

We need to step back and ask ourselves what our goals and aspirations are; what makes us happy; what makes our work meaningful and our farms viable; and what makes our communities healthy? When we know what things really improve our well-being, we can use them as new indicators of progress.

> "Measured in such terms as employment growth and population increases, Kings County has had the best performing economy of any rural area in Nova Scotia over the past 5-15 years" (Robinson, 1999).

It is good that Kings County has a strong economy, but it is also important to make sure that the economy is functioning in a way that allows citizens to realize their most important goals. Quality of life factors into the equation. For example, we want employment, but also work satisfaction and reasonable income levels. We have begun the process of measuring whether the growth in agriculture over the last 5 to 15 years is helpful to peoples' lives and ecologically sustainable in the long term.

Process
A committee of farmers and agriculture-related volunteers in Kings County developed a questionnaire that was used to gather information. A small sample of twelve farmers on eight farms was interviewed to get an idea of priorities and trends. Here is a summary of some highlights from the report for discussion.

An Invitation
Some of the indicators presented below are initial suggestions: we invite you to think of ways to improve them. We also report on some possible trends. We invite you to assess what progress you think has been made in these areas. Hopefully this report will be useful for discussions in farming circles, as well as for the general public, who may not be aware of the hidden benefits and costs associated with agriculture.

Some Highlights for Discussion: Indicators and Trends
If farming truly viable, it will be successful in the long run. Viability is often equated with gross farm receipts, but we know it is based on much more. For example, viability is based on experience and knowledge, fair compensation for work, fair prices for farm products, understanding relationships with neighbours and consumers, work satisfaction, a vibrant local economy, soil quality, and ecological balances.

Indicator: experience and knowledge
Participating farmers had an average of 29 years of farming experience, with a total of 233 years to draw on. This knowledge base is a valuable asset to agriculture in Kings County. However, the average farmer is getting older and there are fewer and fewer younger farmers who are willing to farm.

Indicator: fair compensation for work
Farmers undervalue their labour. On the farms that were able to estimate it, the value of unpaid labour is significant, with an average of $57,800 per farm. Also, most of the participating farmers indicated that the level of income they are getting is not enough for the work and investment they are putting in. Farmers appear to operate on narrow margins and even if their gross income has increased over time, relative expense levels are higher, which leads to a net decrease in income.

Indicator: fair prices for farm products
Few farmers thought that they receive a fair price for their produce. Some of the farmers who do receive a fair price have eliminated the middleman and deal directly with consumers.

Indicator: understanding relationships with neighbours and consumers
The farmers we interviewed do not think they are respected by the rest of society. Some growers have worked to develop good relationships with consumers and increase understanding of farming.

Indicator: work satisfaction
While most of the participating farmers do not think they get a fair price for the products, or a fair return on their investment, or are well-respected by the rest of society, most of those interviewed are still quite satisfied with their work. They appear to have chosen farming as a vocation, not just a job. Some find the challenge exciting, or their connection with animals a motivating factor. The other factors that appear to be related to farmers' satisfaction with their work are their active involvement in soil improvement and a direct connection with consumers.

Indicator: a vibrant local economy
Everyone we interviewed was very conscious of the importance of supporting the local economy by buying farm supplies and machinery within the county. Farms and farm-based industries employ a significant amount of people. This activity supports a vibrant local economy.

Indicator: soil quality
Some positive trends (among interviewed farmers) with regard to soil quality include (1) increased awareness of the importance of soil quality; (2) increased action to maintain soil organic matter; (3) increased use of composted manure as a soil amendment; and (4) slight increases in soil-building rotations. Some other trends are (1) increased intensiveness of cultivated crops and (2) high risk of soil erosion in some areas.

Indicator: resilience
The ability to recover from stresses such as pest attacks, drought, or plummeting commodity prices is a measure of resilience. For example, the fact that IPM was developed and applied in Kings County is a positive trend. A study by Robinson (1999) indicates that Kings County agriculture is perhaps more resilient than other agricultural counties is also a measure of success.

In summary, the GPI Soils & Agriculture Survey has developed a number of suggested new indicators that could help the farmers of Kings County assess if genuine progress is being made in their sector. Further discussions with farmers and farm organizations are critical to developing and using indicators that better reflect the values of farmers in Kings County.

2. Introduction

The ideas, thoughts, goals, and innovations of the 12 farmers we spoke with about sustainable agriculture will be presented along with a preliminary review of other available information on Kings County agriculture. This information should

- provide a basis for developing new indicators of progress in the county
- present preliminary data on some of those indicators
- give readers an idea of some of the hidden benefits and costs associated with agriculture in the county
- profile some innovative practices and ideas
- redefine progress according to farmers' suggestions and present new ways of measuring progress

This report is not final, complete, or definitive. Think of it as an invitation to step off the treadmill and on to the dance floor. Experiment with new steps, or simply step back and assess what is most important in farming life. If we want farming to remain an integral part of county life in the long run, we need to find out what our priorities are and emphasize those. At the same time it is important to minimize risks to farm viability, community, and ecological balances.

At the end of each section, a summary table of indicators will be presented, with details of the indicator and tentative progress marks. A sample is given below:

Summary of the suggested GP indicators

Indicator	Details	Potential Value	Progress
e.g. water quality	Surface water quality on farms	-avoids expensive clean-up	D
e.g. soil OM	Average levels above 3.5% are sought	-source of N ($1/kg) -reduces drought stress	C
e.g. price of food	Price at farm gate should ensure ~ 10% return on investment	-improves farm income -allows for investment in soil quality	D

Progress marks (can be left blank to be filled in by readers):

A achieved maximum progress
B indicator with positive results, some room for improvement
C indicator with net neutral results
D indicator with negative results (decreasing levels over time); lots of room for improvement

3. Profile of Interviewed Farmers

The sample of farmers was carefully chosen to include a number of different farm types that exist within the county (Table 1). The last census in 1996 indicates that there are 707 farms in Kings County. Our sample is not at all representative as it includes just over 1% of County farms. It was also important to include small and large farms; diversified and specialty farms; conventional and organic farms; and to speak with both men and women.

Table 1. Profile of Interviewed Farmers

Farm	Years of expe-rience	Size of farm (acres)	Items sold from farm	Farm category	% of farms in County with similar category (1996)
A	47	400	hay, apples, some pulp wood (presently stopped farming)	fruit	20
B	28	28	garlic (organic)	vegetable	9
C	42	800	carrots, onions, peas, chicken and turkey broilers, grain	poultry	11
D	30	40	apples	fruit	20
E	6	50	breeding stock: sheep, cattle, pigs, and chickens (partly organic)	misc. specialty	14
F	38	309	milk, beef, grain	dairy	8
G	30	250	grain, pork, beef	hog	7
H	12	175	beef, vegetables, berries, grain & hay (certified organic)	beef	18

The interview process required a serious commitment on the part of the interviewers and the farmers being interviewed. Each interview took from two to four hours of focused attention. Half of the farmers approached to do the interview refused because of time constraints and a reluctance to share personal information publicly. Contacting farmers, explaining the purpose of the questionnaire and the concept of Genuine Progress also took more time than anticipated.

It was critical to start with a small sample in order to have the in-depth conversations needed to embark on this work properly. Farmers we spoke with have a better understanding of GPI and a stake in its development . Feedback from farmers who were interviewed was positive.

Observations:
1) Participating farmers had an average of 29 years of farming experience, with a total of at least 233 years of experience to draw on. This potentially reveals something about the knowledge base present in the farming community. We assume that an increase in total years of experience in a farming community would be one indicator of real progress. Experience has a great deal of value, given that inexperienced farmers will suffer productivity losses associated with mistakes made as they learn how to farm. Years of experience is also of value for teaching new farmers. Many new farmers draw on the experience of seasoned growers; an important and valuable service.

Summary of the suggested GP indicators

Indicator	Details	Potential Value	Progress
Work/Employment Capacity (people power)			
Years of farming experience	potentially reveals something about the knowledge base present in the farming community	-avoid productivity losses -resource for teaching new farmers	Not presently measured

4. Priorities of Interviewed Farmers

We asked a number of questions in order to get a sense of what indicators farmers use to judge real progress. The comments are presented here to form the backbone of the report, and highlight what indicators of progress should be chosen.

Question: *Can you give examples of things that improve (or would improve) your quality of life on the farm?*

Four of the eight farmers responded that it would be important to get a fair return or value for their products. Two of those also mentioned that it was important to get a better return on investment. One grower explained that "margins are very small, there's less money for the investment. You have to mesh everything together and gain small efficiencies in order to compete. We employ fewer people as a result."

Another priority was the need to increase leisure time, have a vacation, or have the time to farm and do other things too. Three growers also mentioned that they'd like to get better equipment (without specifying exactly what equipment).

Question: *What would agricultural progress in the future look like for you? Can you describe it?*

Response: Obviously this question hasn't been asked enough. It was not an easy question for growers to answer. The responses are diverse and insightful:

More mixed and small farms. Less government money into big operations, more emphasis on human values.

\Initial cynical comment: "Let the fields grow back into forest." More small farms; increased appreciation of local products; a global minimum wage. [perhaps a global minimum wage would increase appreciation for local products because the imported items would be so much more expensive]

Preservation of smaller farms and keep farmland for farming. It would also be good for farmers to get together to grow 'common crops' so they can co-operate on learning about it and sell it together.

Fruit growing should be a field that people want to get into, that they could make a good living at. It shouldn't matter what size the farm is. Orchards should be more like a forest with diverse varieties. The priority for the government should be to feed our own people. We should be more self-sufficient and have the ability to help other countries too.

A chemical free [assume less synthetics] society would be nice. It would take 10 years if we started now. We would see farmers learn how to farm again; how to read the soil and the seasons instead of conquering the land with fertilizer and pesticides. We should have more diverse crops and products. We would have more people moving to the land. More farmers would look inward than outward for progress on the farm.

He would like to be an example for others who want to farm the way he does, by developing a self-sustaining ecosystem.

We would produce without as many chemicals. Family farms would be more important. Corporate farms don't have the same sensitivity to the land. They don't put back what they take out. Regarding land use, we should learn to live with the development taking place along the 101 corridor and make sure that it doesn't stray into agricultural land away from the highway.

Rejection of GMOs, advancement of organic agriculture. More direct marketing would be nice. It's no good to have more farmers if the whole exercise is futile; we need to have a reason for farms. We're not going to change it all quickly and we have to be practical.

Question: *What has changed for the better on your farm / in your community over the time you have been farming?*

On the farm…
On the farm I am starting to see progress for my efforts and I've learned to more readily accept lack of progress. I want to enjoy it more and not stress everyone else out about it.

Because of the farmers' long-term detailed records, he can see the overall benefits of what he's doing.

There's more awareness of the work we're doing to promote heritage breeds and keep the diversity of the gene pool. Word is spreading.

(1) The use of no chemical fertilizers; (2) like to see the cows outside; (3) the Department of Agriculture used to laugh in your face when you said you were going chemical-free. They don't any more. This has changed for the better.

The level of productivity has increased dramatically [i.e. the cost per unit has gone down]. Stewardship awareness has improved. Farmers are more conscious of taking care of the land than before.

Nipple drinkers that replaced bowls for watering (stupid) poultry have made a big difference. Farm technology is far better. You can farm more land, but this requires more investment and you have to pay the bank.

Not much has changed for the better.

In the community…
In the community I see a heightened sense of awareness about what the issues are. People aren't doing anything about it yet, but at least they are aware; they are not blind.

hey paved the road the farmers live on.

Question: *What has changed for the worse on your farm / in your community over the time you have been farming?*

Response:
On the farm…
Technology has undermined health. Farmers are more sedentary.

One neighbour is spraying fungicides.

Skidoos and ATVs; people leave beer cans at fishing spots on the farm.

"Taking a job has taken me away from the farm. [If I hadn't taken the job] the farm would have been better off but the family would have suffered. The soil, animals, and garden haven't gotten any worse, but they could have been better. But if I'd been here full-time, the house would have been a shambles; the family in disarray.

In the community…
The number of producers has decreased by 50%. Farms are bigger in order to survive.

There are more houses nearby; land use is neglected; some of the unused land has grown over.

There are not many farmers left in the neighborhood. Some have retired, others have gone into other businesses. The restrictions on the sale of farm land have caught these farmers between a rock and a hard place. They can't sell lots from their property for non-agricultural development. They would have to sell a big enough piece so that it would be kept in agriculture. So it's impossible to raise any capital from the sale of property. Given this farmer's disability, this restriction makes it impossible to relieve their financial distress and they're stuck.

Farmer doesn't spread manure in Grand Pré near residences because of sensitivity to community concerns. Last year, farmers were blamed for excess numbers of flies. The Department of Agriculture assisted in resolving the issue by identifying where the breeding grounds were. Herman had to clean out his calving barns every two weeks.

You need to lock the doors when you leave the farm because of local break-ins.

There's less community spirit. There are many people moving in to the area with non-farming backgrounds who don't share the same values as local farmers.

There is a certain vagueness and lack of personal ideals in the community. Bigger is not better in the community.

We've lost out community hospital and our sense of community. We don't know the neighbours like before.

The post office and community school are gone. It's pretty desolate at night.

We've lost the school and the general store as well as the post office. It used to be that everybody knew everybody. The only thing that holds the community together is the church.

"In the community I see that kids in school are not in as good shape financially, nutritionally, and attitude-wise as I was when I was at school. Good kids really stand out these days. Before, they were the norm."

Young peoples' attitudes have changed and they have no respect.

Summary of the suggested GP indicators

Indicator	Details	Potential Value	Progress
Work/Employment Capacity (people power)			
Increase number of farms of manageable size	Many growers mentioned this one, although it is important that the increase in farms is accompanied by good reasons for them to be there.	-improve farming infrastructure, farm related jobs and business opportunities -increase farm knowledge base -increase options for co-operation	C or D
Increase leisure time for farmers	Balance farm work and other interests to preserve health and happiness of operator and family	-prevents accidents and ill-health -allows time for R&D, long-term projects	?
Improved health of farmers	Determined by a health survey?	-reduced health care costs -improved quality of life -fewer sick days	?
Increase opportunities for learning about ecological agriculture	This could involve farmer mentorships and apprenticeships, courses, collaborative research etc.	-improve knowledge-based opportunities for reducing costs and improving productivity	C

Indicator	Details	Potential Value	Progress
Return on Investment (Economic Capacity)			
Fair return for food products	Price at farm gate should reflect real value of food, real value of work	-improved farm income -nutritional quality	D
Increase consumption of locally-produced food	"Feed our own people". At this point about 10-15% of Nova Scotians' food budget is used to buy locall-produced food. Should we strive for 50%? 60%?70%?	-an increase to 50% would create ~58,000 jobs and increase gross farm receipts by 1.5 billion -reduced fossil fuel use for transportation	D
Increase diversity of crops and products	Kings County produces the most diverse mix of food crops and products east of southern Ontario	-better opportunities for rotation -increased economic resilience	B
Increase opportunities for direct marketing	For example, farm gate stands and stores, farmers markets, and weekly local delivery businesses could be developed. Presently more than a dozen Kings County growers sell direct at the Halifax Farmers' Market, and other sell at farmers markets within the county.	-higher net returns for farmers -fresher products for consumer -improved small business opportunities -improved opportunity for consumer awareness	C/D
Increase appreciation of local food products	This would also likely improve relations between farmers and non-farmers as well as possibly improve demand for locally grown food	-reduce pollution associated with transporting goods long distances -improve nutrition of people who eat fresher food -increase number of local jobs	See NSDAM market-ing studies
Resource Base/Capacity and Environmental Quality			
Use of quality farmland for farming	This is not a universally agreed-upon indicator. Other options are needed for farmers who need income for retirement.	-the cost of converting houseland back to farmland is beyond the measurable -good farmland is a finite resource, therefore the tolerance threshold for using it up is very low, making it valuable	?
Increase number of farms with self-sustaining ecosystems	See case study by Jannasch et al, 1999 in later section.	-reduce costs associated with off-farm inputs -increase recycling of nutrients -reduce pollution associated with nutrient overloading	D
Reduce synthetic chemical inputs	This would require concerted research efforts such as the IPM work in Kentville, which requires some long-term investment	-reduce clean-up costs associated with spills and overloading -reduce farm input costs (?) -reduce costs associated with transportation and manufacture of synthetic inputs	C-D
Increased productivity	Cost per unit produced is reduced over time -- meanwhile maintaining (or improving) the productive capacity of the resource	-improved farm income if price of product doesn't fall	C
Improved stewardship of the land	Indicated by …. Less erosion, increased soil organic matter, more discussion groups…	-improved water quality -fewer clean-up costs -fewer soil remediation costs	C/B
Diverse orchards	"Orchards should be more like a forest with diverse varieties". Another farmer mentioned the need for 'deep-rooted' varieties of fruit trees to reduce drought stress.	-fewer losses from drought -increased aesthetic quality (& opportunities for tours etc) -disease/pest resistance	D

Indicator	Details	Potential Value	Progress
Organizational Capacity & Community Infrastructure			
Increased co-operation between farmers	Examples discussed were -trading land to improve rotations -sharing equipment and knowledge -marketing common crops to deal with centralized buyers	-reduces expensive duplication -reduces competition that drives prices down -reduces isolation -improves soil quality	C-B
Increased community spirit in rural areas	Indicated by more activities in the evening, more volunteers available for events, more socializing, less violence and crime	-reduced costs of crime -increased quality of life -less isolation and need for other entertainment	D
Maintained or improved rural infrastructure	Indicated by local schools, health centres, post offices, stores and other businesses	-reduced need for vehicles and driving -more local jobs	D
Increased respect for farmers and farmers' land	Indicated by asking permission to go on land, not littering, less vandalism, fewer nuisance complaints.	-intangible values of having better self-esteem and fewer conflicts	D

Values associated with farming that are not counted by society

Introduction: Often the farming sector provides 'non-tradeable' public benefits that are not counted or recognized by society (until the farms are gone). They should be made obvious in order to make better planning and policy decisions.

