

MEASURING SUSTAINABLE DEVELOPMENT

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APPLICATION OF THE GENUINE PROGRESS INDEX TO NOVA SCOTIA

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## THE GPI SOILS AND AGRICULTURE ACCOUNTS

ECONOMIC VIABILITY OF FARMS AND FARM COMMUNITIES IN  
NOVA SCOTIA AND PRINCE EDWARD ISLAND—AN UPDATE

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## EXECUTIVE SUMMARY

Farms in Nova Scotia and Prince Edward Island generate significant economic benefits both for the rural communities in which they are situated and for the provincial economy as a whole. Farms in Nova Scotia and PEI are currently generating about \$460 and \$390 million (respectively) in direct business spending annually by virtue of their farm operating expenses. These farm operating expenses (and thus business activity generation) grew by 26% in Nova Scotia and by 77% in PEI between 1971 and 2006. Since 1995 alone, farm operating expenses increased by 13% in Nova Scotia and by 15% in PEI—indicating that farm economic contributions continue to grow significantly.

Multiplier studies have shown that, when indirect and induced economic benefits are added, the economic benefits generated by farms are actually much larger than indicated above. Thus, for every \$100 direct contribution of agriculture to the Nova Scotia GDP, about \$200 is actually added to the provincial GDP and more than \$400 is added to the national GDP. As well, annual farm expenditures in Nova Scotia generate more than 10,000 person years of employment—including 6,600 full-time equivalent jobs in agriculture, and nearly 3,700 additional indirect and induced jobs. They also generate more than \$150 million in tax revenues.

One study found that 60% of farm related expenditures in Nova Scotia are made locally within the rural communities where farms are located, and 92.5% are made provincially. Other studies have found that smaller farms generally purchase a higher proportion of goods locally while larger scale farms trend to travel further for farm inputs and to bypass local community suppliers.

Despite the very considerable economic benefits generated by Maritime farms both for the rural communities in which they are situated and for the larger economy, these benefits are now seriously endangered, because all key indicators of farm economic viability in Nova Scotia and Prince Edward Island are trending sharply downward. Thus:

- *Net farm income* has dropped by an average of 91% in Nova Scotia and by 92% in PEI since 1971, and in 2007 reached the lowest levels ever recorded in both provinces. Nova Scotia farms have recorded negative net farm income (where income no longer covers expenses) in four of the last six years, as have PEI farms in five of the last seven years.
- In Nova Scotia, the *expense to income ratio* increased from an average of 82% in the 1970s to 97% in the last decade, and in PEI it rose from an average of 74% to 98% during the same 35-year period—in recent years, far exceeding the 80% threshold estimated as needed for a healthy farm sector. This indicates that the prices paid to producers for their products are inadequate relative to rising input costs, and are not keeping pace with farm expenses.
- While net farm income has been declining, total farm debt increased by 146% in Nova Scotia, and by 445% in PEI, between 1971 and 2006. It is estimated that, in a healthy farm sector, the *total debt to net farm income ratio* should not exceed 600%—a level achieved in the 1970s and part of the 1980s—in order for farmers to service their debt.

That ratio reached an astonishing 4700% in PEI in 2006—nearly 8 times the recommended 600% threshold.

- The *solvency ratio* (total liabilities or debt divided by total assets or the capital value of farms) has increased by 106% in Nova Scotia and by 143% in PEI since 1971, indicating that Nova Scotia and PEI farms are becoming much less sustainable, with the rate of farm debt increase rapidly outstripping any appreciation in the capital value of farms.
- While *return on investment* figures are not available for all farm sectors or for provincial agriculture as a whole, apple farmers have seen negative returns in every year since 1995 for which data are available.

The results indicate clearly that—except in supply managed sectors like dairy and poultry—farming is no longer economically viable in Nova Scotia and PEI, and is now in a state of serious crisis—in actual danger of demise as an economic, social, and cultural institution in both provinces. That, in turn, will have serious economic and social consequences for rural communities in both provinces.

The number of farms continues to decline. Nova Scotia now has only 3,795 remaining farms (out of the nearly 50,000 that existed 85 years ago), and PEI only has 1,700 remaining farms (out of the 14,000 that existed 85 years ago). Many now question whether these numbers are sufficient to keep farming infrastructure, support businesses, and farm communities viable.

A key cause of declining farm viability is depressed farm product prices. In Nova Scotia, farm input and grocery food prices have gone up much faster than farm product prices, so it is costing farmers considerably more to farm without a commensurate gain in income. Yet, remarkably, depressed farm product prices are not reflected in cheaper food prices for consumers, indicating the profit-taking is happening in other parts of the food supply chain rather than at the farm gate. Thus, in 2006, farm product prices were 15 percentage points below farm input prices relative to 1986 levels, and 24 percentage points below grocery store prices relative to 1986 levels.

Reasons for depressed farm product prices include global commodity pricing and trade agreements, consumer demand for the cheapest price for food regardless of its origin or actual cost of production, and continued consolidation among retailers and processors. As well, reliance on GDP-based indicators like gross farm cash receipts, which rose by an average of 6.7% in Nova Scotia and by 29% in PEI from 1971–2006, send misleading signals to policy makers, businesses, and the general public, since they obscure changes in the cost of farming and therefore do not reveal the *net* income, expense, and debt levels that determine viability.

This present report updates GPI Atlantic's 2001 report, titled *Farm Viability and Economic Capacity in Nova Scotia* (Scott 2001), which also reported—based on the most recent data available at the time—that all key indicators of farm viability were in serious decline. Among other results, the 2001 GPI report noted that net farm income had declined by 46% since 1971. At the time that original GPI farm viability report was published, the data did not yet show net farm income in negative territory, though the trends were certainly headed in that direction.

Thus, while the *absolute* figures at the time still showed marginal economic viability for Nova Scotia farms (on average), the *relative* trends pointed towards a developing crisis.

The 2001 GPI reported warned explicitly that:

All five indicators of farm economic viability [ . . . ] in the Nova Scotia farm sector show that farm viability in Nova Scotia is being seriously eroded, and independence is being undermined. These disturbing trends are occurring even while farm cash receipts are growing, and while standard economic growth measures fail to signal problems. Yet, if current trends continue unabated, the future of Nova Scotia agriculture is clearly at risk.