Question: *In your opinion, what are the most important values associated with farming that are generally not counted or recognized by society?*

The responses indicate many important values along with some of the frustrations associated with the gap in understanding between farmers and non-farmers:

"Quality of life; living close to nature; having space and independence; country way of life. Also, a feeling for the land and your own stewardship of the land."

Working close with nature; building something you can see; longer-term view.

Farmers are taken for granted. Land is not respected by non-farming people (like snowmobilers driving across farmers' fields).

Society doesn't recognize the work, risk, and costs to the farmer. It's the middleman that gets the raise.

"People don't understand that farming is part of survival. They don't understand the time and hard work involved, or the pride a farmer takes in his or her work."

Farmers are feeding society without being financially compensated for the work that goes into it. This work is not recognized by society.

People in society should be more willing to ask 'what can I contribute?'

"There is not enough knowledge in society about the cost, investment, and risk involved with farming. Maybe if the trucker's strike [at the NB/NS border] had gone on for a few more days, consumers would become more aware of the importance of local farms."

In the past, farmers have had a means of looking within themselves. Some things we don't seem to have anymore are problem-solving, critical thinking, self-reliance, and self-worth. Farmers are losing their knowledge of the land. It's all consultants now.

One value that's not counted is that if a person gets stuck, it's a farmer that gets called to pull that person out.

Summary of the suggested GP indicators

Indicator	Details	Potential Value	Progress
Work/Employment Capacity			
Unpaid labour	See section on work/employment	- estimates range from $15,000 to $60,000 per farm	Not currently measured
Problem solving and critical thinking	It would be difficult to measure, but important nonetheless	-improved ability to be an effective citizen - reduced need to pay for outside help	?
Resource Capacity and Environmental Quality			
Ability to live close to nature and learn from it	It was mentioned that farming allows you to see more directly the consequences of your actions	- development of skills and perception - science classroom/teacher - no need for 'therapy'??	B

Source of pride

Introduction: This was one of the most important questions in the interview because it shows how important it is for this group to have concrete accomplishments despite all the challenges they face. Certainly this is an indication of the creativity and resilience of the people who are farming now. The comments below are taken from interview notes and speak for themselves.

Question: *Is there anything about the farm you are particularly proud of? Several things? List and short description.*

Responses:

"When I came into the farm, there was nothing much there except it had enough diversity in terms of soil types and it was all put together [the land is not scattered about]. The farm has started to respond to organic principles, and it's been a long slow process. When strict organic principles are applied -- no cutting corners -- and I take the time needed, I start to see the results. I have enthusiasm that a lot of farmers are losing. Another thing that was good is that my father delivered this to me at a good price. Also, I have a patient wife. People told me to stop. But I persevered, my Dad persevered. Now, finally, it is starting to pay off."

This is a heritage house and farm.

They are proud that their two sons have chosen to continue farming; proud of their efforts around more sustainable practices including composting and green manure use.

The beauty of the orchard and mowed grass.

They are proud that they haven't left yet! In 1994 when they started, the farm was a "weedy patch… no gardens, lawn, greenhouses, no pasture or paddocks. There were unused buildings. We researched heritage breeds and certified organic and set the farm up as an extensive not intensive operation."

He's proud about everything on the farm. "It's been a slow and steady progress, a learning curve about organic farming and its application. I've learned from the 'old guys' in the area."

He's proud that he rotationally grazes his cows; puts them out to pasture in the summer. He says they are happier cows. He wants to prove to others that it's more expensive to keep them in the barn all year round. He says that he saves money on grain and that there are fewer health problems with his cows. He is working with the agricultural college to study milk production of his cows compared to more conventional methods. He is proud that he has not used chemical fertilizer for 11 years, just manure.

He tries to work with the community, do his best. He also does pig roasts across Nova Scotia, and feels that this helps with community relations and education of the public.

This preliminary look at some priorities, sources of strength, and preferred futures will help inform the rest if the report. The indicators outlined above (as well as a few others) will be used as the backbone for assessing the long term viability of farming in Kings County. The report is divided into the following sections:

Long term viability of farming in Kings County is based on

- **Work and Employment Capacity (People Power)**
- **Return on Investment (Economic Capacity)**
- **Resource Base Capacity and Environmental Quality**
- **Organizational Capacity and Community Infrastructure**

5. Work and Employment Capacity (people power)

The capacity and willingness of people to choose farming as a vocation is a fundamental determinant of the viability of farming. We need to track numbers of farmers, job satisfaction, new entrants, knowledge-base, and availability of people willing to work on farms. The amount of employment generated from agriculture also needs to be tracked and valued.

"[F]arm entrepreneurs [are] a key agricultural resource and a source of ongoing economic strength and adaptability for the local Kings County economy."
Robinson (1999)

Number of farmers
The number of farmers in Kings County has stayed relatively stable from 1981 to 1996 (Table 2), however, we don't know the change in number of farms over the last four years, which could be significant.

Table 2. Kings County Farm Numbers and Types

Census Year	**1981**		**1986**		**1991**		**1996**	
Total number of farms	792		711		666		707	
Number of farms with $2,500 or more in gross receipts	593		598		580		591	
Number of farms with $2,500 or more in gross receipts, by farm category	Number	%	Number	%	Number	%	Number	%
Fruit	156	--	124	21	118	20	117	20
Cattle (beef)	122	21	100	17	113	19	104	18
Misc specialty	21	3.5	38	6	61	10	82	14
Poultry and egg	46	8	74	12.5	68	12	64	11
Vegetable	With fruit	--	41	7	58	10	53	9
Mixed	47	8	54	9	29	5	47	8
Dairy	75	13	69	11.5	63	11	46	8
Hog	73	12	56	9	37	6	44	7
Field crop (except grain and oilseed) including potatoes	37	6	28	5	28	5	32	5

Statistics Canada, 1997; 1992; 1987; 1982; McLaughlin and Robinson, 1992; 1994; 1989.

Classification of farms could be somewhat misleading because the classification is based on which commodity brings in 51% or more of farm receipts. However, farms producing fruit and cattle are the dominant types. Declines in cattle-, hog- and dairy-based farms have been balanced by increases in miscellaneous specialty operations.

A number of farmers indicated that having more 'small' farms is important. Another variant of this goal is to have less polarization or more equity between the 'size' of different farms. David Robinson, Economist with the NSDAM sheds some light on this issue (Robinson, 1999) by comparing farms to other businesses. He reports that the largest 235 farms accounted for 90% of the agricultural product sales in the county, and that average sales for this group of farms is over $500,000 annually. However, "while most of these businesses would be considered locally as 'big farms' there are no or few farms in Kings County that would be considered particularly large operations in the major production areas of North America."

"I hate to see bigger and bigger farms taking over small ones. I could name 5 or 6 examples just in this area. I think it is something that we farmers should try and take care of. We should not try to go that route."

-Kings County pork and poultry farmer (Campbell, 1994)

Another facet of this issue is *concentration* in the farming sector. If we want more farmers, and less polarization between the size of farms, then increasing concentration in some sectors may be of concern. Although there are many benefits associated with supply management (see section 6, Return on Investment) concentration appears to be an unfortunate cost associated with the supply-managed commodities. Dairy and poultry are obvious examples (Table 3 and 4).

Table 3. Concentration of Dairy in Nova Scotia

Year	Number of dairy cows	Number of dairy farms	Dairy farms as a % of total NS farms	Average number of dairy cows per farm
1996	26,623	619	13.9	43
1991	28,913	818	20.6	35
1986	34,122	1,031	24.1	33
1981	36,237	1,427	28.3	25
1976	38,582	1,999	36.8	19

Source: Statistics Canada, 1997.

The Nova Scotia Dairy Commission gives slightly different figures from Statistics Canada's shown in Table 3., and they show even more concentration in the dairy sector The number of dairy farms in Nova Scotia declined from 490 in 1994 to 419 in 1998. Cow numbers per farm increased 14% from 50 to 57 in the same period (G. Comeau, N.S. Dairy Commission, cited in Jannasch, et al, 1999).

Table 4. Concentration of Poultry in Nova Scotia

Year	Number of hens and chickens	Number of poultry farms	Average number of hens and chickens per farm	Average number of hens and chickens per farm, Kings Co.
1996	3,558,559	483	7,368	21,811
1991	3,616,704	640	5,651	
1986	3,050,298	792	3,851	
1981	3,435,103	1,305	2,632	14,110
1976	2,992,860	1,384	2,162	
1971	3,055,813	1,472	2,076	
1961	2,184,995	5,907	370	
1951	1,630,305	14,151	115	

Source: Statistics Canada, 1997.

Work and work satisfaction

Contributors to farm

We asked a number of different questions about work on the farm. First of all, we asked how many people contribute to the farm. The average number of full-time contributors per farms in our survey fell from 3.5 in 1991 to 2.5 in 1999. Part-time help also fell from an average of 9.8 to 5.2 people per farm during the same time. The percentage of female full-time contributors to the farm increased slightly relative to male full-time contributors (see Table 5).

Table 5. Full and part-time contributors to surveyed farms.

Year	# of people who contribute to farm		full-time contributors	
	full-time	part-time	% male	% female
1991	3.5	9.8	73.2	26.7
1999	2.5	5.2	66.8	33.2

Value of unpaid labour.

After the value of unpaid labour was estimated (those who could estimate it), comments such as "the farm would not be able to sustain that amount" or surprise in general were the general reactions. Table 6 shows that on the farms that were able to estimate it, the value of unpaid labour is significant, with an average of $57,800 per farm.

Table 6. Value of unpaid labour on surveyed farms

Farm	value of unpaid labour ($)	Wage rate stated/hr ($) or comment
A	20,000	5.50
B		"satisfaction"
C	110,000	"50% of work is unpaid"
D		"farmers don't get paid!"
E		"enormous/value of lifestyle"
F	127,000	?
G	0	?
H	32,000	10.00
mean	57,800	

Work satisfaction

Farmers rated work satisfaction (1 completely unsatisfied, 10 completely satisfied) very highly in general, except "A" who became injured as a result of farming activity (Table 7).

Table 7. Rating of work satisfaction

Farm	1991	1999	Comments
A	8	1	Developed physical problems, et "I don't think there's a better life out there."
B	9	9	"Very high"
C	10	10	"I find it an exciting challenge"; "I like the diversity of the work"; "I get a lot of satisfaction from the happiness of the other workers on the farm"
D	9	8	"The physical work is satisfying but you don't get enough back from it to make it worthwhile"
E	8.5	8.5	"Need higher levels of energy to get the work done. Also need stress relief."
F	9	9	Would like to spend less time with machinery and more time with cows, which could happen on a smaller farm.
G	8	8	"I wouldn't be here if it wasn't satisfying. You make a commitment, find a certain amount of enjoyment in the work, go through the ups and downs."
H	7	8	"It's ok as long as it doesn't become all-consuming…I want the kids to enjoy it. I would recommend living and working on a farm, but don't let it swallow you up and spit you out."
mean	8.6	7.7	

It would be interesting to follow up with other questions such as "can you give examples of aspects of farming that are particularly satisfying for you?". As an indicator of work satisfaction, we asked if the farmer would want their children or other relatives to take over the farm. Most answered that they would not pressure them to take over the farm. Although it would be nice for family to maintain a connection to the land, it was important that farming be a choice. As a final indicator of work satisfaction, we asked if another work opportunity came up, would you take it and stop farming. All farmers responded with "No" except two who would take other opportunities but still farm part time.

Work satisfaction levels are quite high among interviewed farmers. It appears that all of them farm because they see it as a vocation. They are all there farming because they have chosen to.

"I really enjoy farming. I find it a challenge. I get a lot of satisfaction out of it. … I am really impressed by farmers who could sell off their land but who say it should be preserved for farming even though they haven't made any money off it for 10 years." -Kings County beef and vegetable farmer (Campbell, 1994).

Farmers' status in society.
We asked farmers to rate how people viewed them. They rated their status in society from 1: very low, to 10 very high. It is interesting that over the last decade the average rating, in their opinion, has gone down from an average of 4.6 to 4. One farmer made the comment that farmers never get credit for innovation, scientists do. Other comments indicated that farmers' status is hampered because of several factors including
1) dirty image;
2) the population has never known hunger;
3) farmers are a minority of about 4% in the County;
4) food is not important therefore people who produce are not important; and
5) public is cynical about our requests for handouts.

In the Kings County general survey, respondents will be asked to rank farmers status in society. It will be interesting to compare the results with farmers' own perception of how they are viewed by others.

The feeling that no one appreciates what you do can add to stress in an occupation, and reduce quality of life. Although most interviewed farmers get a lot of satisfaction with the work they are doing (which boosts genuine progress), they generally seem to feel others didn't appreciate the contributions they were making (which lowers genuine progress). The picture will not be complete until we can verify 'society's' perception of farmers' role in the community, and determine whether people feel it is important to have agriculture as part of the fabric of rural life.

Motivations for farming; positive and negative aspects of farming
The motivations and *positive* aspects of farming were grounded in the excitement and challenge of making an operation work, or in one case of making the farm a self-sustaining ecosystem. Connection with animals and the outdoors were also strong motivations. One comment about seeing the direct consequences of actions was important. "When you live on the land, you know that if one insect gets out of hand because you changed its habitat, this can throw the whole balance off. Farmers get a sense of balance and can see the impact more quickly."

Comments on the *negative* aspects of farming included "thankless and unforgiving at times"; "there's no stability"; "no fair value for produce"; "infrastructure costs are high"; "takes too much time away from family"; "weather unpredictable"; "my back hurts"; "more sedentary than before because of technology"; "physically dangerous because of the machinery and chemicals"; "no matter how hard you work, you don't get the returns". Another farmer got very specific; he wishes he'd bred his cows for longevity rather than high milk production.

Employment in agriculture

Traditionally figures for "labour productivity" are reported, with the underlying assumption that more goods produced by fewer people is a good thing. Certainly it is a good thing under two conditions: (1) full employment, and (2) people don't want to do the kind of work in question. In Kings County there is not full employment, but we don't know unless we look into it further whether (2) is true or not (some jobs are obviously more desirable than others).

If society's goal is to have as much quality employment as possible, with little or no unemployment, then we would seek to have as many total numbers of jobs (or paid weeks) as possible. Another figure for this indicator would be gross receipts per number of jobs (or paid weeks), to indicate the labour-intensivity (as opposed to labour productivity) of farming operations. The *quality* of the work would also have to be evaluated by using indicators of work satisfaction (both employee and employer), educational opportunities, safety, job security, reasonableness of wage and quality of labour pool from which farmers have to choose.

Total numbers of jobs (or paid weeks).

In 1996 agricultural and related services employment in Kings County increased 13% since 1981 and 5% since 1991 (Robinson, 1999) (see also Table 8). Agriculture and related services created 2,530 jobs in 1996. Agricultural related manufacturing such as food processing and industries that produce goods and supplies used by agriculture created another 1,962 jobs. If service businesses which are wholly or largely agriculturally based are included, it is estimated that a total of 4,600 people are employed directly as a result of the agricultural activity in the county. This represents 16% of the county's total labour force (Robinson, 1999).

Direct agricultural and related service jobs have not kept pace with increases in gross farm receipts for the period between 1980 and 1996 (see Table 8). 'Labour productivity' increased dramatically between 1980 and 1990 (i.e. for a given level of output, there were fewer people employed), but did not change significantly between 1990 and 1995/6 (i.e. for a given level of output, the number of people employed stayed the same). Robinson (1999) observes that recent agricultural growth in Kings County appears to have occurred more in labour intensive areas as compared with the national industry's growth. This is a favourable trend if society's goal is to have more employment, and levels of work satisfaction are adequate for both employees and employers.

Table 8. Kings County Agricultural Employment

Year	Gross farm receipts ($)	Ag and related services employment	Ag related manufacturing employment	Total ag related jobs	Gross farm receipts per total ag related job	Gross farm receipts per direct ag job
1995/6	132,449,000	2,530	1,962	4,600	$28,793	$52,351
1990/1	125,202,000	2,400				$52,168
1980/1	71,109,000	2,245				$31,674

Source: Robinson, 1999. Note: need to correct for inflation

Gross receipts per weeks of paid employment.
The 'number of jobs' figure is somewhat misleading, given that some jobs may be part time or only last a few weeks. Using the figures for 'number of paid weeks of employment' may more accurately reflect employment status. On average, it took $2,352 in gross receipts to produce one week of paid work on Kings County farms in 1995. It takes $2,391 in gross receipts to produce a week of paid labour for the province as a whole. In PEI it takes $3,965 to produce a week of paid labour. This indicates that on average farms in Kings county have been more labour intensive than the PEI provincial average. Agriculture was even more labour intensive in Kings County in 1980 when only $1,235 in gross receipts corresponded to a week of paid employment.

Table 9. Weeks of Paid Employment on farms in Kings County,

1995	**Kings Co.**	**NS**	**PEI**
Total gross farm receipts	$ 132,449,162	$ 384,333,174	$349,195,896
Total weeks of paid labour	56,319	160,760	88,058
Gross receipts/week of paid labour (derived)	$2,352	$2,391	$3,965
1985	**Kings Co.**	**NS**	
Total gross farm receipts	$ 98,465,000	$ 258,640,000	
Total weeks of paid labour	61,705	164,393	
Gross receipts/week of paid labour (derived)	$1,596	$1,573	
1980	**Kings Co.**	**NS**	
Total gross farm receipts	$71,109,000	$198,607,848	
Total weeks of paid labour	57,574	151,741	
Gross receipts/week of paid labour (derived)	$1,235	1,307	

Source: Statistics Canada, 1997; McLaughlin and Robinson, 1989. Note: need to adjust figures for inflation.

Agriculture in Nova Scotia has been shown to be more labour intensive than other parts of Canada. According to Robinson and MacDonald (2000) the greater use of human resources in Nova Scotia may be a response to its lower cost (and greater dependability) as compared to the situation in other agricultural regions. They indicate that although we use more labour per output, our agriculture is just as productive -- if not more. "Hog producers in Nova Scotia for example achieve higher feed conversions and higher livestock productivity (pigs marketed per sow) as compared to their typical counterparts in the rest of Canada and the USA. These farms use of labour per unit of output, however, appears to be 15-20% higher. Dairy producers in Nova Scotia similarly achieve a higher output per cow but utilize more labour per hectolitre of milk shipped." Having said this, it is important to point out that producers often find it hard to get help on their farms, which is an important but multifaceted problem beyond the scope of this report.

6. Return on Investment (Economic Capacity)

"Sustainable agriculture has to be economically viable… Farmers put it high on the list."
-Kings County vegetable farmer (Campbell, 1994)

The ability to generate an income from farming helps to keep farmers focused on quality food production and land stewardship. If the return isn't there, potential growers may choose other occupations, and there will be declines in farm numbers. Trends in farm income, farm product prices, return on investment, and other measures will be introduced along with some discussion of how farming affects the county economy.

Effect of agriculture on the county economy
The value of agriculture to Kings County is immense and should be made explicit to its citizens. Agriculture contributes directly in terms of generating agricultural business and employment, as well as indirectly in terms of training, tourism, and food security.

Indirect benefits
One example of an indirect benefit is tourism. According to Robinson (1999), "[t]he importance of agriculture to the scenic beauty of the Annapolis Valley and hence to recreational visitors and tourism related businesses should be noted. Different farms regularly receive out-of-province bus tours. Oaklawn Farm is a major county attraction and farm vacation packages are offered by others. Fairs such as the West Kings Community Fair further increase the appeal of the county to visitors. Both distant and day trip visits from nearby parts of the province are increased by the presence of the agricultural industry." And… where would the apple blossom festival be without the apple blossoms?

"If I make $300,000, I will have spent the same in the local economy. Our products come from nothing and give something." -Kings County vegetable and beef farmer (Campbell, 1994)

Direct benefits
Direct economic benefits include employment and business multipliers. For example, if 707 farms generate 4,600 agriculture-related jobs, the multiplier is 6.5 for farms to jobs. Similarly, if agriculture generates $117 million in farm expenses, it is likely that the figure is multiplied by at least 2 to estimate business generated.

It was clear from the interviews that farmers spent a significant proportion (88%) of their expense allocation within the County (Table 10) (although many of the products purchased are not grown or manufactured within the County). This creates a significant amount of business activity, and it makes it worthwhile for agricultural service industries to locate in the County.

Question: *What are the proportions of farm expenses and revenue spent and earned*
-within Kings County; OR
-within NS but outside of Kings, OR
-outside of NS.

Table 10. Farm Expenses and Revenues Spent and Earned within the County, surveyed farms, 1991 &1999

1991	proportion of farm expenses spent within Kings	proportion of farm expenses spent within NS, outside of Kings	proportion of farm expenses spent outside NS	proportion of farm income from Kings	proportion of farm income from NS, outside Kings	proportion of farm income from outside NS
A	100	0	0	50	0	50 (PEI)
B	93	7	0	?	?	?
C	75	0	25	100	0	0
D	100	0	0	100	0	0
E	95	5	0	99/20	1/80	0
F	100	0	0	1	95 ?	0
G	40	?	?	?	?	60
H	100	0	0	50	50	0
mean	88			60		

1999	proportion of farm expenses spent within Kings	proportion of farm expenses spent within NS, outside of Kings	proportion of farm expenses spent outside NS	proportion of farm income from Kings	proportion of farm income from NS, outside Kings	proportion of farm income from outside NS
A	100	0	0	xx	xx	xx
B	93	7	0	?	?	
C	25 ?		25	77	0	23 (Que)
D	100	0	0	100	0	0
E	95	5	0	99/20	1/80	0
F	100	0	0	1	95?	0
G	90	?	?	?	?	10
H	100	0	0	50	50	0
mean	88			58		

Farm income

It is curious that most often we see reports of "agriculture sector growth" or total farm receipts as indicators of agricultural growth and progress. For example, "the real growth in output recorded by the local agricultural industry over the 1980 to 1995 period was about 28%. Sectors which contributed most significantly to this expansion were poultry, vegetables, and in the earlier years of the period, hogs" (Robinson, 1999). While real growth is an important indicator, real net farm income is a more realistic indicator of the 'health' of the industry.

Question: *Would you like to comment on the level of income you get from farming? Is it enough for the work and investment you put in?*

Most interviewed farmers indicated that the level of income they are getting is not enough for the work and investment they are putting in (see Table 11. Comments such as "no fair value for the work you put in" or "no fair value for the product" were common. One grower said that on the one hand, the chain stores and competition nationally and globally have beaten producers down to the lowest price possible. On the other hand, National Income Stabilization programs have made a positive difference. Another farmer emphasized that although their gross income had increased over time, relative expense levels are higher, which leaves them with a net decrease in income.

The only two growers who said they are compensated adequately for their work and investment are both organic growers who market all or most of their products directly to the people who eat them.

Table 11. Satisfaction with farm income, surveyed farms

Type of farm	Adequate income for work and investment?	Does income fluctuate over time?
Apples, no longer farming	No	Constant until disability
Garlic, certified organic	Yes	Constant until disability
Poultry, Field vegetables	No	Fluctuates because of vegetable production and drought. Overall net decline.
Apples	No	There have been fluctuations in product price and yield and overall, income has gone down over time.
Mixed specialty	No: "If we were in it for the money it wouldn't be enough."	It has fluctuated, but only because of decisions to change the farm
Dairy	Not fair value for the work you put in	Income is declining even though the quota provides a certain measure of stability. Although rotational grazing keeps costs down, overall, "it used to be easier."
Pork, grain, beef	No, but stabilization programs help	Income has gone up and down. It fluctuates based on a 3- year cycle.
Certified organic mixed beef, vegetables, berries, grain, hay	Yes. "I don't expect to get rich, but I can set a price I'm comfortable with. I've been told I don't charge enough."	Fluctuates based on productivity rather than prices.

Two farmers expressed frustration with the basic belief that if you work hard your returns will be good. Over the years this has proved not to be true for one of the fruit growers. With the increased interest rates and other costs in the 80s, he got more and more in debt and was forced to sell a lot of his land to pay down his debt with the bank [selling the capital]. In other words, factors beyond his control have meant that no matter how hard he worked or how good the crop was, he didn't make enough money to continue. "The return isn't there." Later he mentioned that his inheritance and money from off-farm jobs has also gone into the farm. This farmer's story is an example of poor farm product prices forcing him to use up the farm capital and subsidize the farm products with off-farm income.

Another farmer explained that farming is a tremendous investment with a low return. Usually businesses can expect 22 to 26% return on their investment. A farmer's return is more like 4 to 5%. This would not be tolerated in other sectors. There are still some family farms that are caught in the squeeze -- to advance they have to get bigger. The solution seems to be for them to find a niche.

The only source of stability and adequate income seems to come from EITHER quota systems for poultry and dairy OR farmers that direct market organically grown food. Genuine progress indicators would have to include both adequacy/fairness of the level of income (as defined by the farmer) and stability/resilience of the level of income. Of course the level of income would be based on net returns rather than gross returns.

Net farm income

Average net farm income ($22,359) in Kings County (Table 12) is higher than the provincial average of $12,760 per farm. The average ratio of expense to revenue is 88% for Kings County and 85% for the province as a whole.

Table 12. Kings County Average Farm Income (Current dollars)

Year	Gross farm receipts ($)	Total farm expenses ($)	Net farm income ($)	Net farm income per farm ($)	Ratio of expense to revenue
1995	132,449,000	116,641,057	15,808,105	22,359 (707 farms)	88%
1990	125,201,880	108,274,643	16,927,000	25,416 (666 farms)	86%
1985	98,465,000	90,612,836	7,852,164	11,043 (711 farms)	92%
1980	71,109,000	Only reports selected farm expenses			

Statistics Canada, 1997; 1992; 1987; 1982. Note: need to adjust for inflation.

Although the gross farm receipts for agriculture have increased 6% from 1990 to 1995, net farm income has not experienced a similar relative growth (it went down by 12%). While it is good for the agriculture service sector to have farmers spending lots of money in the County, farmers have not been the beneficiaries of all the business they generate. The narrowing margins are reflected in farmers' interview comments.

Even the indicator of net farm income is a bit misleading as it is often an incomplete picture of the real situation.

Below is an examination of the different ways to measure income.

Four Different Ways to Measure Income of Apple Operations (Average Income per Farm, 1997)

Option	Calculation	"Income" ($)
1	**All revenues - some expenses.** The expenses do not include equipment and machinery depreciation, inventory changes, unpaid labour, or interest on equity. They also do not include depreciation on large capital investments or productive capacity of the land.	4,315
2	**All revenues - most expenses.** The expenses do include equipment and machinery depreciation, inventory changes, unpaid labour, or interest on equity. They do not include depreciation on large capital investments or productive capacity of the land.	(29,035)
3	**Food product revenues only - most expenses.** This is the same as option 2, but subsidies have been removed from revenues. This gives a more realistic picture of real income from the sale of food products.	(36,899)
4	**Food product revenues only - all expenses.** This is the same as option 3, but depreciation on large capital investments and productive capacity of the land have been included. This would be the most realistic picture of real income from the sale of food products. *With option 4, soil-buidling programs or other major expenditures which increase productive capacity in the future would be given credit. On the other hand, 'running down the farm' would be shown as a loss.*	Not currently calculated.

Source: FMAP survey data of 14 fruit growers in Nova Scotia. Anonymous, 1998.

Risk

Other indicators of farm viability include measures debt per farm and income as a proportion of capital value. Higher levels of debt and capital infrastructure may allow a farmer to expand and reduce per unit costs when farm product prices are good (for example supply managed commodities). However, high levels of debt and income/capital value may increase risk when prices or other conditions take a downturn. The tables below (Tables 13 and 14) show that farm receipts is increasing relative to capital value per farm (i.e. it takes less capital investment to get the same amount of income). The indicator peaked in 1990 at 46%. Kings County farmers are in a more resilient position than the heavily capitalized potato farms of Prince and Queen's County, PEI. Figures for debt at the Kings County level are not reported.

Table 13. Capital value, Kings County (Current dollars)

Year	Census farms	Total capital value (=value of land and buildings, machinery and equipment, livestock and poultry)	Capital value per farm ($)	Total debt ($)	Debt per farm ($)
1996	707	$ 307,223,642	434,550	Not reported	Not reported
1991	666	$ 274,170,672	411,670	?	?
1986	711	$ 239,442,000	336,768	?	?
1981	792	$ 219,295,678	276,889	?	?

Source: McLaughlin and Robinson, 1992; Statistics Canada, 1997; 1982. Note: Need to adjust for inflation

Table 14. Kings County Farms Capital Value to Gross Farm Receipts Ratio (current dollars)

Year	Total gross farm receipts ($)	Total farm capital (=value of land and buildings, machinery and equipment, livestock and poultry) ($)	Farm receipts as a proportion of capital value (%)	Ratio: Prince Co. PEI	Ratio: Queens Co. PEI
1995	132,449,000	307,223,642	43%	24%	24%
1990	125,201,880	274,170,672	46%		
1985	98,465,000	239,442,000	41%		
1980	71,109,000	219,295,678	32%		

Source: McLaughlin and Robinson, 1992; Statistics Canada, 1997; 1982; Robinson, 1998. Note: Need to adjust for inflation

Since we cannot determine debt levels, the next best indicator would be interest payments (Table 15). This is another indicator that shows a positive trend, as net farm income is going up relative to interest payments. This could be a result of lower interest rates in the 90s than the 80s.

Table 15. Interest payments on farms in Kings County

Year	Census farms	Interest payments ($)	Average interest payments per farm reporting ($)	Total interest payments / total net farm income (%)
1996	707	5,693,043	14,597 [390 farms]	36
1991	666	6,544,032	15,922 [411 farms]	39
1986	711	4,207,871	10,626 [396 farms]	54
1981	792	Not reported	?	?

Sources: Statistics Canada, 1997; 1987; 1982. Note: Need to adjust for inflation

"It keeps coming back to economics and big loans and banks on your back. We all want to be bigger and own more. I know some of the back to the earth types say we should just stay small and produce as much as you need. But you get caught up. You take out a loan to buy something. Then you have to get more pigs to pay off your loan. Before you know it, you are caught. It is the same for everyone. Everyone is in debt." -Kings County poultry and pork farmer (Campbell, 1994)

Farm financial viability

"People have no idea of the capital investment or the farmers' own money that goes into a farm."
-Kings County pork and poultry farmer (Campbell, 1994)

We found some of the best work in terms of farm financial viability has been done by the Farm Management Analysis Project (FMAP) Surveys where detailed records are used to determine various financial indicators (see References section for a list of the documents used here).