Nova Scotia farmers are spending more to produce food and getting less for their products. They are going deeper into debt and having more trouble making payments on their debt. In many cases farmers are no longer breaking even, are working other jobs to keep their farms, and may be forced to sell their land. Put simply, many Nova Scotia farmers can no longer afford to farm [ . . . ]. If current trends continue [ . . . ] major parts of the province's agriculture sector will disappear.

As this update indicates, these and other troubling trends noted in the 2001 report have indeed continued unabated, as have the underlying causes of these trends. A key purpose of the Genuine Progress Index is to provide an early warning system of potentially troubling trends so that corrective interventions can be undertaken before development of a real (and potentially irreversible) crisis. Unfortunately, the adverse trends reported in the 2001 GPI farm viability report did not spur sufficient public, government, industry, and corporate action to reverse those trends and enhance the economic viability of farming in Nova Scotia. Instead, those adverse trends have been allowed to continue to the point where recovery is no longer an option for many farmers, who are forced either to abandon farming or to sell off portions of their farms.

Extensive GPI Atlantic interviews with Nova Scotia and PEI farmers produced a number of farmer recommendations to improve farm economic viability, including:

- 1) Market diversification to improve competition (and therefore prices) for food products.
- 2) Regulation to prevent excessive mergers of companies in the food system.
- 3) Greater supply management to ensure that food prices not fall below a reasonable cost of production.
- 4) Stimulation of increased demand for local products, for example through local procurement policies by businesses, retail stores, universities, schools, hospitals, and government agencies. This solution may be aided by escalating gas prices, as transportation becomes more expensive and local food thus more competitive.

Such actions, including shifts from reliance on food imports to local food, will require the collaboration of all economic, government, and social sectors, including the media and a public more discerning and determined to buy and eat local food and to support Maritime farmers. A positive development that may help initiate actions to restore farm economic viability before it is too late is the new awareness and understanding of these issues that has emerged within

government in recent years. Thus, the potential for positive, corrective action is now very much greater than it was at the time of the original 2001 GPI report on this subject.

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*Needless to say, any errors or misinterpretations, and all viewpoints expressed, are the sole responsibility of the author and GPI Atlantic.*

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## LIST OF ABBREVIATIONS

4-H	4-H is a well-known rural / farm youth group
AB	Alberta
AVC	Atlantic Veterinary College, PEI
BBEMA	Bedeque Bay Environmental Management Association, PEI
BC	British Columbia
BSE	Bovine Spongiform Encephalopathy
CA	Canada
CALL	Canadian Agricultural Lifetime Leadership program
CBC	Canadian Broadcasting Corporation
CFIA	Canadian Food Inspection Agency
CO <sub>2</sub>	Carbon dioxide
CPI	Consumer Price Index
CSA	Community Supported Agriculture
FCC	Farm Credit Corporation
FMAP	Farm Management Analysis Project
FTE	Full Time Equivalent
g	grams
GDP	Gross Domestic Product
GPI	Genuine Progress Index
ha	Hectare (2.24 acres)
HACCP	Hazard Analysis and Critical Control Points
kg	kilogram
km	kilometres
MN	Manitoba
NAICS	North American Industry Classification System
NB	New Brunswick
NFU	National Farmers Union
NL	Newfoundland and Labrador
NS	Nova Scotia
NSAC	Nova Scotia Agriculture College, Truro, Nova Scotia
NSDAF*	Nova Scotia Department of Agriculture and Fisheries, changed to N.S Department of Agriculture in 2006
NSDAM*	Nova Scotia Department of Agriculture and Marketing (until 2000)
NSFA	Nova Scotia Federation of Agriculture
NSFGA	Nova Scotia Fruit Growers' Association
ON	Ontario
PE or PEI	Prince Edward Island
PEIDAFF*	Prince Edward Island Department of Agriculture, Fisheries, Aquaculture, and Forestry
PYE	Person Year of Employment (equivalent to 40 hours/week * 50 weeks = 2,000 hrs/year)
QC	Quebec
PRRS	Porcine Reproductive and Respiratory Syndrome, a disease of hogs
RCIP	Rural Communities Impacting Policy
RST	Rural and Small Town (see Glossary)
SEA	Self Employment Assistance
SK	Saskatchewan
US	United States
WI	Women's Institute
WWOOF	Willing Workers On Organic Farms
WWII	World War II

\* Note that the agriculture departments in PEI and NS have had several name changes in the last decade. For PEI: Dept. of Agriculture and Forestry until 2002; Dept. of Agriculture, Fisheries, and Aquaculture until 2004; currently, Dept. of Agriculture.

## 1. Introduction

This report on the economic viability of farms and farm communities in Nova Scotia and Prince Edward Island updates GPI Atlantic's 2001 study, titled *Farm Viability and Economic Capacity in Nova Scotia* (Scott 2001). While the latest available data in 2001 were mostly from 1999, this update references data to 2006, and in some cases to 2007.

This report is also part of the much more extensive *GPI Soils and Agriculture Accounts for Nova Scotia*—a work in progress for more than a decade. In recent years, further work on those Accounts has attempted to define “farm viability” in broader terms to include the value of human and social capital. Therefore, this present report also constitutes a part of that larger effort to examine farm viability from this wider perspective, which this introductory section attempts to outline. Thus, in September 2008, GPI Atlantic will release a companion report to this one, focussing on human and social capital in agriculture, as a complement to this report focussing on economic viability in particular.

It is important to note that these reports, though separately released, are in fact integrally related, as the following introduction shows. For example, farm contributions to the rural communities in which they are located go far beyond provision of economic benefits, even though the wider social networks to which farms make a vital contribution often stem from and are based on economic considerations. As well, if all key economic indicators of farm viability are in decline to the point where expenses exceed income, as this present report shows, the continued determination of Maritime farmers to farms must logically be based on other human and social factors that go beyond economic considerations alone.

In order to undertake this broader exploration of farm viability in the Maritimes, of which this present update of economic indicators forms just one part, it was necessary to go well beyond existing data sources and to develop new indicators of human and social capital that are not presently tracked. That indicator development process was undertaken through series of extensive interviews with farmers in Nova Scotia and PEI, conducted largely in 2003 (Scott et al. 2003). Those interviews, which constitute a separate volume, are referenced briefly in this present report, and much more extensively in the accompanying report on human and social capital that will be released in September 2008.

In sum, this present report should be read both as a relatively straightforward update of GPI Atlantic's 2001 study on *Farm Viability and Economic Capacity in Nova Scotia* (Scott 2001), and also as part of a much broader and more extensive effort to redefine and expand the understanding of the viability of farms and farm communities in Nova Scotia and Prince Edward Island. The first part of this introductory section is devoted to explaining that larger context.

## Social Capital in Farming and in the GPI

The first and most basic question this study has sought to address is: What benefits to society are provided by the farms of Nova Scotia and Prince Edward Island? Research over several years, including wide-ranging interviews, has produced a remarkably extensive list of such societal benefits, not all of which are easily quantifiable. A small sampling of responses to this question include:

- the contributions of “farm culture”;
- the existence of people who have a working knowledge of the natural world;
- the farm knowledge base (knowledge of how to produce food essential to existence);
- employment and business generation in rural areas;
- farmers’ markets that enable consumers to purchase food directly from producers;
- land stewardship;
- rural organizations and services;
- a certain degree of food security;
- social events like church dinners, exhibitions, and country dances;
- tourism.

These benefits, and many more, can collectively be considered part of the “social contribution” of farming—the stock of social wealth produced by farming that goes beyond the economic benefits provided by agriculture as a sector of the economy.

In 2001, GPI Atlantic released a report entitled *Farm Viability and Economic Capacity in Nova Scotia* (Scott 2001), which reported that the four key indicators of farm viability were in serious decline. These four key indicators are:

- Net Farm Income
- Expense to Income Ratio
- Return on Investment
- Total Debt to Net Farm Income Ratio

Since the release of that report seven years ago, there has been a continued plunge in the trends for all four of these indicators of farm viability in Nova Scotia.

The adverse trends in these four indicators, signifying a clear and ongoing decline in the economic viability of farming in Nova Scotia, have inevitably produced a second key research question: if farm viability indicators have been in continuous decline for over 25 years, why do Nova Scotia farmers continue to farm? This question cannot be satisfactorily answered in terms of simple economics, since the current economics of farming simply do not support continued farming by most Nova Scotia farmers.

*Words such as “wealth,” “efficiency,” “indicator,” “monetization,” and “progress,” or phrases such as “food miles” or “social capital” are associated with specific meanings, found in a very detailed Glossary at the end of this report.*

Extensive GPI interviews with farmers both in Nova Scotia and Prince Edward Island (PEI), indicate that the question can only be answered in social (rather than purely economic) terms, and in ways that point to a key facet of “social capital.” For example, the interviews revealed a tenacious resistance among farmers and in farming communities against simply letting the farm sector fade away—despite the extraordinary economic challenges faced by the sector. Conversations in 2003 both with farmers and with many other residents of farm communities pointed to a myriad of uncounted social, human, environmental, and community benefits associated with farms that have somehow kept farming alive in the region against all financial and economic odds.

In sum, the willingness and determination to make farming work that the research and interviews have revealed simply cannot be explained by conventional economic indicators of progress, and have prompted the deeper exploration of human and social capital undertaken in succeeding chapters. Although we are accustomed to thinking of “wealth” in material terms, the research on which this report is based reveals that there is substantial human and social capital associated with farms and with farming, without which both our rural communities and society at large would be much “poorer”—in ecological, human, social, and even economic terms.

For more than a decade, GPI Atlantic’s focus and mandate have been to ask what *genuine progress* in society looks like, and to attempt to assess whether we are achieving such progress. Thus a set of genuine progress *indicators* has been developed in a wide range of social, economic, and environmental dimensions to assess how well we are doing as a society. From the GPI perspective, human, social, and natural capital are as integral components of our national and provincial wealth as the produced, material, and financial capital that are regularly tracked in our standard economic accounts and measures of progress. Not only does the GPI therefore explicitly value human and social capital, but it also recognizes that they are as subject to depreciation as produced capital, and thus equally require re-investment to restore and enhance their value.

The concern to account for social and human capital in agriculture is not simply an attempt to assess the “softer” and less tangible components of social progress and wellbeing. Instead, it has been acknowledged as essential to livelihood and even survival. Thus, food security has long been recognized as an essential component of national and regional security (Gardner, 1996)—with the capacity of a society to feed itself in times of insecurity, crisis, or conflict potentially more important and essential to survival than military might. Particularly in an era of volatile and unpredictable global markets, in which vulnerability is enhanced by increased dependence on foreign sources of supply, analysts have remarked that it may be more essential than ever for communities to be able to rely on a secure, local source of food and nutrition. For this reason too, maintaining and enhancing the potential capacity, productivity, and health of agricultural resources and rural communities in the Maritimes is an essential indicator of *genuine progress* in the Nova Scotia Genuine Progress Index (GPI).

All measures of progress are, by definition, normative, since they must always answer the question, “progress towards what?” This question necessarily involves value choices. In the Genuine Progress Index, those values are explicit. For example, there is a broad social consensus that adequate livelihood security, peaceful and secure communities, a healthy population, clean

air and water, healthy natural resources, and an educated populace are essential components of wellbeing. Therefore, these values can be considered a suitable basis for indicators of progress.

Similarly, food security for this and future generations can be considered a fundamental social objective that in turn depends on a healthy farm sector. For this reason, the health and economic viability of agriculture goes beyond an assessment of one among many economic sectors, but represents a core social value that in turn defines an explicit goal in the GPI against which progress can be assessed. In each section of this report, therefore, the potential goals or thresholds against which progress can be measured will be suggested and made explicit at the outset.

In economic growth-based measures of progress, “more” is always implicitly considered “better.” So long as the economy is growing, politicians, economists, and experts therefore consider us “better off.” By contrast, the inclusion in the Genuine Progress Index (GPI) of social and environmental values and objectives not considered in standard economic growth measures means that *less* may sometimes be *better* in the GPI. For example, less crime, less sickness, less pollution, less waste, and fewer greenhouse gas emissions are all indications of genuine progress in the GPI. By contrast, burning more fossil fuels, spending more money on war, and paying for the effects of crime, sickness, and pollution, make the economy grow simply because money is being spent, and are therefore misleadingly interpreted as signs of progress and prosperity in measures based on the GDP.