Table 16. Indicators of Viability

Farm Type	Number of farms sampled	Year	Expense Ratio (%)	Debt/ Equity Ratio	Interest as % of Revenue (%)	Total Interest (current $)	Return on Equity or Investment
Dairy	71	1998	87	1.9	9.0	32,340	9
Dairy	76	1997	81	1.8	9.0		9
Dairy	~70	1996		1.7			
Apple	14	1997	120	1.4	6.4	7,496	0
Apple	15	1996	110	0.8	6.0	7,528	0
Apple		1995	103	1.4	7.1	7,757	0
Apple	11	1994	120	1.9	8.3	7,628	0
Apple	12	1993	104	2.0	6.9	6,816	0
Apple	12	1992	94	2.4	6.5	6,935	0
Beef	11	1997	167		21.0	7,865	0
Hog f to f	26	1998	97	6.3	5.6	37,117	0
Hog f to f	24	1997	122	3.8	4.3	29,435	0

In Table 16 we show figures derived from detailed farm management surveys conducted through the Nova Scotia Department of Agriculture. The results from these surveys are not statistically significant, but they reflect, perhaps more accurately, what is happening on some farms. The apple production records are particularly relevant to Kings County, as most apple production occurs there.

The economic indicators used in Table 16 are taken directly from the farm management analyses. The expense ratio was modified slightly to include depreciation and inventory in expenses and remove subsidies from income. The indicators are explained fully below.

Expense Ratio: This ratio was also used above in Table X. It is an indicator of the percent of expenses relative to income. The higher it is, the more risky the operation becomes, and the narrower the margin becomes. One hundred percent indicates expenses match income and the operation just breaks even, leaving no income to compensate the operator for his or her time. A figure over 100% indicates that the farm is losing money. Ideally the ratio should be 60% or less, according to the dairy FMAP for 1997/8 (p.3). The figure is derived by dividing *farm expenses* (operating and fixed expenses, plus depreciation and inventory changes; unpaid family labour, operator labour, and interest on equity are not included) by *gross revenue* (includes all sales from the farm product in question and crop insurance payments, but does not include subsidies), and multiplying by 100. Most farms sampled (except for dairy) had an expense ratio close to 100% or more which is not a healthy indicator of long term viability. Even the dairy farmers' expense ratio is going up. (This expense ratio cannot be compared directly with the one in Table X because the figure was derived differently.) In terms of ecological viability, it is unfortunate that the beef sector is in such poor shape because it is important to have ruminant livestock for rotations that include sod in the county farming mix.

Debt/Equity Ratio: This ratio shows the level of debt relative to assets. Having a low debt relative to assets is a sign of a healthy business (and a low interest rate). In Table X we see that the hog sector has a high debt to equity ratio relative to the others sectors. To reduce risk from fluctuating markets and

weather, it would be important to reduce that ratio to 1 or less, particularly for non-supply managed commodities.

Interest as a % of Revenue: This indicator shows the percentage of revenue used to pay interest on debt. This indicator is also affected by interest rates, but these rates in recent years have been quite reasonable relative to the eighties. The beef sector is again showing signs of ill-health at 21%. Anything above 5% puts a lot of pressure on an operation. Note that in this figure, subsidies are included in revenues.

Total Interest: This is a straightforward indicator that shows the average amount of interest paid per farm per year on surveyed farms. It looks like the lending institutions are profiting from the high debt levels carried by hog and dairy farms. It is also interesting that during times of crisis such as drought, aid packages are usually designed to help farmers with interest payments. It would be important to record here how much government money in guaranteed loans and subsidies is used to pay farm interest.

Return on Equity: This is a telling indicator in terms of economic viability of farms. Only the dairy producers (out of the group featured here) are making any return on their investment (9%). If the return on investment is below other investment opportunities (such as GICs, RRSPs, mutual funds or other businesses), then in the long term, people will be reluctant to invest in unprofitable farming operations -- particularly where a large investment is required. This has already been identified by the Federation of Agriculture as a serious problem. It is important that the return on equity is also not too high. By 'too high' we mean that it is possible to 'mine' the farm or the forest for high returns today, compromising the ability of the resource to produce a return in the future. Therefore, it is important to interpret the return on equity alongside of the resource indicators. (Return on Equity is derived by subtracting the value of unpaid family and operator labour from net income, and dividing that by the operator's equity. Equity is total assets minus total liabilities -- basically it is similar to the notion 'investment'.)

Price of food

"The retailers and wholesalers are obviously not losing money. Sobeys built and rebuilt stores all the way from Sydney to Yarmouth. If agriculture was prospering you'd see new barns all the way from Sydney to Yarmouth."

-Kings County vegetable farmer (Campbell, 1994)

"We [farmers] are the only component of the food system that does not demand a margin. The retailers and wholesalers sure do. They dictate our price, and if they can get it cheaper anywhere else they do!"

-Kings County vegetable farmer (Campbell, 1994).

"If supply exceeds demand even by a little bit you get exploitation of the producer. The economic system we live under depresses prices. An economic problem is also a moral one. Marketing boards try to rectify this exploitation."

-Kings County poultry farmer (Campbell, 1994).

"... farmers have to do what they can to survive. They can't farm for the long-term. They over-use fertilizers or farm marginal land just to keep going." -Kings County poultry farmer (Campbell, 1994).

If the price of farm products goes down, this plays havoc with farm income and overall viability. The index for farm products was discontinued in 1995, although it provides an excellent measurement of this indicator. The price index for farm products is presented in Table 17 along with price indices for farm inputs and food in stores. They show a dismal picture of the price/cost squeeze most farmers experience.

Table 17. Price indices (1986=100)

Year	Farm products, NS	Food in stores, Canada, avg.	Farm inputs, Atlantic	Fertilizer, Eastern Canada	Hired farm labour, Atlantic	Farm mortgage, Atlantic
1998			131.4	135.4	156.8	132.8
1997			133.7	138.7	153.2	137.6
1996	discontinued		131.8	139.4	150.5	145.5
1995	107.2		124.4	130.6	144.8	144.1
1994	105.4	116.6	121.6	113.3	143.5	145.2
1993	105.9	117.3	118.1	107.5	141.1	146.8
1992	104.2	115.2	112.3	107.6	135.7	128.9
1991	106.8	116.9	111.4	108.6	130.1	124.6
1990	107.3	114.2	111.9	104.3	125.6	120.9
1989	104.8	109.9	111.1	108.9	120.3	114.2
1988	104.3		106.7	109.3	112.5	106.2
1987	105.9		101.5	99.3	106.3	101.7
1986	100		100	100	100	100
1985	92.9		97.7	106.6	95.4	96.4
1984	94.9		98.5	107.5	91.9	95.6
1983			96	102		87.5
1982			94.6	107.9		85.4
1981			92	106.1		73.7
1980			82.4	101.3		56.3
1979			75.4	82.2		47.8

Source: McLaughlin and Robinson, 1999; 1995; 1992.

Price of Food Case Study: Effect of Concentration in the Retail Food Sector on Food Prices

MacDonnell, 2000:
Concentration in retail food sector = private gain, public costs
"Aside from Co-op Atlantic in Moncton, there are now only two very large food retailers in the Maritimes. Empire Co. owns the familiar Sobeys stores. Loblaws Co. owns that IGA stores, as well as those shiny new Atlantic Superstores…. Both behemoths are the result of mergers which took place late in 1998, which also created the largest grocery wholesale companies this country has ever seen.

Sobeys Canada, with annual sales of 10 billion (and climbing) … is now the second-largest food distribution organization in Canada in terms of sales and geographic presence. … Stellarton-based Empire Co., parent company of Sobeys, bought out the Oshawa Group…, as well as Knechtel, Tood Town, Bonichoix and Price Chopper chains….” Loblaws bought IGA and Agora Food Merchants in Atlantic Canada, and Montreal-based Provigo. “Loblaws was already Canada’s largest supermarket chain, with $11 billion in annual sales. “

“[T]he bottom line is that the food industry is more concentrated than ever. The results have been positive for shareholders, but not so good for many Maritime growers who used to supply the chains.” Sobeys shareholders over the last 10 years have received a return on investment of ~15 to 8% (www.sobeys.ca), while farmers are getting very close to 0%.

“Riverview [Herbs] co-owner John Sipos doesn’t see any single, diabolical force at work. Consolidation is driven by the ‘logic’ of the marketplace. It’s just business, he says. But also aided by our tax dollars. The modern economy runs on cheap transportation -- (relatively) cheap fuel and government-built infrastructure -- an environment hostile to the small producer. ‘In my mind, all food products that come into the Maritimes from outside are being subsidized in some way,’ he says, whether it’s taxpayer-funded irrigation projects in California, or the highway system. The price tags on our fruit and vegetables do not reflect the true cost of getting them there.”…

Reduction in buyers = no relationship between growers and buyers, national suppliers

“In the strange business of buying and selling produce, signed contracts detailing what and how much to plant and sell are amost unheard of. “The produce business is very much built on personal relationships,” says [Peter] Rideout [NSDAM marketing specialist]. The mergers swept those relationships aside, ushering in a new tiny cabal of buyers. Not only are the new buyers unfamiliar with the region, they’re too harried to deal with numerous local suppliers.”

“Fifteen years ago, Atlantic Wholesalers had perhaps 20 separate distribution centres in the Maritimes. Now they have one. ‘They’ve gone from about 30 buyers down to two or three,” says Neri Vautour, a business development officer with the New Brunswick Department of Agriculture and Rural Development.”

The major chains have been making some changes in terms of who supplies their produce, generally switching from suppliers that provide items such as herbs to the Maritime stores to suppliers that can supply herbs to all stores across the country. Potato, herb, yoghurt, broccoli, onion suppliers were told not to deliver last fall because another supplier had been found.

Riverview Herbs co-owner Jim Bruce “says, ‘Sobeys needed someone who could supply the whole chain from coast to coast, not just select stores in the Maritimes, and as well needed to reduce the number of suppliers in order to simplify bookkeeping.’”

Concentration = downward price pressure for growers

David Dawson, potato grower and packer from PEI: “It really feels that the big chains are putting a lot of pressure on producers to supply the product for nothing.”

Peter Rideout, NSDAM marketing specialist: “Being a price-taker is nothing new for Maritime growers, says Nova Scotia’s Rideout, adding that the mergers will only make it worse as the chains

continue to centralize their buying. 'One of the changes that has happened with the mergers has been a trend towards national buying versus regional buying.' … Now national buying pits our growers against producers right across the country…. Probably as a consequence, he adds, fruit and vegetable prices have remained flat, despite drought and increased production costs. 'Prices at the farm gate are not much different than they were five, even 10, years ago. But growers costs have at least doubled, if not more.'"

Growers' strategies

Peter Rideout, NSDAM marketing specialist: "…growers who get together to form marketing groups and producer co-ops are able to take advantage of economies of scale. Farmers who market their produce jointly are more likely to specialize in one or two crops and increase acreage, a plus as far as consistency of supply is concerned. The several marketing groups that have already formed throughout the Maritimes [including in Kings County] are treated well by the chains."

Neri Vautour, NBDARD business development officer: " 'What needs to be done is that the growers have to talk to each other and say, look, we're not each other's competition here'…."

Reduction in food value

John Sipos, Riverview Herbs: " 'The net loser here is the consumer because the consumers aren't getting as fresh a product as they should be.' He points out that selecting vegetable varieties that store and travel well aren't necessarily the most flavourful. … 'I just hope that in five or 10 years from now, it'll s witch back and people will start to realize that price isn't everything, and that maybe there's actually more value in spending a few cents more and getting something of quality,' Sipos says. 'Ultimately, it's the consumers who will drive the whole industry. If they start demanding better quality, then eventually I assume the grocery stores will give them what they want.'"

Flexibility and Diversification

If economic viability farms is dependent on a diversified sector, as suggested by David Robinson, Kings County is in good shape for this indicator. Kings County produces the widest range of crops and livestock of any farming area east of southern Ontario (Robinson, 1998). "The continued prominence of agriculture in the county's economic life has resulted from the industry successfully shifting to new opportunities as economic conditions and technologies have changed. …[T]he entrepreneurship of local farm people…gives the industry a highly dynamic aspect that may not always be appreciated. The capacity of its leading industry to adjust and adapt to altered circumstances has been an important economic strength for the county over time….Today agriculture in the county is highly diversified" (Robinson, 1999).

Trade: Local vs. Export Markets

It is uncertain whether selling food locally or beyond our borders is better for farm viability. For now, I will only include some comments on the subject from Kings County farmers.

"… Yes we should [be more self-sufficient]. We did it with supply management. Canada should keep on producing rather than depending on other countries for food."

-Kings County poultry and vegetable farmer (Campbell, 1994)

"The first round of GATT is basically predatory. There may be some short-term gains, but the long-term effects will be very negative…. For an economy to flourish it needs a sound agricultural base. People should grow what they can and what they need and import the rest."
-Kings County poultry farmer (Campbell, 1994)

"We are worried about the future and what comes after GATT. I think we may keep supply management in this round but we'll eventually lose it."
-Kings County poultry and pork producer (Campbell, 1994)

"A lot of people see agriculture as a burden on the government….They don't realize what would happen if agriculture in Canada were halved. Maybe no problem in the short run, but real problems later."
-Kings County poultry and pork producer (Campbell, 1994)

"…these big plans like NAFTA think that people should only produce things that they can produce the cheapest… We have high cost of farming here and no-one would be farming anymore. Who will take care of the land?… Who will provide the jobs? I think each province needs local food production to help keep up social benefits and so on. It is not practical, this NAFTA plan."
-Kings County vegetable and beef producer (Campbell, 1994)

"We shouldn't have [self-sufficiency] in every item. But yes [we should strive for] a high degree of self-sufficiency or food security. It is ok to grow a little extra wheat and trade it for bananas. We are doing all our own milk in the provinces, and that does a lot for them. Why do away with that and bring in cheap milk from Texas? I can't understand it. Maybe the day will come when we'll run out of fossil fuels."
-Kings County vegetable and beef farmer (Campbell, 1994)

Marketing
It is possible that the type of marketing chosen will affect farm viability and return on investment. Growers were asked several questions about selling food. Other figures and case studies of marketing arrangements are presented here.

Question: *Describe any value-added products or components you sell from the farm.*

Five of the eight farms did not sell any 'secondary products'. Two sold cut and wrapped meat and another made apple cider until health regulation requirements for stainless steel equipment forced them to stop. Another farm had produced various condiments but they found it too labour-intensive to continue.

Farm sales of **value added (or secondary) products** in Nova Scotia increased from 2.2% of total sales to 3.1% of total sales between 1992 and 1994. This is potentially a positive trend if it provides better return on investment for farmers. Nova Scotian farms had a higher percentage of secondary production farm sales than in other Eastern Canadian provinces (see Table 18). No similar statistics are available for Kings County.

Table 18. Farm Sales of Secondary (or Value Added) Products, 1992-1994

Year	Nova Scotia farms			PEI proportion of secondary production sales (%)	NB proportion of secondary production sales (%)	QC proportion of secondary production sales (%)
	Sales of primary production ($)	Sales of secondary production ($)	Proportion of secondary production sales (%)			
1994	299,610,000	10,090,000	3.1	0.2	2.4	1.3
1993	294,719,000	9,005,000	2.8	0.3	2.2	1.2
1992	298,175,000	7,352,000	2.2	0.2	1.9	1.0

Source: Statistics Canada Cat.21-603-E, printed June 95

It is difficult to determine whether secondary production on farms indicates genuine progress or not. It is one way for the farmer to increase their portion of a product's retail value. And certainly it is a good thing if the farm in question benefits from it. However other arrangements can be made in which several farms pool their product to market or process it together, thus attaining an appropriate 'economy of scale'.

Example of 'value-added'

George Foote is an orchardist and apiarist who works about 100 acres in Nova Scotia's Annapolis Valley, between Berwick and Kentville. He says paying off debt would be his first priority if someone gave him $1 million. Next, he would renew some of his orchards.

But his dream project -- something he has had in mind for a long time -- is to create a 'garden-like orchard,' to bring consumers right to the farm. To some extent he does this now, with school groups touring the operation, and some customers coming in the fall to buy apples, honey, and cider. But with a 'pedestrian orchard,' he could attract more people.

Foote says he enjoys having people come to visit, and it is hardly surprising that he enjoys cutting out the middle men. While consumers pay about a dollar a pound for his apples at retail stores, he gets a wholesale price of only 15 cents a pound. He says he is struggling to make a living this way. By bringing people right to the source, he could offer fresher, cheaper apples, and his profit margin would be considerably better.
(Somerville, 1999)

Example of co-operative marketing

"The Southeast New Brunswick Horticultural Association is a group of fruit and vegetable growers spread over three counties. Like other marketing groups, it was formed partly to keep local growers from slipping off the radars of grocery chains. Using aggressive advertising campaigns, it educates consumers that good food is local food. It tells them who grows what, when it's available, and where. It tells them if they can't get it at Sobey's or the Superstore, they can get it right on the farm…".

"Local farmers started meeting several years ago when produce prices dipped to all-time lows. In 1998, nine growers formed the Horticultural Association. …" The group bought advertising, produced feature newspaper pages with seasonal recipes, and produced a French-language radio show that ran 4 days per week. Other growers saw that their efforts were working.

"As a result their Association grew to 23 members. Not only is it bringing consumers and growers closer together … growers are sharing equipment and exchanging market information." They have created a registered trademark brand name for use on packaging: Really Local Harvest." This is a reaction to the standard that anything could be labeled 'local' if it could be supplied in 24 hours by plane.
(MacDonnell, K. 2000)

Question: *What is the replacement value of farm products consumed by the farm family and employees?*

Estimates of the yearly replacement value of farm products consumed on farm (or by employees) ranged from $0 to $8,000 (Table 19). It appears that some producers do not eat very much of their own products, or they undervalue it.

Question: *What is the portion of the retail price received for you farm products (%)?*

For those farmers who were marketing their products directly through direct sales, farm stores, roadside sales, or farm markets, the portion is significant (70 to 100%). For farmers selling to processors or wholesalers, the portion dropped to less than half of the retail price of the food (see Table 19). One grower commented that he wanted to minimize the wholesale part of his sales because, (1) he doesn't make any money selling his products (especially vegetables) wholesale, and (2) the end product (in this case certified organic) is put out of reach of most people.

Kings County farmers who are producing human food that doesn't require processing are in a unique situation because of a large potential market that exists close by. The flip side of this advantage is that residential development puts so much pressure on farm land and farm practices are considered to be a nuisance by some residents.

Question: *How would you describe your relationship with the people who buy the food you produce? Rate from 1, no contact; distant, to 10, regular contact; high degree of understanding.*

Those producers who had regular contact with their customers were very positive about the relationship, and rated it highly (see Table 19). Producer 'H' noted that his customers are very encouraging and that 75% o f his customers say he isn't charging enough.

Table 19. Sales of Farm Products

Items sold from farm	Value of farm products consumed ($)	Marketing arrangement(s)	Relationship with customers	Portion of the retail price received for your farm products (%)	
				1991	1999
hay, apples, some pulp wood (presently stopped farming)	200.00	Sold apples direct from farm or truck, also to Scotian Gold	9 (direct sales)	82.5 direct sales of apples	N/A
Organic garlic	1,000.00	Sells at farmers market and directly	10	70	70
carrots, onions, peas, chicken and turkey broilers, grain	100.00	No relationship with customers -- sells to processors mostly	1	4 for carrots	4 for carrots
apples	15.00	Sells to Scotian Gold and has farm stand	9 (farm stand)	?	?
Organic breeding stock: sheep, cattle, pigs, and chickens	8,000.00	Sells to other farmers	N/A	--	
milk, meat (beef), grain	876.00	Sells to dairy	1	?	46
grain, pork, beef	0.00	Sells to Pork NS and a portion at farm store	"good" relationship with direct customer	100 for farm store pork	100 for farm store pork
Organic beef, vegetables, berries, some grain & hay	350.00	-Wolfville farm market -wholesale	10 1	Beef: 10 Veg: 90	Beef: 75 Veg: 100
Mean	1,317.63		6	59	66

Consumer / Farmer Relationship, and Consumer Understanding of Farming

"We have tried to avoid wholesalers and deal directly with Sobey's. We'd love to just sell right from the farm. But the apples go through a packing house, the chickens through Canada Packers, the calves to a feed lot, and the vegetables are most direct. Dealing with wholesalers, there is no money in it…"
-Kings County mixed farmer (Campbell, 1994).

"We are being pressured into giving more concern to our environment. I am one to believe that this is a good thing. But I am concerned that this will go to an extreme. Hopefully there is a happy medium." -Kings County vegetable and poultry farmer (Campbell, 1994).

"Everything is all glass and concrete. Most people think soil is dirt." -Kings County vegetable farmer (Campbell, 1994).

"Most people are so ignorant of where their food comes from and the cost of production." -Kings County pork and poultry farmer (Campbell, 1994).

"I think it is probably a good idea [to have closer ties between farmers and consumers]. We have to educate the public. Retailers probably see it as an advantage not to educate the consumer. It would be nice to cut out retailers but our society isn't geared up for it. As a farmer you can only get by by doing one thing and doing a bang up job of it. You can't be doing all the marketing too."
-Kings County pork and poultry farmer (Campbell, 1994).

"People are getting farther and farther away from understanding the farm. Everyone used to have a grandfather on the farm."
-Kings County pork and poultry farmer (Campbell, 1994).

7. Resource Base Capacity and Environmental Quality

This section highlights only a few of the main resources underlying the productive capacity of agriculture. Although some trends might be visible in soil or water capacity and quality, they are very difficult variables to pin down at a county level. An attempt was made to use input use as an indicator of resource capacity, but again, it was too difficult to make assessments as none of the variables will hold still! This is, of course, what makes farming so challenging and exciting. It is more reasonable to look at what is happening at the farm level, and each farmer is in the best position to assess their own stewardship of the resource. Comments and case studies are presented along with some of the figures. The value of "nature's services" is also discussed.

Use of farmland in Kings County

"The overall farming capacity or capability (however defined and measured) of Kings County is disproportionately large relative to its comparatively meagre agricultural land resources. In 1996, for example, the county accounted for 0.52% of the total agricultural employment in Canada but … only 0.07% of the country's cropland area" (Robinson, 1999). "Similarly the industry's commercial infrastructure including agricultural processing is large relative to a total cropland base of only 58,000 acres. One aspect of local agriculture which partly reconciles these differences of course is in the importance of non-land based production, especially poultry, eggs, and hogs in the county. Another is the emphasis on land-intensive horticulture or high value crops. This commodity focus was influenced largely by the scarcity of farmland facing those attempting over time to develop farm and related businesses…. It is the availability of good farmland in sizeable blocks that is most limiting for farm development" (Robinson, 1999).

The scarcity of farm land along with the ost of land and competition with housing developments generally means that farmers have to crop more intensively and "make every acre pay" -- thus discouraging more extensive use of land such as hay/beef and discouraging the use of soil-building phases of a rotation. It becomes cheaper in the short run to use fertilizer and crop all the time. In the long run, there may be heavy prices to pay for the intensive use of land.

"In recent years 'early land' with adequate water for irrigation has become among the most valuable farmland in the Annapolis Valley. In the past such land was rated poorly" (Robinson, 1999).

Question: *What proportion of your farm land is in woodland, perennial crops, rotated pasture and hay, and annual crops?*

Table 20. Summary of Respondents' Use of Land, 1991-1999 (% of total farm area)

	Woodland	Perennial Crops (no plowing for at least 3 yr)	Rotated Pasture & Hay (plowed every 1-2 years)	Annual Crops	Total % shown
1991 average	21	30	6	20	77
1999 average	18	33	8	23	82
% change	-3	3	2	3	

Because we asked different questions, the Statistics Canada figures for cropped land and pasture land cannot be compared with the figures above (Table 20). Because perennial sod is helpful in building soil organic matter, we wanted to know the portion of land that is in perennial sod vs. short-term sod, which was not obvious from Statistics Canada tabulations.

It appears that the proportion of farm land that is wooded is declining over time. We have not assessed the quality of the wooded land for providing benefits to the farm such as materials, firewood, and habitat for beneficial insects and birds. However, it is a concern that wooded land (as a portion of total farm land) is declining. Perennial crops (such as established fruit and berries, hay and pasture) are important for soil cover to prevent erosion, and have the potential to build soil organic matter. The portion of perennial crops on farms appears to be increasing, which is potentially positive. Rotated pasture and hay is important for soil-building between annual crops in a rotation. They may not have as much potential for soil building and erosion protection because of frequency of plowing, but they are nevertheless important for soil building between annual crops. The portion of these crops appears to be increasing among interviewed farmers which is potentially positive. The portion of farm land in annual crops is also on the rise (see also Tables 21 and 22), which is good because it allows for more annual crops to be produced. However, there is concern that the portion of annual cropping is getting too high to allow for proper soil-building rotations. Two farmers mentioned that they trade land with other farmers in order to make sure they don't plant the same crop in too rapid a sequence. The purpose of planting other crops between peas or potatoes, for example, is to reduce disease and insect pressure that builds up in a monoculture system. Both farmers were very pleased with the effects of trading land, but one pointed out that there is still not enough diversity. There is a growing need for land-trading partnerships with farmers who grow a variety of different crops (including hay sod).

Table 21. Cropped, Pasture, and Wooded Areas as % of Farm Area in Kings County

Census Year	1976	1981	1986	1991	1996
Total area of farms (%)	100	100	100	100	100
Total cropped land* (%)	36	39	40	40	42
Pasture land* (%)	9	9	7	7	6
Wooded land (%)	37	36	34	??	??

Table 22. Use of farm land in Kings County

Census Year	1976	1981	1986	1991	1996
Total area of farms (acres)	166,777	165,167	149,079	139,476	138,955
Total cropped land* (acres)	59,291	64,569	60,293	55,904	58,288
Pasture land* (acres)	15,523	14,641	10,230	9,945	8,532
Wooded land (acres)	62,306	59,584	50,458	??	??

Source: Statistics Canada, 1997; 1992; 1987; 1982.

Example: The Need for Biodiversity
Mitham (1999).

Kenna MacKenzie, a research scientist specializing in berry crop entomology at the Atlantic Food and Horticulture Research Centre in Kentville, has done research into lowbush blueberry production in NS and NB. Her conclusions:
-it is important that there are enough flowering plants available for bees to forage before and after the blueberries [or other crops] blossom
-the bees have to have enough forage in the spring so they can get enough pollen and nectar to have reproduction for the following year.
-hungry bees won't reproduce, populations will plummet, and the crop will suffer

-lack of forage will also drive away wild pollinators (e.g. bumble and other bees, parasitic wasps) that are part of the ecosystem
-herbicides such as Velpar may reduce the competition blueberries face from other plants, but they also eliminate food sources for bees and other beneficial insects
- shelterbelts with lots of flowering plants as well as trees are important for encouraging beneficial insects.

Soil quality

"I can't say that we have been the best stewards. We lose a lot of soil in the ditch and the pond. I don't like to see it."
-Kings County pork and poultry farmer (Campbell, 1994).

"I feel very personal about all of our land. I want to build it up in quality. Luckily this isn't too hard since it was mostly forage and orchard…" -Kings County mixed farmer (Campbell, 1994).

"…Erosion is the difficult thing. The problem is there isn't much animal agriculture in the Valley anymore and not much money in hay. We could have a rotation of sod, but in the Valley the climate lends itself to vegetable production. Really we need [ruminant] animals for hay rotation and manure."
-Kings County poultry and vegetable producer (Campbell, 1994).

"… We struggle to do the right things…. We have a responsibility to maintain our agricultural and land resources. The burden on farmers is unfair."-Kings County vegetable farmer (Campbell, 1994).

"Organic people are bringing out the importance of maintaining the soil and the environment around us. We should have an awareness of these. We have changed practices and are evolving to reflect this new thinking. But there is so much information that it is hard to keep up." -Kings County vegetable farmer (Campbell, 1994).

"Do you know who is the biggest [soil] eroder? Man. With every house built that land is lost. It can never go back into agricultural land, as with every highway." -Kings County vegetable farmer (Campbell, 1994).

"There is no question but that land is alive. All in a life cycle…. To have productivity you have to have life for the breakdown process. We have been lucky… we have 18 [inches of topsoil]. That's why people are practicing minimum till or no till. To preserve this topsoil."
-Kings County poultry farmer (Campbell, 1994).

Among interviewed farmers there was an awareness of soil quality issues as well as a willingness to do something about maintaining the soil's productive capacity. It is one of the most important indicators of long term viability of farming, and it is very complex. For more background information on soil quality, please refer to the provincial agriculture GPI report.

Question: *What is the dominant soil texture on the farm?*
The soil textures ranged from clay to quite sandy soil. Most farms have a combination of different textures, which is apparently typical for the Valley.

Question: *What comments do you have regarding the soil organic matter levels on your farm over time?*

One farmer, who uses liquid manure, told us that it doesn't have much fibre, so he has to supplement it with crop residues and green manures. He observes that Valley farms are "losing the livestock sector" and expresses concern about the need for diversity. He thinks it would be ideal to turn the soil back into sod for two to three years [between annual crops], and that crop rotation is "really important". The trigger that caused him to pay attention to soil organic matter was that he experienced soil erosion and yield losses when he grew continuous monocrop potatoes. He also mentioned the soil around Canning has been "really depleted" over time. He also commented that higher levels of soil organic matter retain calcium.

Table 23. Soil Organic Matter Levels on Surveyed Farms

Type of farm	Comments about soil organic matter (SOM) levels/soil quality
Apples, no longer farming	There has been a decrease in SOM levels since they sold their livestock and stopped using manure in 1989. Until then, SOM was stable.
Garlic, organic	SOM level of 18% (extremely high) is a result of a conscious soil-building rogram.
Poultry, Field vegetables	In general, SOM is increasing due to green manure use, although SOM is more challenging to build up in sandy soils. We are developing an understanding of how to work it better.
Apples	SOM tends to be low, which is typical of orchards. Soil on this farm is a bit acidic and needs lime.
Mixed specialty, certified organic	Organic matter is incorporated routinely. Plant health, weed, insect, and bird life are all used as indicators of soil quality. "It's been a modest, slow process, with noticeable improvement.
Dairy	SOM is building up slowly with the use of composted manure and green manures. "It's a slow process."
Pork, grain, beef	Soil organic matter levels range from 1-2% (low) in some areas, and 3-4% (good) in others. Corn stalks, wheat stubble, and green manures are used to increase SOM. High SOM helps to retain calcium in the soil..
Certified organic mixed beef, vegetables, berries, grain, hay	Very conscious about not burning SOM, preserving it, and adding to it. From 1991 to 1999 SOM and soil quality have definitely improved.

Question: *What proportion of cropped land is bare over the winter?*

It appears that there is a high degree of consciousness regarding the soil loss potential when fields are left bare over the winter. Growers have changed crops and taken other steps to reduce bare soil over winter (see Table 24). It appears that less soil is left bare over the winter now than ten years ago.

Table 24. Soil Left Bare Over Winter, Surveyed Farms

Farm & Type	Proportion of Cropped Land Left Bare Over Winter
A - Apples, no longer farming	Fields were always left in sod unless they were to be seeded in the spring.
B - Garlic, organic	Soil is never left bare.
C -Poultry, Field vegetables	In the past, up to 50% of the soil was left bare, because one main crop was harvested late, with no time to establish a green manure. Now 20% is left bare because they no longer grow that crop. On 35 acres, straw was used to cover the soil over the winter.
D - Apples	No soil is left bare.
E - Mixed specialty, certified organic	No soil is left bare.
F - Dairy	21% of dykeland is plowed in fall and left bare for spring seeding because it's too wet to plow in the spring.
G - Pork, grain, beef	About 20% of the cropped land is left bare over the winter.
H - Certified organic beef, vegetables, berries, grain, hay	In 1991 about 10% was fall plowed for spring planting. In 1999 about 1% (2 acres) was worked in the fall and left bare. Uses winter grains to avoid bare soil over winter.