In the GPI Soils and Agriculture Accounts, and from the more comprehensive capital accounting perspective of the GPI, progress is indicated by optimum *net* gains that account for a full range of social, economic, and environmental costs, rather than by maximum *gross* gains like farm revenues or outputs, as in the GDP. Unlike conventional accounting practices, therefore, we attempt to include *unaccounted* costs and benefits, including those incurred outside the market economy, in our determination of net gains (or losses).

Because the GPI (and indeed any set of sustainable development measures and any capital accounting approach that includes asset depreciation and returns on investment) requires a long-term perspective by definition, we also try to incorporate this long time-frame into the following analysis of genuine progress in agriculture. Thus, genuine progress includes optimal levels of quality food production, thriving farms, and resilient farm communities *in the long term*.

Because indicators of farming viability have been in decline for so long (at least a quarter of a century as noted), progress towards a thriving and healthy agricultural sector and agricultural communities may require more than just “sustaining” what we have at this point in time. A long-term perspective therefore requires both a retrospective analysis that ensures current levels are not blindly taken as the “base” or “threshold” for progress, and also a forward-looking analysis that attempts to assess current actions in light of their long-term impact on future generations. Thus, producers in agricultural communities who conserve and enhance soil quality, water resources, and the many other components of natural and social capital in agriculture, can be seen as making a significant long-term social contribution to rural communities, to the common good of society as a whole (given its dependence on agricultural communities for its food security, health, and wellbeing), to future generations, and to “genuine progress” in agriculture.

By tracking the state of natural, social, and produced resource stocks, the GPI capital accounting system is also intended to provide early warnings of potential asset depletion and degradation. Thus, real progress may require a shift to *preventing* farm and infrastructure loss rather than attempting to fix the problem after losses and damage have occurred. In the following analysis, we have therefore attempted to show where preventive investments may offer opportunities for long-term savings.

In short, “genuine progress” in the GPI is seen as the product of *balance* between the various capitals and *efficiency* in resource use, rather than of simple gross quantitative growth, as indicated by measures that rely on GDP.

### ***Report Contents***

There are three parts to this broader analysis of the viability of farms and farm communities in Nova Scotia and Prince Edward Island.

The first part is based on a set of interviews and discussions with farmers and people in farm-related occupations in Nova Scotia and Prince Edward Island (PEI). A key purpose of those conversations was to identify appropriate indicators of farm and farm community viability, to ascertain the conditions that lead to viability, and to ensure that the conclusions of this study were in line with actual lived experiences. As noted above, such interviews were essential in order to understand why farmers continue to farm in the face of highly adverse economic circumstances, to identify the components of human and social capital that are not captured in conventional economic growth-based statistics, and to ascertain the conditions required to sustain farming in Nova Scotia and the Maritimes over time. The details of those interviews and discussions are recorded in the accompanying report *Farm and Community Viability: Report on Interview Results* (Scott et al 2003).<sup>1</sup>

The second part of the study records the trends associated with the indicators of viability identified in the interviews. For example, since one of the indicators of viability identified in the initial interviews was the need for farmers to get a “fair price” for their products, actual product prices over time were then documented.

Finally, an effort was made to begin putting a value on the wide-ranging contributions farms and farmers make to society—many of which contributions have long been invisible in the conventional economic accounts and in the standard economic growth-based indicators of progress. This valuation work is particularly important at this point in time, in light of warnings by some interviewees that Maritime farms will not last long. Both the interviews and the objective indicator trends recorded reveal quite clearly that Nova Scotia and Prince Edward Island stand at a critical point in farming history, and that there is therefore an increasingly urgent need for an understanding of the true value that farms provide.

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<sup>1</sup> This report is available on the GPI Atlantic website at: <http://www.gpiatlantic.org/pdf/agriculture/farmviab.pdf>

The colloquial saying that “you don’t know what you’ve got till it’s gone” may be quite literally true in this case. If society does not indeed understand and appreciate the value of what we have, it will be unlikely to react when a viable dairy farm is purchased in order to build a Wal-Mart. The valuation work undertaken in this study is therefore an attempt to start “knowing what we’ve got” *before* it’s gone, which in turn may give rise to policy measures designed to protect the region’s farming resources.

### ***The Issue of Monetization***

To the extent possible, GPI studies attempt to assign monetary values to key components of natural, human, and social capital that are not generally valued in conventional economic accounts. But what is the economic value of strong community bonds, or of equipment sharing between farmers, for example—neither of which is currently valued in GDP-based statistics? Because market values are not designed to capture such “intangibles,” estimation efforts in the field of social capital will necessarily be rough. Nevertheless, the effort is necessary, since failure to count such presently unvalued benefits produces even grosser inaccuracies and resulting policy distortions as these benefits are currently given an arbitrary value of zero in the conventional accounting ledgers. The GPI valuation efforts at least attempt to count and thus acknowledge the existence of those benefits, thereby bringing them to the fore to allow proper discussion.

In reality, the necessity to assign monetary values to non-market benefits for the purpose of bringing attention to such benefits is a sad commentary on the priorities of our society, since it reveals the extent to which material values dominate the policy and public arenas. Nevertheless, such economic valuation is essential in this day and age in order to highlight and acknowledge those aspects of farms and of farming communities that have in fact been demonstrated to have vital value to Maritimers.

The GPI assesses the economic value of social and environmental assets by imputing market values to the services provided by our stock of human, social, and environmental capital. However, this valuation effort should be understood as a strategy rather than goal, since *monetization* itself does not have any inherent value. Indeed, money is designed to capture market transactions and must be acknowledged as a poor tool to assess human, social, and ecological values. Until such values are fully integrated into the decision-making process in their own right, however, monetization has temporary *strategic* utility in order to ensure that such vital non-market values receive proper policy attention.

Monetization is therefore a temporary measure, necessary only as long as financial structures, such as prices, taxes, and monetary incentives, continue to provide the primary cues for the actual behaviour of businesses, consumers, and governments. From this perspective, monetization is a useful tool to communicate with the world of conventional economics, not a view that reduces profound human, social, and environmental values to monetary terms.