Question: *Have you taken actions over the years to improve soil quality? Please describe them.*

Every farmer answered yes to this question without hesitation. Their descriptions of soil improvement practices are reproduced below in their own words.

A: Regular manure applications until 1989 when livestock was sold. Since then, fertilizer and lime has been applied as required by test results.
B: This farmer spends 8-10 years improving the land before cropping it. In the first year, manure is added, buckwheat is planted. Then manure is added again and heavy oats are planted. Then there is a sequence of clover, oats and barley, then another year of clover. Green manures are varied according to nutrient needs. "The purpose of farming is to increase the resource; the crop is a by-product."
C: Depending on soil needs, specific green manures are now planted. For example, ryegrass is used for its excellent root system, oats for vegetables, and barley for soil improvement. Crops are rotated and monoculture farming is avoided.
D: Lime is applied. The soil is ripped four feet deep to aerate the soil between orchard trees.
E: Green manures and livestock manure is applied to land. Fish fertilizer was used until it became too expensive.
F: Composted manure and green manures have been used to improve soil. No synthetic fertilizers or pesticides have been used for 11 years.
G: There has been less soil compaction following use of no-till methods. Cash crops are rotated with sod. Rye is planted as a cover crop then killed with Roundup and corn is planted directly into the residue. The yields were low initially, but now the crops are 70% or better than they were before no-till. No-till saves on tilling costs and decreases soil compaction. The Roundup costs only about $7 to $8/acre. No-till wheat is being grown on a pilot basis also.

Crop Expenses vs Revenues
This is a very tricky variable to pin down trends for. The information gathered is presented here, with very few conclusions.

Question: *Do you use synthetic fertilizer to fertilize crops? Which crops? How much money is spent on fertilizer? Do you have any comments about synthetic fertilizer use?*

As seen in table 25, only four of the eight farmers use synthetic fertilizer. Of those four, all mentioned that they apply fertilizer based on soil and leaf tests. A more precise application based on testing allows for some reductions in fertilizer use as well as cost savings. In one case, the increased amount of fertilizer needed is balanced out by more precise application methods, resulting in no net change in costs over time. One farmer mentioned the price of fertilizer has gone up. [insert fertilizer price index here too] He also said that it costs so much to apply liquid manure that it is cheaper for him to buy synthetic fertilizer. Another farmer said he uses less synthetic fertilizer because of increased animal manure use.

Table 25. Synthetic Fertilizer Use on Surveyed Farms

Farm & Type	Fertilizer used?	Crops fertilized?	Amount spent on synthetic fertilizer ($)	
			1991	1999
A - Apples, no longer farming	yes	Apples and hay	4,000	0
B - Garlic, organic	never		0	0
C - Poultry, Field vegetables	Yes -- 50% is synthetic 50% is animal and green manure	Carrots, onions, peas, wheat	??	50,000
D - Apples	yes	apples	??	1,100
E - Mixed specialty, certified organic	no		0	0
F - Dairy	Not since 1988		0	0
G - Pork, grain, beef	yes	Everything - grains mostly	30,000	30,000
H - Certified organic beef, vegetables, berries, grain, hay	no		0	0

Table 26. Fertilizer and Lime Expenses, Kings County

Year	Gross Farm Receipts ($'000)	GFR/farm ($)	Fertilizer and lime expense ($'000)	F & L per farm ($)	Ratio of F & L to GFR (%)	Ratio of F & L to total crop expenses (%)
1995	132,449	187,340	3,335	6,426	2.5	36.8
1990	125,202	187,991	2,931	5,874	2.3	40.8
1985	98,464	138,487	3,262	6,007	3.3	43.0
1980	71,109	89,784	2,577	4,156	3.6	N/d

Source: Statistics Canada, 1997; 1992; 1987; 1982; Historical Overview of Canadian Agriculture

Fertilizer and lime expenses have remained quite stable between 1980 and 1995 (Table 26). Even though the price index for fertilizer has risen above the price index for farm products, gross farm revenues have not declined relative to the amount spent on these two inputs. Lime purchases during this time have, however declined (see Table 28).

Question: *Do you use lime? How much money is spent on lime? Do you have any comments about lime use?*

Most farmers interviewed used lime, and thought its use was beneficial. Costs appear to have gone up for a couple of the growers. The subsidy for lime has gone down over the last 10 years, although it was not totally removed until 2000. One grower commented that there is no net increase in lime costs over the last 10 years because of precision application (which makes lime use more efficient by putting it where it is needed). Two farmers commented that use of livestock manure on fields helps to stabilize lime requirements. Farm "F" has had soil pH stabilize since synthetic fertilizer use was terminated in 1988. Given adequate soil organic matter, once the pH was raised, it stayed up.

Question: *Do you use animal manure to fertilize crops? Liquid/solid? Which crops? Does any manure used come from elsewhere? Is any of the manure used composted? Money spent on manure (including application costs)? Comments?*

Every farm except one uses manure, either from their own farm (5/8) or from another farm (2/8) (see Table 29). All growers with their own solid manure are composting it (4/8) prior to field application. Two farmers mentioned that it's cheaper to use synthetic fertilizer but there are more benefits

associated with using manure including an increase in soil micro-organisms and improvement in humus.

Table 27. Lime Use on Surveyed Farms

Farm & Type	Lime used?	Comments?	Amount spent on lime ($)	
			1991	1999
A - Apples, no longer farming	yes	Cheapest soil amendment with steady results	800	0
B - Garlic, organic	Uses fish bone meal	Dolomitic lime can bind minerals in soil. Lime is generally used as a band-aid instead of for soil-building	100	0
C - Poultry, Field vegetables	Yes	Uses GPS system to target lime applications. Soil samples show whether to use dolomitic or calcitic lime. Apply lime every year.	5,000	5,000
D - Apples	yes	Applies every two years. It was cheaper when it was subsidized. 3-4 tons/acre applied, depending on leaf and soil analysis.	??	??
E - Mixed specialty, certified organic	no			
F - Dairy	yes	Uses lime plus gypsum, which builds up soil calcium levels faster than calcitic lime	??	467
G - Pork, grain, beef	yes	Soil pH stays higher with manure applications. Subsidy has decreased, causing the per unit cost to rise for the farmer.	3,000	6,000
H - Certified organic beef, vegetables, berries, grain, hay	yes	Usually doesn't have enough money for lime.	?	0

Table 28. Lime Use, Kings County and Nova Scotia Farms

Year	Kings Co. farms		Nova Scotia farms	
	Total use of lime (tons)	Average amount per farm (tons)	Total use of lime (tons)	Average amount per farm (tons)
1998	6,500	9.2	18,203	4.1
1997	6,247	8.8	23,786	5.3
1996	8,188	11.6	22,582	5.1
1995	12,867	18.2	55,000	12.4
1990	18,088	27.2	75,477	19.0
1985	23,034	32.4	92,732	21.6
1980	30,714	38.8	99,330	19.7

Source: McLaughlin and Robinson, 1992; 1999. They cite the Nova Scotia Department of Agriculture and Marketing.

On one farm, manure is applied either in the fall before a green manure is sown, or in the spring/summer to pasture. The farmer has noticed an increase in the quality of the feed each year, and animal health is getting better every year.

Another farmer decided to invest $55,000 in a concrete composting pad and building to protect the manure being composted. He felt it was well worth the money because the higher quality composted manure eliminates fertilizer costs. Nutrients are retained (not leached) in the manure because of the protected composting area, and in the soil because the compost increases organic matter.

Table 29. Manure Use

Farm type	Manure used (crop)?	Comments?	Amount spent on manure ($)	
			1991	1999
Apples, no longer farming	Solid manure (hay, apples)	100% of manure comes from off the farm now that livestock are gone. When they had livestock, manure used in orchard was composted.	0	0
Garlic, organic	Solid manure (garlic, vegetables, hay)	100% of manure comes from off the farm. It is applied before green manures are grown for two years.	87	87
Poultry, Field vegetables	Solid composted manure (onions, carrots, peas, wheat)	All own farm manure.	5,000	2,500
Apples	none		0	0
Mixed specialty, organic	Solid, composted manure (all crops)	All own farm manure. Exchange a case of beer for spreading job.	0	~30
Dairy	Combination of liquid (aerated) and composted solid (hayfields)	10% of manure comes from off the farm and it is traded for straw. Manure applications on fields have increased fertility too much in some cases.	0	0
Pork, grain, beef	Mostly liquid manure (grains, grassland)	10% of manure comes from off the farm. $125/hour is spent to spread the liquid manure.	?	37,500
Organic beef, vegetables, berries, grain, hay	Solid, composted manure (vegetables, pasture, hay)	All own farm manure. Would like to have a concrete pad to help with the composting process and reduce nutrient losses.	0	0

Case study: One Dairy Farmer's Attempt to Reduce Costs and Increase Benefits
(from Jannasch et.al. 1999)

Background The number of dairy farms in Nova Scotia declined from 490 in 1994 to 419 in 1998. Cow numbers per farm increased 14% from 50 to 57 in the same period . With consolidation into larger herds, the overall trend is away from grazing towards confinement housing. Infrastructure development has focused on maximizing production rather than controlling costs. Technological advances have been made in capital intensive, mechanical harvesting and feeding systems, but little research has been directed towards relatively low input grazing systems. Focusing on increased production runs the risk of nutrient loading in the environment from nutrient runoff. Meanwhile, farm input costs continue to rise and quota values have risen 79% since 1996. On the other hand, expectations are that liberalization of world trade will cause milk prices to fall for Canadian farmers. Reducing costs while building long-term soil fertility is an opportunity and a clear option to maintain profit margins.

Kipawo Holsteins is a 75 cow dairy in Kings County, N.S., consisting of 86 ha (211 a) of dykeland and 63 ha (154 a) of upland. In 1988, owner Herman Mentink took the first step towards more sustainable farming methods by eliminating purchased N-P-K fertilizers and synthetic pesticides. He stopped growing corn, diversified his crop rotation and adopted a more systematic approach to soil management. Herman Mentink's focus was on reducing costs rather than increasing production. Emphasis was placed on optimizing the ratio of soil cations and replacing dolomitic limestone with gypsum and calcitic lime. In 1992, cows were given limited access to pasture and by 1996 were grazing under a Management Intensive Grazing regime that usually extends from late April to early November. Other innovations included fall cover cropping and the construction of an enclosed composting facility in 1997. Milk production has increased from 8272 kg per cow in 1990 to 8789 kg in 1998 and the feed cost per litre of milk has declined from 15.3 cents/litre to 10.6 cents/litre over the

same period. Purchases of dairy concentrate have decreased 20%. With the exception of imported concentrate and some waste poultry manure, the farm is self-sufficient in nitrogen. Fourteen years of soil analysis reveal that a decline in potassium levels immediately after 1988 has been reversed and phosphorus levels remain high. Calcium use is declining. The switch to ecological farming methods has generated considerable cost savings in terms of fertilizer and feed purchases and resulted in opportunities for selling organic milk.

Some Reduced Costs
-Prior to 1988, as much as $10,000 was invested in fertilizer per annum.
-Consistent drop in feed costs from 15.3 cents/litre in 1990 to 10.6 cents in 1998. The provincial average in 1996 was 14.60 cents. In total, feed costs have decreased from $126, 5621 to $95,283 per year while milk production has increased 8.6% from 8272 kg in 1990 to 8989 kg in 1998. Although the reduction in feed costs is considerable, it does not account for land costs or lost opportunity costs.
-Veterinary costs have not changed appreciably, but Herman Mentink has observed an improvement in leg and hoof condition. Heat detection is also easier even though breedings per cow and breeding interval have not changed substantially. Until the late 1980's feed analyses indicated low levels of forage calcium, and calcium supplements were included in the ration. Since 1990, calcium levels have increased and mineral supplements, except kelp meal, are no longer fed.

Some Environmental Benefits
The adoption of sustainable farming practices has, in all likelihood, generated environmental benefits which were not explicitly measured. Given the relatively high levels of soil P, it is reasonable to assume that if P fertilizers were still being applied, some release in the environment would be occurring. Other studies have found nutrient inputs are typically 3-8 times greater than exports on New York dairy farms, contributing to hazards including nitrate accumulation in groundwater, eutrophication of water due to P loading and negative effects on animal health caused by K accumulation in feedstuffs. Leaching of N and K from uncovered manure piles has been largely eliminated at the Mentink's by the construction of an enclosed composting facility. In a high rainfall region such as Atlantic Canada up to 50% of K cations and a significant portion of N may be lost over winter, when leached from uncovered manure pile. Finally, with such a large portion of his land under semi-permanent or permanent soil cover, erosion and run-off risks are minimal.

Case Study - Finding a Balance During Drought
From DeMoura, D. 1998.

By the end of 1998, farmers in the Valley had experienced one-in-35-year dry conditions two years in a row. 1999 was no better. 2000 is looking dry too. Farm Focus headlines proclaim drought-related losses of 50 million or more per year in agriculture. How can farmers cope with this climatic calamity? Denise DeMoura gathered some comments in her article, some of which is reproduced here:

Brian Smith, Executive Director of Agricultural Development for Nova Scotia "is encouraged by the increased adoption of sustainable practices by farmers. … 'some soils in the Valley are being overworked. Monocultural practices have to be addressed. We do need to look more closely at the economics of producing the best balance of crops -- between economics and conservation.'"

"Forage crop production has suffered badly in the last two years [1997 and 1998]. Many farmers have reduced their herds, hanging onto just enough to keep them in business. 'One thing beef, dairy, and sheep herds need is plenty of forage,' says Bill Thomas, forage specialist in Truro. This year [1998] was especially bad because there was no moisture at the start of the growing season."…

"Ted Hutten isn't interested in drought compensation. He considers drought a normal part of the farming life; there are ups and downs, and it's just one of the downs.

His operation has some flexibility. He is not hemmed in by conventional forage systems. Nine beef cattle are a new addition to his farm, and they keep the insulated barn warm enough so vegetables and apples can be stored above them all winter. He buys hay to supply one of their daily meals; in season, the other meal is discards from his five acres of mixed vegetables.

The cattle also offer the added benefit of manure to keep the gardens high in organic matter, so the soil retains as much moisture as possible. Hutten claims not to know much about long-term solutions to the drought problem, but his actions speak louder than words.

He's also interested in more adaptable root stocks for future apple trees. 'These new small trees have such shallow root systems they can't stand any drought.' He chooses not to grow potatoes precisely because they require so much irrigation. In a lean year, he has the advantage of being able to set his own prices; the majority of his sales are direct to consumers through the Halifax Farmers Market….

Charles Thompson, vegetable specialist with the Department of Agriculture and Marketing in Kentville…would like to see more diversity…. New food products broaden the industry, making it more secure….

Processing under-utilized commodities is a way to diversify, and diversity is the survival tool of the small. Potato farms have grown larger in the Valley since Hostess asked farmers to specialize for economies of scale. There are fewer than a dozen potato farmers in the region now supplying Hostess, and they were hit hard by drought… Potato farmers in Nova Scotia are now scrambling to find more fields to add to their rotations. [Charles] Thompson also suggests the possibility that they could subcontract to other farmers; this would be a logical arrangement, since potatoes grow better coming after forage sod…..

Certainly farmers can't count on financial aid or compensation. 'Five years ago government started cutting the heart out of agricultural assistance,' says Laurence Nason [NSFA]. Farming is in crisis, with prices remaining low. 'People are starting to realize that to ensure a stable supply they're soon going to become dependent on sources they have no control over,' he adds, 'like Mexico, where DDT is still used.'

Pest control

There is a certain amount of pride associated with the ability to reduce pesticide use. In general, pesticide use was regarded as a practical tool, but everyone would cut down on its use if they could. For more background information on pesticides, please refer to the provincial agriculture GPI report.

Question: *How much money on average did you spend on crop protection products and services? Do you have to apply more/less to get the same results as in previous years? Any other comments?*

One farmer who is very satisfied with IPM system in his orchards also pointed out that sometimes he has to switch products because the insects develop a resistance. Two farmers mentioned that newer pesticides are more expensive but also more concentrated. The apple growers who use synthetic pesticides mentioned (with a certain amount of disgust) how much of the product is used for cosmetic reasons only. In one case a fungicide is sprayed every seven days. One organic grower observed a greater variety of insect eating organisms including ladybird beetles, various birds, and bats along with a decline in mosquitoes and slugs over the last three years.

Table 30. Crop Protection Products and Service (CPP&S)Use on Surveyed Farms

Farm & Type	Amount spent on CPP&S ($)		Comments
	1991	1999	
A - Apples, no longer farming	13,500	0	Products became more expensive and concentrated over time and as banned products like DDT were replaced. New methods of application are more expensive.
B - Garlic, organic	17.50	0	One can of Bt lasts 10 years. Also uses hand picking and bran for pest control.
C - Poultry, Field vegetables	??	60,000	Pest control has become more expensive.
D - Apples	?	?	Well worth the money. Costs slightly more. Uses an IPM system and likes it.
E - Mixed specialty, organic	0	19	Uses Safers Soap and special plant-based home brew for different plants and different challenges.
F - Dairy	0	0	I don't have pests now that I don't grow corn. Some blowfly in manure, but composting helps to resolve it.
G - Pork, grain, beef	14,000	14,000	Herbicide use varies according to humidity and crop rotation (rotation = not the same weed every year). Also uses Bt corn with 20% refuge. Finds Bt cost-effective.
H - Organic beef, vegetables, berries, grain, hay	0	0	We have a high tolerance for pests at this point and use manual methods of control. Tolerance for pests may lower after off farm job is given up.

Comments from farmers regarding pesticides:

"…people think there are too many chemicals used, but they direct this at local farmers, not the United States and other countries where regulations aren't as tight; then people got to the store and pick the nicest apples, which are probably the ones with the most chemicals on them!… People are going to have to change their ideas if they want less spray about how produce should look."

- Kings County mixed farmer (Campbell, 1994).

"… I guess I am still quite willing to use pesticides in growing our crops. I would use fewer. From an economic point of view it is to my advantage to cut down… I can see some farmers using less pesticides, but it makes a big difference if a lot of your land is in sod relative to vegetable production…" -Kings County poultry and vegetable farmer (Campbell, 1994).

"… people are being hypocrites. Look at other examples -- roads, buildings, all the families with two cars. What of the impact of these things?… Pesticides are a result of what society has generated; no one wants to pull weeds or squish bugs by hand."

-Kings County vegetable farmer (Campbell, 1994).

"...I don't get overly concerned because I know there is a balance. Our government regulations have been getting stricter and stricter. They are unbelievably safe compared to when we started." - Kings County vegetable farmer (Campbell, 1994).

"You have the full spectrum from organic to total reliance on artificial chemicals. The reality has to be somewhere in between…. We need more Integrated Pest Management… IPM is logical. It makes sense. You knock out the parent population at the right time. [As a result] there is a lot less use of pesticides." -Kings County poultry producer(Campbell, 1994).

"We're always finding out that stuff we thought was safe isn't safe -- like DDT." -Kings County pork producer (Campbell, 1994).

"I started to farm before a lot of chemical use came in. When they did they were presented to us as very safe, nothing to worry about. We handled things with our bare hands; no respirators. The tradition of spraying here goes back about 80 years with the orchards. I didn't have the respect for these things that [my son] does. I do now. He has taught me."
-Kings County vegetable and beef farmer (Campbell, 1994).

Table 31. Pest Control Products Expenses, Kings County

Year	Gross Farm Receipts ($'000)	GFR/farm ($)	Pesticide expense ($'000)	P per farm ($)	Ratio of P to GFR (%)	Ratio of P to total crop expenses (%)
1995	132,449	187,340	3,324	8,611	2.5	36.7
1990	125,202	187,991	2,433	6,369	1.9	33.8
1985	98,464	138,487	2,399	5,193	2.4	31.6
1980	71,109	89,784	1,704	3,246	2.4	n/d

Source: Statistics Canada, 1997, 1992, 1987, 1982; Historical Overview of Canadian Agriculture

Pesticide expenses are rising on Kings County farms (Table 31) and the ratio of pesticide expenses to total crop expenses is also on the rise, indicating that farmers are having to spend a larger percentage of their crop expense budget on pesticides.

Example: Nature's 'Free' Services
Insectivorous wild life at your service (Gibson, 1997):
-One bat may catch an estimated 3,000 insects per night. However, a few insects, like lacewings, can hear bat calls and manoeuvre to escape. (Lacewings are beneficial insects.)
-Swallows prefer open spaces where they can wheel widely and hawk for insects.
-Yellow warblers busily flit through the shrubs and trees searching for insects…. They capture all types of insects, including many… pests.
-… the numbers for some songbirds, including the rose-breasted grosbeak and gray catbird [largely insectivorous], have declined. Furthermore, researchers predict that other common species may also become scarce during the next one or two decades.
-short eared owls, barred owls, and red-tailed hawks are valuable for controlling rodents
-dragonflies and damselflies are major predators of mosquitoes and blackflies
-downy woodpeckers "feed primarily on insects and search through the shrubs and trees to find them. … [They] consume large numbers of corn borers and are an important means of naturally controlling this agricultural pest."

-"flickers eat insects of all types and catch them both on the ground and during flight….In late summer, they also feast on grasshoppers."

Example: Farmers Recognize Non-Monetary Values
Short-eared owls in Kings County (Gibson, 1997):
Short-eared owls nest on dykelands, often in well-established hayfields. New varieties of hay that mature earlier, and the need to get two cuts of hay per season have made successful nesting difficult. Local naturalists studied their nesting patterns, and presented the information to farmers who "fully supported" a proposal to avoid cutting hay where the owls are nesting. The farmers "recognized the value of these birds in controlling rodents." Volunteers monitor over 9000 acres of dykelands from the roads. When they identify a nest, the farmer is approached for permission to visit the site, and an experienced birder assesses and flags sites that need to be mowed around.

Example: Conservation Co-operation
Bald eagles in Kings County (Gibson, 1997):
Bald eagles were scarce in the area in the mid 1900s, but today there is an expanding population thanks to a community effort in Sheffield Mills. Discontinuing use of pesticides like DDT was one critical factor along with changing human attitudes. "The provision of winter feeding stations is another explanation for the growth of the eagle population. Farm carrion is a valuable source of energy. In the early 1960s, Cyril Coldwell, a local farmer and birder, established a carrion pile on his farm and after several years up to 50 eagles sometimes visited it at one time. Other farmers followed his example… One poultry farmer, Dick Harvey, described the arrangement as: 'a good partnership. The eagles need to eat and I have mortality in my barn. They clean it up.'

Crop and Livestock Value

Question: *What is the approximate value of crops produced on your farm in 1991/1999? (Estimate replacement value for crops used to feed livestock).*
Question: *What is the approximate value of livestock and livestock products produced on the farm in 1991/1999 (excluding non-food related stock such as pets, horses etc)?*

Table 32. Crop and Livestock Value, Surveyed Farms

Farm & Type	Crop Value ($)		Livestock Value ($)		Total Food Value ($)*	
	1991	1999	1991	1999	1991	1999
Apples, no longer farming	50,000	0	0	0	50,200	200
Garlic, organic	10,000	2,000	0	0	11,000	3,000
Poultry, Field vegetables	400,000	800,000	1,100,000	1,800,000	1,500,100	2,600,100
Apples	??	??	0	0	??	??
Mixed specialty, organic	10,000	0	10,000	3,500	28,000	11,500
Dairy	??	??	250,000	300,000	250,876	300,876
Pork, grain, beef	125,000	85,000	?	1,000,000	??	??
Organic beef, vegetables, berries, grain, hay	9,125	22,800	15,000	26,000	19,475	30,250

*Total food value = livestock value plus crop value not fed to livestock and also includes replacement value of farm-produced food that is eaten on farms.

Table 33 and 34 below shows some of the revenue and cost information for livestock production in Kings County

Table 33. Feed and Supplement Expenses, Kings County

Year	Gross Farm Receipts ($'000)	GFR/ farm ($)	Feed and Supplement expense ($'000)	F & S per farm ($)	Ratio of F & S to GFR (%)	Ratio of F & S to total livestock expenses (%)
1995	132,449	187,340	32,929	78,589	24.9	67.2
1990	125,202	187,991	30,066	74,237	24.0	61.6
1985	98,464	138,487	29,725	66,948	30.2	71.0

Source: Statistics Canada 1997, 1992, 1987, 1982; Historical Overview of Canadian Agriculture

Table 34. Vet and Drug Expenses, Kings County

Year	Gross Farm Receipts ($'000)	GFR/ farm ($)	Vet and Drug expense ($'000)	V & D per farm ($)	Ratio of V & D to GFR (%)	Ratio of V & D to total livestock expenses (%)
1995	132,449	187,340	1,404	3,900	1.06	2.87
1990	125,202	187,991	904	2,417	0.72	1.85
1985	98,464	138,487	588	1,492	0.60	1.40

Source: Statistics Canada 1997, 1992, 1987, 1982; Historical Overview of Canadian Agriculture

Feed and supplements are a major expense for livestock farmers in Kings County. About 70% of livestock expenses are for feed. The expense for feed is declining somewhat relative to gross farm receipts on County farms; it has declined from 30% to 25% of gross farm receipts (see Table 33). Veterinary and drug expenses, although they are a very small portion of total livestock expenses (3%) have risen relative to gross farm receipts between 1985 and 1995 (Table 34). It would be good to track this indicator over a longer period of time in order to see if vet and drug costs are really rising relative to other costs and relative to income. It is interesting that both pesticide and vet/drug costs are showing similar preliminary trends. If they continue to rise it indicates that either the prices of these items are rising faster than other prices, or their use is rising *ceterus paribus,* which indicates a long-term weakness in cropping and livestock systems. At this point these two indicators will simply be flagged for future monitoring.

Question: *What proportion of livestock feed is produced on the farm? Off the farm but within the county? Off the farm, outside the county?*

Results: None of the feed for livestock is purchased outside of the county. The amount produced outside of the county is unknown but assumed to be a significant amount.

Water quality & capacity

Questions: *We asked a number of different questions regarding water quality in an attempt to assess any changes in water quality/quantity on farms over time as well as any costs associated with changes.*

All farms use at least one well. The only complaints about water quality were because of an animal getting into the well, or the water is 'hard'. Farm "G" uses a $4,000 filter, but otherwise, everyone uses and is satisfied with their well water. There were some complaints about surface water. In two cases surface water quality has gone down because of a neighbour's farming practices. Another farmer pointed out that surface water tends to be good until it "goes by a town".

Two farms do some irrigation. In both cases costs have gone up because of the introduction of a new crop that needs to be irrigated. Therefore it is difficult to make a statement about trends in irrigation costs. In 1999, one spent close to $200,000 for irrigation. Certainly the land area irrigated in Kings County has risen dramatically between 1980 and 1995 (Table 35).

Table 35. Irrigation in Nova Scotia and Kings County

Year	Number of farms with irrigation		Area irrigated (ha)	
	Kings	NS	Kings	NS
1995	111	280	1,601	2,239
1990	72	180	1,386	2,179
1985	65	157	838	1,169
1980	55	126	387	605

Source: Statistics Canada, 1997; 1992; 1987; 1982.

Question: *What recommendations for action would you have to reduce risk from drought?*

Of all the water quality questions we asked, this was the one that yielded the best information and ideas. The following comments were recorded.

A: The farmer believes, like his grandfather before him, that it was/is a mistake to drain land. He feels that the water table is dropping. "If you have a bucket of water and don't want to lose it, you don't punch holes in the bottom."
B: Higher organic matter helps during a drought. Use mulch in gardens.
C: More wells. Collect water off-season in catchment basins and existing marshes; use booster pumps to distribute. Find ways to track water use (some farmers don't get permits to draw water and are not tracked). Develop infrastructure of water steps down the mountains [that border the Valley].
D: Store water in reservoirs on mountain, fill in winter, feed into brooks. North Mountain is ideal.
E: Increase soil organic matter. Use mulch in gardens.
F: Increase soil organic matter -- to a point. Don't overwork the soil. Dykeland is good during drought.
G: Grain crops are tougher and don't need irrigation. The corn he harvested last August (during the drought) was the "best ever". It was Bt corn and he thinks this helps it survive better.

Observations: Two respondents had very technical solutions to the drought problem, and the others mentioned more biological solutions. No one mentioned restoration of tree cover or wetlands which are known to reduce the severity of drought conditions.

"I get upset and worry about our water supply and the high nitrate levels."
"But that may be there naturally. They are trying to blame the farmers."
-Kings County pork and poultry farmers (Campbell, 1994)

Study of Farm Well Water Quality in Kings County
Briggins and Moerman, 1995:
In 1988, the Province of Nova Scotia initiated a four-year study of water quality in the most risk-prone areas of Kings County. These areas are all farmed intensively. Water samples were collected in the summer of 1989 from 102 wells for pesticide, nitrate-N, and coliform bacteria analysis. An additional 135 wells were analysed for nitrate-N only.

The study area is generally characterized by deep, coarse-textured soils. Ninety percent of the population relies on wells to meet their water supply needs.

Results:
Very low levels of pesticides were found in 41% of the wells. All residue levels were below maximum acceptable concentrations for Canadian drinking water. Atrazine was the most prevalent pesticide, occurring in 79% of the wells with detections (Table X). Eight wells had more than one pesticide detected. In general, there was a tendency for wells with pesticides to also have elevated nitrate-N concentrations. The pesticides selected for analysis were derived by a panel of agricultural specialists based on pesticide properties and use patterns in the area.

The majority of cases with Atrazine contamination reported no Atrazine use in the last 3 years, and in some cases, within the last 10 years. This indicates how persistent Atrazine and its metabolites can be in the environment.

Nitrate-N levels exceeded guidelines of 10 mg/L in 13% of the study wells (the provincial average is 7%). The maximum concentration measured was 46 mg/L. A study in 1974 of Canning area wells found that 25% had nitrate-N levels that exceeded guidelines. In this study, 29% of the wells sampled in the Canning area exceeded the guideline.

Coliform bacteria exceeded guidelines in 9% of the study wells.

Since it has been more than ten years since the water samples were collected for analysis, another study of the same wells to compare results would be useful now that there is a baseline reference point.

Table 36. Pesticides used and detected in Kings County agriculture, Briggins and Moerman, 1995

Pesticide	Trade Names	Annual Use(1)	Leaching potential (2)	Occurrence (% of wells with detections)
Atrazine	Aatrex, Vectal	high	probable	Atrazine and its metabolites: 79%, Simazine: 12%:
Atrazine with cyanazine	Blazine	high	probable	
Atrazine with bentazon	Laddok	high	probable	
Atrazine with dicamba	Marksman	high	probable	
Atrazine with simazine	Ekko, Eramox	high	probable	
Atrazine with metolachlor	Primextra	high	probable	
Des ethyl atrazine	(atrazine metabolite)	high	probable	
Chlorothalonil	Bravo	medium	probable	2%
Azinphosmethyl	Guthion	low	high	
Dimethoate	Cygon, Sys-tem, Hopper Stopper	low	high	2%
Malathion	Malathion, Cythion	low	potential	
Captan	Captan FL	high	unlikely	5%
Deltamethrin	Decis	low	unlikely	
Permethrin	Ambush, Pounce	low	highly unlikely	2%
Chlorfenvinphos	Birlane	low	Not ranked	
Metolachlor	Dual, Primextra, Dualin, Checkmate	?	?	5%
Alachlor	?	?	?	7%
Metribuzin	Sencor, Conquest, Lexone	?	?	10%

1. Based on 1986 pesticide sales for Nova Scotia (Environment Canada, 1988). High: >30,000 kg a.i. Medium: 5,000 - 30,000 a.i. Low: <5,000 kg a.i.
2. Based on leaching potential values (LPVs) from McRae (1989).

Example: Amphibians as indicators in Kings County
(Gibson, 1997): In many places, the numbers of amphibians have undergone dramatic reductions during the past decade. Practices such as draining marshes and meadows, and cutting forests often result in a loss of amphibian habitat. Acid rain and other types of pollution also reduce breeding success. Amphibians live both on land and in water. They have a moist, permeable skin and quickly respond to changes in the quality of air and water. Amphibian populations are excellent indicators of environmental stress and should be monitored with care.