In sum, monetization is a necessary step in light of the dominance of the materialist ethic, in order to overcome the tendency to undervalue the services of unpaid labour, natural resources,

and other assets conventionally regarded as ‘free’; to make their contribution to prosperity clearly visible; and to bring these social and environmental assets more fully into the policy arena. Monetization also serves to demonstrate the linkages and connections between non-market and market factors, such as the reality that depletion of a natural resource will eventually produce an actual loss of value in the market economy. Despite this utility, monetary values can never be taken as a literal description of reality.

As the grip of market statistics on the policy arena is hopefully and gradually loosened, the desired direction for the GPI is to return to the direct use of a wide range of key time use, environmental quality, economic, and social indicators as direct guides to decision-making. This will also allow for greater accuracy and precision than reliance on derivative economic values. For this reason, all economic valuations are based on underlying physical indicators, and the Nova Scotia GPI includes a wide range of non-monetary assessments, such as an ecological footprint analysis, in which no attempt at monetization is made. To assess the impact of human activity and consumption patterns on the environment, for example, the use of land values in the footprint analysis is actually a far more direct method of assessing environmental impacts than the use of monetary values.

While the assignment of monetary values to non-market assets may appear absurd and even objectionable from many perspectives, it must be acknowledged that we do currently and conventionally accept economic valuation for a range of non-market values in a number of areas. For example, society accepts the necessity for monetary court awards for grief and suffering due to crime or accidents, and insurance companies assign monetary values to life and limbs as necessary measures to compensate actual human losses. We pay higher rents for dwellings with aesthetically pleasing views, and we sell our time, labour, and intelligence often to the highest bidder—even though the value of all such assets is clearly far beyond what can be captured by the monetary prices assigned to them. Yet prices are assigned, nevertheless, in order that value is at least acknowledged. Similarly, in a world where ‘everything has its price,’ monetizing social and environmental variables in the GPI to the extent possible assigns them greater value in the policy arena and provides a more accurate measure of progress than excluding them from our central economic accounts and core measures of progress.

Note: Except when numbers are cited from other secondary sources as specified, all figures in this report (in all graphs and tables) are in 2007 constant dollars. Thus the (\$2007) notation is used to signify that the numbers on a graph or in a table have been converted to 2007 dollars to eliminate the inflation factor from the dollar amounts and thus to allow direct comparison of real dollar amounts through time. Whenever numbers are quoted directly from other secondary sources and not converted to 2007 dollars, this will be specified in the text.

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## Economic Viability in Farming Communities

*Farmers will thrive if there is enough sun, and enough rain, and enough markets, and enough of a return on investment and labour. They will thrive if they receive a fair price for the food they produce, rather than receiving the lowest percentage of the food dollar.*

—Carol Kern, “The More Things Change,” *Rural Delivery* 28(7): 26.

*In short, agriculture on PEI was seen as having considerable economic potential for the future. There will be growth, and there will be economic benefits. The issues are, what that growth will mean for PEI as a society, and the extent to which those economic benefits will stay in PEI. It is the role of government to ensure that what’s good for the agricultural industry is also good for PEI. The Task Force’s consultations indicated that “bigger is better” is not what’s best for PEI. Government and industry must work together to ensure **quality of growth**, rather than **quantity of growth**.*

—PEI Cabinet Committee on Government Reform, 1992, p.12.

This report on economic viability in farming communities in Nova Scotia and Prince Edward Island provides some economic background to the environmental, social, and community issues raised in the Social Capital report. Indicators of economic viability in Nova Scotia’s farm sector were originally reviewed in the previous GPI Atlantic report titled *Farm Viability and Economic Capacity in Nova Scotia* (Scott 2001), at which time the latest available data were for 1999. Here, those indicators are updated to the year 2006 (and to 2007 where data are available), and PEI’s farm sector is also included in the analysis.

The basic economic viability of farming is a key indicator of genuine progress in agriculture. Economic wellbeing is *typically* and conventionally measured in terms of the total gross income accruing to the agricultural sector. In this report a number of more nuanced and therefore more accurate measures of economic wellbeing are included, taking into account the multiplier effects of economic activity, price indices, and measures of *net* income, equity, and debt, all of which more precisely indicate farmers’ actual economic and financial situation than do gross receipts.

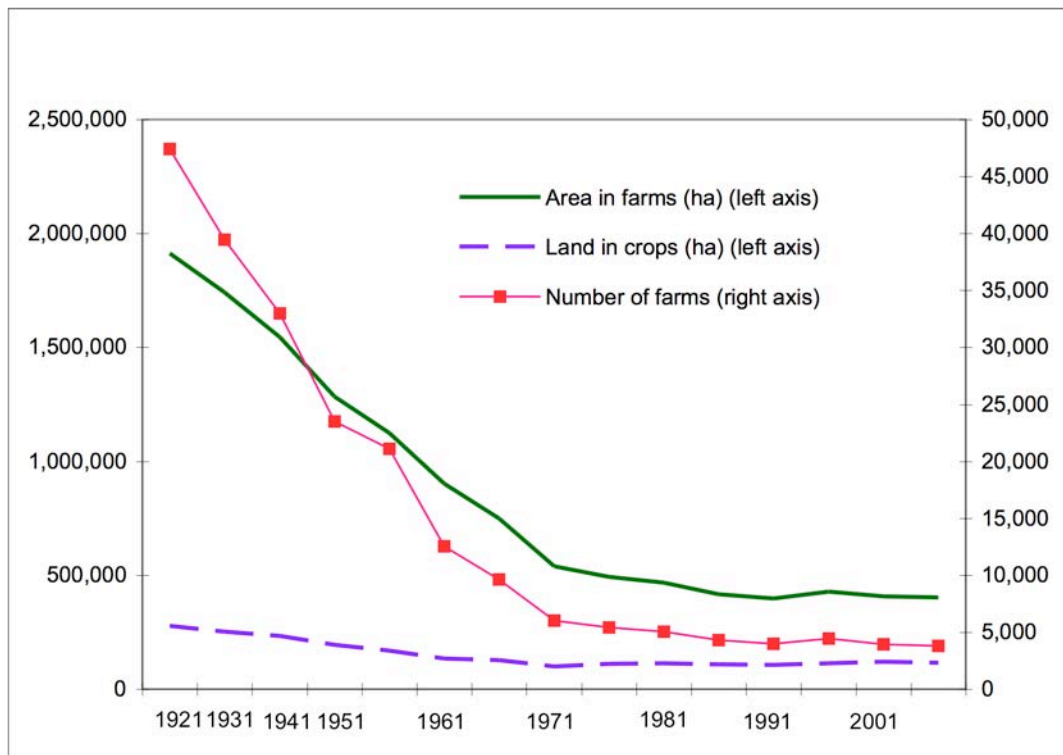
As noted above, however, indicators always and by definition reflect underlying social goals and values. Thus, the indicator selection in this section must also reflect the fundamental economic goals for agriculture that are alluded to in the quotations above and that include thriving farms, fair prices, circulating wealth within the region, and a sufficient return on investment to ensure economic and financial viability.

## 2. Background

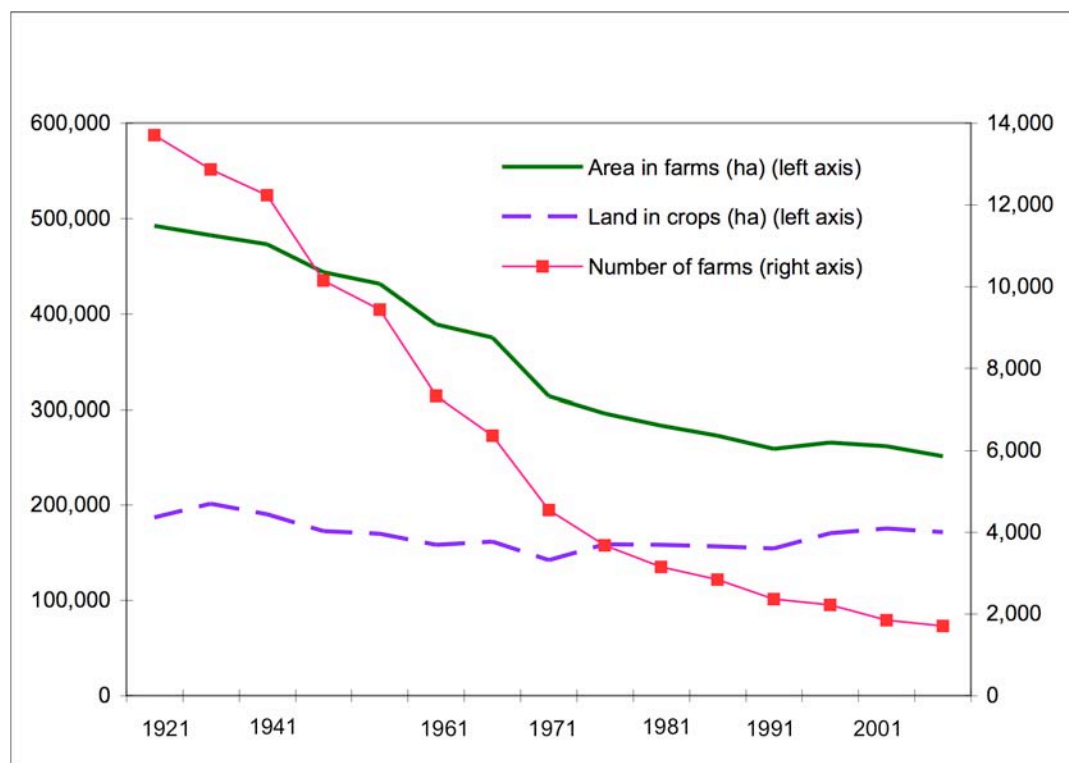
Since 1921, when the Census of Agriculture began, both Nova Scotia and PEI have lost a significant number of farms, as clearly indicated in Figures 1 and 2 below. Historical records indicate that farms were abandoned or lost for a number of reasons, including lack of good soil, unfavourable location, farm labour shortages, changing economic opportunities, farmers recruited to the Second World War, increasing mechanization, and the need to achieve economies of scale that resulted in consolidation and replacement of many small farms by agro-industrial enterprises. After steep declines in both farm area and number of farms for half a century, the loss of farms has continued in both provinces since 1971, but at a much less pronounced rate than in the prior half century (Figures 1 and 2 below).

The area of land in crops has remained much more stable. Now that Nova Scotia has only 3,795 remaining farms (out of the nearly 50,000 that existed 85 years ago), and PEI only has 1,700 remaining farms (out of the 14,000 that existed 85 years ago), many are questioning whether these numbers are sufficient to keep farming infrastructure, support businesses, and farm communities viable. Just as a certain quantitative baseline threshold of numbers is considered essential to maintain the existence of a species and to save it from extinction, a similar question might be asked about farming.