Energy and Other Efficiencies

We did not get a very complete picture of energy efficiency as we did not ask how much each farmer spent on fuel use and electricity. However, we discussed the issue, and present a table of alternative measurements of efficiency as a way to conclude the section on resource capacity and environmental quality.
Question: *Do you have any comments about energy use efficiency on your farm?*
Most of the responses to this question were centered on efficiency of machinery use. Farm "C", for example, uses more efficient machinery helps to reduce energy use and reduces travel over fields. They use more fuel now than in 1991 because they have more land now -- which results in a net increase of fuel use. In general growers try to be as energy efficient as possible, given the resources they have.

Question: *Do you have ideas for improving energy efficiency?*

Four ideas given were to insulate buildings, redesign barns for natural ventilation, upgrade machinery, and harness tidal power.

Question: *What would you need to implement efficiency measures?*

Almost every farmer said he or she needs money. Other needs were design information and lower fuel prices.

It has been shown in the Netherlands and Canada that a significant energy input into farms is synthetic fertilizer.

Table 37. Various Ways of Measuring Efficiency

Types of efficiency	Details	Emphasis on
Feed conversion efficiency	Decrease in feed required per unit of animal product	Very controlled breeding, environment and feed
Lower mortality rate	Decrease % mortality of livestock	Breeding, handling etc
Labour efficiency (or productivity)	Increase product output per worker hour. (Important where labour is expensive or unavailable.)	Mechanization, automation, capitalization
Land efficiency (or productivity)	Increase product per acre. (Important when land is expensive.)	Intensive use of land
Animal unit efficiency	Increase production per cow or per sow etc. (Important when cost of feed is low relative to investment in each animal.)	Intensive animal feeding

Price efficiency	Increase earnings per unit of product. (Important when margins are low.)	Food quality, direct marketing, product differentiation
Energy efficiency	Increase product or earnings per unit of energy use. (Important when cost of fuel is high or energy use leads to climate change.)	Efficient designs, technologies, alternative energy
Waste efficiency	Decrease landfill waste; nutrient losses. Increase use of safely re-usable and recyclable materials	Minimize off-farm inputs, optimize use of on-farm resources.
Design efficiency	Waste from one production area used as a feedstock for another production area	Efficient designs, minimize excess work and off-farm inputs
Input use efficiency	Increase production earnings per off-farm input expenses, *while maintaining productive capacity*	Reducing use of socially-costly inputs such as synthetic fertilizer or plastic
Transportation efficiency	Reduce total amount of km shipping required for inputs and outputs	Local sourcing, local markets
Ecological efficiency	Optimum use of nature's services for nutrient recycling, pest control, water recycling and filtration etc.	Design, habitat, ecological knowledge

"…In the past we farmed labour. Today we farm capital" -Kings County vegetable farmer (Campbell, 1994).

"The whole challenge is finding cash to buy equipment and to mechanize…. I have to try and produce cheap enough so that my costs are cheaper than anywhere in the world regardless of their conditions and what they pay for labour…"
-Kings County vegetable and beef farmer (Campbell, 1994).

"From a practical point of view animal products are more efficient than vegetable. Animals convert non-edible vegetable matter into usable protein." -Kings County poultry farmer (Campbell, 1994).

"At the [government] level [decision-making] is just economics. The personal welfare of producers and animals is irrelevant. We saw this with the push for people to get into hogs and go way into debt. I know a lot of efficient producers who just couldn't stay afloat."
-Kings County poultry farmer (Campbell, 1994).

8. Organizational Capacity and Community Infrastructure

Farm organizations, government services, and infrastructure that makes farming possible and pleasant are all part of the equation that makes farming viable in the long-run. A preliminary look at some of the trends shows some stresses and opportunities here.

"I was asked to sit on the IPM orchard board…NS is quite far ahead in IPM. It is quite a leader in it…. Dick Rogers in Kentville used some of our land as a test block. We were really pleased to have him do this." -Kings County mixed farmer (Campbell, 1994).

Government Programs

Question: *Do you feel the provincial government Department of Agriculture is doing a good job?*

Most of the growers felt they were having less and less contact with the Department of Agriculture and Marketing over time. Many were unwilling to give a rating and there was a large variation among those who did.

Table 38. Rating the Effectiveness of NSDAM's Work, Surveyed Farms

	Is the Department of Agriculture doing a good job? (1 v.poor to 10 v. good)	Rate effectiveness of subsidies (1 v.poor to 10 v. good)
Mean score, 1991	6 (4 responses)	4.5 (2 responses)
Mean score, 1999	6 (4 responses)	4.5 (2 responses)

Question: *Would you like to comment on specific things the Department of Agriculture does really well, and specific things they could improve?*

The items that farmers felt the department did well included testing and observation trials on farms, the farm loan board, farm improvement subsidies, milk subsidy, 4H, extension, and agricultural awareness. Two farmers mentioned Sean Firth, the beef extension specialist, was very helpful, in particular because he is encouraging farmers to get away from a feedlot situation and towards a pasture and hay based system.

The items that farmers took issue with included the decrease in locally-relevant research, reduction in extension staff to farmer ratio, bad-mouthing of organic farms, and 'recipe' approach to farming. Many noted that funding cuts were hurting the department. A few specific people were noted as 'willing to put in the time', but the 'good' people are hampered by lack of funding to fulfill their mandates. Their was a general distaste about 'bureaucracy'.

Question: *Do you feel that government subsidies are effective? Rate from 1 not effective at all to 10, very effective.*

Response: Not many farmers were willing to answer this question (see Table 35 above). This was obviously not a very effective question. When we asked for comments, the response was better (see next question).

Question: *Do you have any comments about specific subsidies that are very effective? Specific subsidies that could be improved?*

Effective subsidies included land clearing, drainage, dyke forming, lime, ponds for fire and irrigation, and bins for apples. The lime subsidy was mentioned by 7 of the 8 producers as being effective. One producer mentioned that safety net subsidies were good but not universal enough.

Subsidies could be improved by
1) making them available only to full-time farmers;
2) making them more accessible to smaller, less rich farmers;
3) providing more follow-up to make sure they are used properly;
4) providing subsidies for irrigation infrastructure;
5) increasing levels of subsidies to match those in the US or EU.

The drought relief was mentioned by two growers. One who really needed it didn't get as much back as it cost them to apply. Another got more back than he needed.

Although the supply management system (a subsidy of sorts organized by the marketing boards) was regarded as a good thing because of the stability in income it provides, two growers mentioned that it sometimes hampers new entrants and those who want to provide a differentiated organic product.

Question: *If you could change taxes and fees you pay to the government associated with farming, what would you change? How have they changed over time.*

This did not appear to be a major issue with the farmers we spoke with. Most were in favour of the HST rebate, although two asked why farmers have to pay it in the first place. There were many calls for simplifying taxes. Taxes and fees associated with hiring people and tests have gone up and become more complex. Municipal taxes are getting "steep," according to one grower.

Farm organizations

Question: *Would you like to comment on specific things farm organizations do really well, and specific things they could improve?*

Specific things farm organizations do well:

- The Nova Scotia Fruit Growers Association introduced new semi-dwarf apple tree varieties.
- The Chicken and Turkey marketing boards have held the industry together and have prevented [US-style] corporate farming in Kings County.
-The Nova Scotia Federation of Agriculture is effective. They are concentrating on public relations, policy development, and legislation.
- The main reason to have farm organizations is to liaise between the industry and government and "we've gotten fairly reasonable hearings."
- Pork Nova Scotia is the best pork producers organization in Canada. It is well-funded and takes care of promoting pork.

Specific things farm organizations could improve:

-The Organic Crop Improvement Association has too many gray areas, and to become certified organic, the grower has to spend too much time and money that would be better spent farming.
-There's a lack of direction in the Nova Scotia Organic Growers Association.
-The National Farmers Union is defunct in NS.
-Farm women's organizations are not very active in Kings County at the present time.
- Farm organizations should recognize all kinds of farming, including conventional and organic.
- Farmers have to stick together and educate the public more. Most people have no connection to farm life.
-The organizations are managed by farmers who have no time to devote to it. The weakness of farm organizations is reflected in the weakness of the farmer's position.

9. Conclusions

The conclusions will be presented in two forms. One is the table of Genuine Progress Values and Indicators. The second is a series of comments from farmers, who get the last word.

Summary of the Suggested GP indicators for Work/Employment Capacity (people power)

Indicator	Details	Potential Value	Progress
Years of farming experience	potentially reveals something about the knowledge base present in the farming community	-avoid productivity losses -resource for teaching new farmers	Not presently measured
Increase number of farms of manageable size	This indicator could also include: polarization in farm size, or measures of concentration of farms	-improve farming infrastructure, farm related jobs and business opportunities -increase farm knowledge base -increase options for co-operation	C or D
Increase leisure time for farmers; work satisfaction	Balance farm work and other interests to preserve health and happiness of operator and family. This indicator could also include measures of work satisfaction.	-prevents accidents and ill-health -allows time for R&D, long-term projects	Not currently measured
Improved health of farmers	Determined by a health survey?	-reduced health care costs -improved quality of life -fewer sick days	Not currently measured
Unpaid labour	Ideally the value of unpaid labour would be measured, and over time would go down.	- estimates range from $15,000 to $60,000 per farm	Not currently measured
Problem solving and critical thinking	It would be difficult to measure, but important nonetheless	-improved ability to be an effective citizen - reduced need to pay for outside help	Not currently measured
Farmers status in society	Rate from 1 very low, to 10 very high. Ideally it would be high.	-high self-esteem -more likely to have new entrants	Perception is low: D
Employment	Measured by total number of jobs and gross receipts per paid weeks. The indicator has to be tempered with levels of job satisfaction for employee and employer.	-employment generates income in county -potential for increased understanding of farming	C to B
Increase opportunities for learning about ecological agriculture	This could involve farmer mentorships and apprenticeships, courses, collaborative research etc.	-improve knowledge-based opportunities for reducing costs and improving productivity	Not currently measured

Summary of the Suggested GP indicators for Return on Investment

Indicator	Details	Potential Value	Progress
Fair return for food products	Price at farm gate should reflect real value of food, real value of work	-improved farm income -nutritional quality	D
Increase consumption of locally-produced food	"Feed our own people". At this point about 10-15% of Nova Scotians' food budget is used to buy locall-produced food. Should we strive for 50%? 60%?70%?	-an increase to 50% would create ~58,000 jobs and increase gross farm receipts by 1.5 billion -reduced fossil fuel use for transportation	D
Increase diversity of crops and products	Kings County produces the most diverse mix of food crops and products east of southern Ontario	-better opportunities for rotation -increased economic resilience	B
Increase opportunities for direct marketing	For example, farm gate stands and stores, farmers markets, and weekly local delivery businesses could be developed. Presently more than a dozen Kings County growers sell direct at the Halifax Farmers' Market, and other sell at farmers markets within the county.	-higher net returns for farmers -fresher products for consumer -improved small business opportunities -improved opportunity for consumer awareness	C/D

Indicator	Details	Potential Value	Progress
Increase appreciation of local food products	This would also likely improve relations between farmers and non-farmers as well as possibly improve demand for locally grown food	-reduce pollution associated with transporting goods long distances -improve nutrition of people who eat fresher food -increase number of local jobs	See NSDAM market-ing studies
Adequate farm income	This would include survey of farmers, tracking net farm income measured in realistic ways, ratios of expense to revenue, and a decent return on investment (or equity).	-adequate farm income = boosting Kings County economy -improved stewardship options -improved prospects for new farmers	D
Reduced Financial Risks	Measured by debt to income ratio and income to capital value ratio	-reduced chance of bankruptcy and loan write-offs -improved outlook for farmers	C-B

Summary of the Suggested GP indicators for Resource Base/Capacity and Environmental Quality

Indicator	Details	Potential Value	Progress
Use of quality farmland for farming	This is not a universally agreed-upon indicator. Other options are needed for farmers who need income for retirement.	-the cost of converting houseland back to farmland is beyond the measurable -good farmland is a finite resource, therefore the tolerance threshold for using it up is very low, making it valuable	?
Increase number of farms with self-sustaining ecosystems	See case study by Jannasch et al, 1999 in later section.	-reduce costs associated with off-farm inputs -increase recycling of nutrients -reduce pollution associated with nutrient overloading	D
Reduce crop expenses relative to revenues (including lower use of synthetic inputs)	This would require concerted research efforts such as the IPM work in Kentville, which requires some long-term investment Also, reducing inputs relative to revenues will have to be placed within the context of not reducing the soil's (and other resources') future productive capacity.	-reduce clean-up costs associated with spills and overloading -reduce farm input costs (?) -reduce costs associated with transportation and manufacture of synthetic inputs (including costs associated with increases in greenhouse gases)	C
Increased productivity	Cost per unit produced is reduced over time -- meanwhile maintaining (or improving) the productive capacity of the resource	-improved farm income if price of product doesn't fall	C
Improved stewardship of the land	Indicated by less erosion, increased soil organic matter (at 3-5% if possible), fewer bare soil days, longer rotations which include sod, more discussion groups…	-improved water quality -fewer clean-up costs -fewer soil remediation costs -improved soil productivity	C/B
Ability to live and learn from nature	It was mentioned that farming allows you to see more directly the consequences of your actions	- development of skills and perception - science classroom/teacher - no need for 'therapy'??	B
Optimum biodiversity	"Orchards should be more like a forest with diverse varieties". Another farmer mentioned the need for 'deep-rooted' varieties of fruit trees to reduce drought stress. Also beneficial insects and birds need habitat.	-fewer losses from drought -increased aesthetic quality (& opportunities for tours etc) -disease/pest resistance -ability to take advantage of nature's services	D
Healthy livestock	Measured by mortality rates, use of drugs, farmer surveys	-fewer costs associated with veterinarians -improved quality of food products	?
Optimum water quality	Measured by nitrate-N, bacteria, and pesticide residue testing	-reduced need for purchased water -avoid cleanup costs	?
Optimum energy efficiency	Measured by energy use to revenue ratios	-reduce greenhouse gases which have costly side-effects -reduce farm expenses in long run	?
Ecological resilience	Measured by the ability to recover from stresses such as drought or other weather fluctuations	-reduced emergency expenses	?

Summary of the suggested GP indicators for Organizational Capacity and Community Infrastructure

Indicator	Details	Potential Value	Progress
Increased co-operation between farmers	Examples discussed were -trading land to improve rotations -sharing equipment and knowledge -marketing common crops to deal with centralized buyers	-reduces expensive duplication -reduces competition that drives prices down -reduces isolation -improves soil quality	C-B
Increased community spirit in rural areas	Indicated by more activities in the evening, more volunteers available for events, more socializing, less violence and crime	-reduced costs of crime -increased quality of life -less isolation and need for other entertainment	D
Maintained or improved rural infrastructure	Indicated by local schools, health centres, post offices, stores and other businesses	-reduced need for vehicles and driving -more local jobs	D
Increased respect for farmers and farmers' land	Indicated by asking permission to go on land, not littering, less vandalism, fewer nuisance complaints.	-intangible values of having better self-esteem and fewer conflicts	D
Maintenance of useful government programs	Track government collaboration with farmers, 4H, extension and testing services.	-reduces farmers' R&D costs	C-D
Effective farm organizations	Track successful lobbying efforts, numbers of volunteers, democratic process for decision-making	-reduce isolation -improve bargaining ability	C-B

"The problem is that [we sometimes] only see the world in terms of the use that we can make of it, not how we can live in it."

-Kings County poultry farmer (Campbell, 1994).

"There are two sets of [ethical] issues: the farmer's and the public's. The big issue from the farmer's point of view is should we bother to produce food? You sentence yourself to a life of poverty to do it and we are very sensitive to criticism. We get very paranoid about public agendas that point to us for polluting and not treating our animals well. The public also expects to have food very cheaply. We find it very frustrating." -Kings County vegetable and beef farmer (Campbell, 1994)

"The way we would love to do things is to have people pay enough for the products that we produce. This would work well for everyone. We could keep the rural areas alive and looking well. This is good for the tourist industry too. We could ensure that our soil and water resources are cared for. I don't think anyone is better equipped to do that than us."

-Kings County vegetable and beef farmer (Campbell, 1994)

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