**Figure 1. Nova Scotia Farm and Crop Area; Number of Farms (1921–2006)**



**Figure 2. PEI Farm and Crop Area; Number of Farms (1921–2006)**



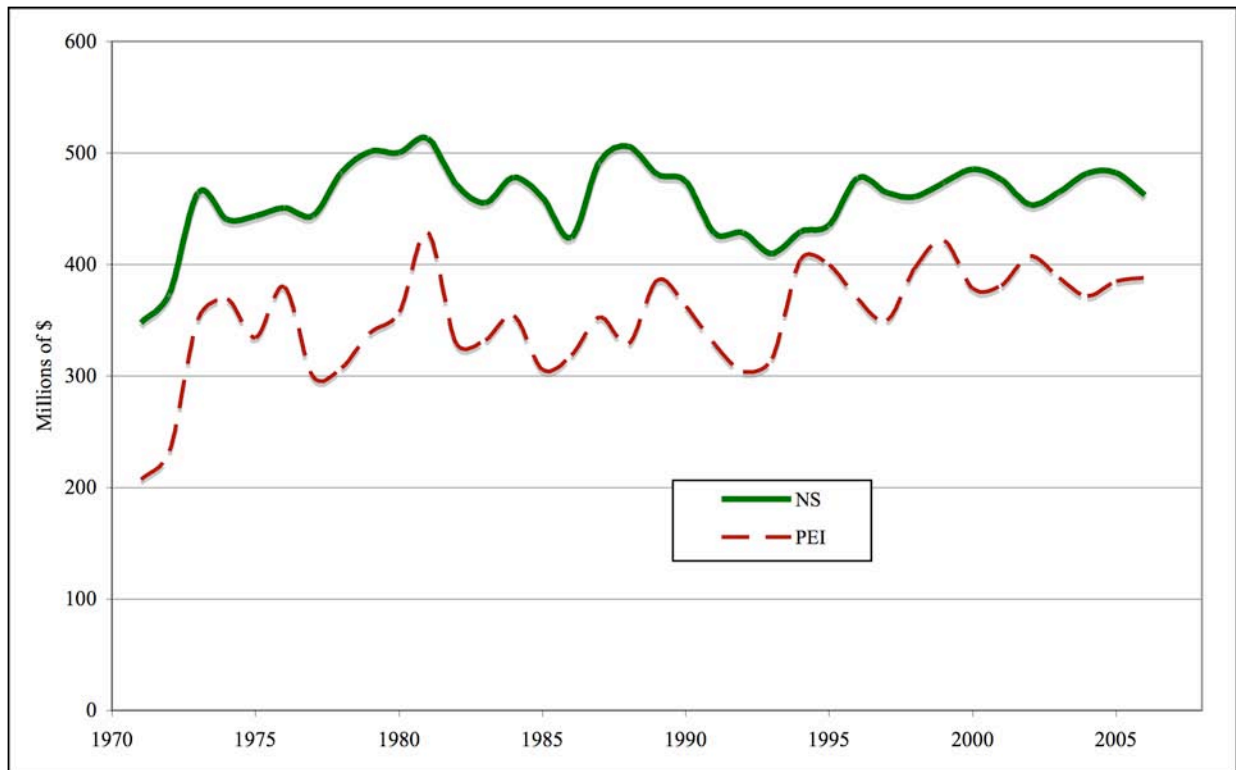
Source: Figures 1 and 2 are derived from Statistics Canada, Census of Agriculture.<sup>2</sup>

While the number of farms in both provinces has been in decline, the total farm cash receipts earned—or the gross income generated on the remaining farms—have, on average, gone up when the overall trend is observed (see appendix for chart with trend line). They rose very substantially in the 1970s, fell in the early 1980s, and then rose again to remain fairly stable in the last decade (Figure 3 below).

When the period as a whole is considered, total farm cash receipts went up by 6.7% in Nova Scotia and by 29% in PEI during the 35-year period between 1971 and 2006. Trend lines have not been shown in Figure 3 below in order not to give a distorted impression of steady increase, since most of the rise in farm cash receipts was in fact in the early 1970s. However, the chart with the trend line has been provided in the appendix in order to demonstrate the derivation of the 6.7% and 29% increases.

<sup>2</sup> Farms statistics from <http://www.statcan.ca/english/freepub/95F0302XIE/2001001/tables/html/optab13.htm> - 11. Note: The definition of a Census Farm has changed between 1921 and 2001, affecting the comparability of data among censuses. For a summary of these changes, see Census Farm in the glossary. Area in farms from <http://www.statcan.ca/english/freepub/95-629-XIE/1/1.5.htm> - 11. Land in crops from <http://www.statcan.ca/english/freepub/95F0302XIE/2001001/tables/html/optab13.htm> - TFtn. Note: For each of the Censuses conducted between 1921 and 1976, land in crops included field crops, vegetables, fruits, and nursery crops. Since 1981, the definition of land in crops has been expanded to include sod.

**Figure 3. Total Farm Cash Receipts, NS and PEI Farms, 1971–2006 (Millions of \$2007)**



Source: Derived from Statistics Canada, 2007. *Agriculture Economic Statistics*. Farm Cash Receipts. Cat. No. 21-011.

However, total cash receipts and gross current income alone can be very misleading indicators of economic wellbeing, since they provide no indication of liabilities, expenses, changes in farming costs, net income, and capacity to service debt. Three additional, more comprehensive, and therefore more accurate indicators of farm viability, along with nine actual measures, are therefore presented in Section 5 below. Those data show clearly that all other measures of farm sector economic health are in steady decline.

### 3. Farm Contributions to Community Economic Wellbeing

Abundant evidence, including responses to GPI Atlantic interviews in 2003 (Scott et al. 2003), shows that farms support rural communities economically in a number of ways—directly, through employment, spending, investment, and by generating products for sale, and indirectly, through webs of business relationships, secondary and spin-off spending, and by deliberate selection of local businesses for the supply of everyday farm needs.

Sample responses from the 2003 GPI Atlantic interviews point to farms as the real primary producers at the base of many rural Maritime economies, because they generate wealth that in turn affects other aspects of rural life. According to one respondent, “When the farming is good, everything else in the community is thriving. When the farming is in a slump, everything else suffers.” Another reported, “[W]hen the farmers have a good year, they put more money into the rink or the church or other community activities. They buy new equipment and trucks.” And another noted that “everything else stems from what they [the farmers] produce—processing, value added products [etc.]”

According to one rural business source, the business community is also aware that farms play an important economic role in rural communities: “Farms *create* wealth, which generates economic activities in the community.” One farmer counted nearly 100 businesses with which the farm does business.

At the same time, the small and diminishing number of farms in PEI particularly has made it increasingly difficult to support specialized businesses. According to one interviewee, “This farm has a great interest in supporting machinists in our businesses. One man in particular is a fantastic resource for the community, but there must be a bunch of people to support him in his business and the local people are trying hard to do that, so he stays.”

A dairy farmer in Nova Scotia also describes the importance of his web of business relationships in the local economy. His relationship with the nutritionist at the feed supplier, for example, is important, particularly because the grower himself is producing most of the feed that the supplier then sells. That company in turn supplies the farmer with many of the other supplies needed for his farm. The farmer also deals with Truro Agro-mart for his purchase of chemical fertilizers and herbicides. All these dealings in turn require a more extensive relationship that creates other jobs, since these same companies also do the soil sampling and a lot of the field mapping for the dairy farm. Commenting that “support works two ways,” this farmer notes that he also supports other local businesses such as machinery dealers, hardware stores, and welding shops.

Another dairy farmer in Antigonish County estimated that “agriculture pumps 26 million dollars into the local economy” annually. Perhaps more importantly, the same farmer also estimates that “70 to 80% of revenue generated on a farm goes back to local community.”

## 4. Indicators of Economic Wellbeing

The main indicators of farm and farm community economic wellbeing used in this report are outlined in Table 1 below. Several of these indicators and measures were first developed in the GPI Atlantic report *Farm Viability and Economic Capacity in Nova Scotia* (Scott, 2001) and are updated here with data from the last seven to eight years, and other indicators were developed from the GPI Atlantic farm community interview process conducted in 2003 (Scott et al, 2003). Both these earlier reports, which should be referenced in conjunction with this present one, can be downloaded free of charge from the GPI Atlantic website at [www.gpiatlantic.org](http://www.gpiatlantic.org).

**Table 1. Indicators and Measures of Economic Wellbeing in Farming**

Indicator	Measure
Generating and Circulating Economic Activity	Direct economic benefits of farms
	Indirect economic benefits of farms
Fair Prices	Farm product price index
	Farm input price index
Income, Equity, Debt	Net farm income
	Expense to income ratio
	Return on investment
	Debt to net farm income ratio
	Solvency ratio

### Generating and Circulating Economic Activity

#### *Business Activity—Direct Economic Benefits*

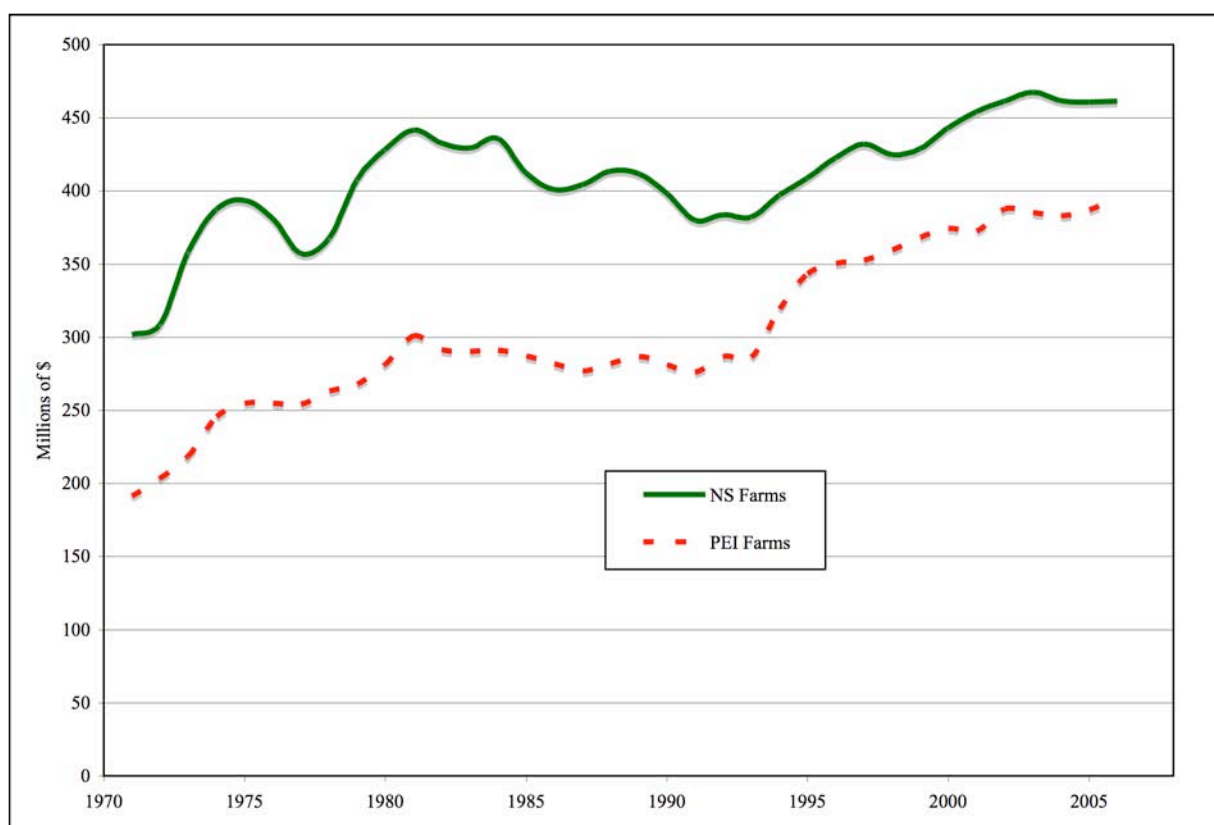
Farms generate economic activity in two direct ways—firstly by purchasing goods and services required for the production of farm products and for the sustenance of farm households, and secondly by producing farm products upon which other businesses (many in rural areas) depend. For example, many food processors, retailers, warehouses, veterinarians, insurance companies, suppliers, mechanics, builders, accountants, machinists, and others depend on farmers for part or all of their business.

The direct business activity generated by farming can, to a certain extent, be tracked by looking at farm expenses and cash receipts over time. Farm expenses reflect the amount of money farmers are spending in order to keep farming. These expenses include a depreciation figure, which converts capital costs (buildings and equipment) into a yearly expense figure. The

operating expense figure can be used to approximate the amount of economic benefit farms are generating for employees and for farm-related businesses such as those listed above.

Figure 4 shows that farms in Nova Scotia and PEI are currently generating about \$460 and \$390 million (respectively) in business spending annually by virtue of their farm operating expenses. Figure 4 also shows that these farm operating expenses (and thus business activity generation) grew by 26% in Nova Scotia and by 77% in PEI between 1971 and 2006, with substantial increases in the 1970s and since 1995, and with a flatter period between the early 1980s and mid-1990s. Since 1995 alone, farm operating expenses increased by 13% in Nova Scotia and by 15% in PEI<sup>3</sup>

**Figure 4: Total Farm Operating Expenses, NS and PEI, 1971–2006 (Millions of \$2007)**



Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. CANSIM tables from series 002-0005.

<sup>3</sup> Statistics Canada. 2007. *Agriculture Economic Statistics*. CANSIM tables 002-0005. The 1971–2006 increases are calculated using the 1971–2006 trend line for averaging purposes: NS farms:  $460 - 365 / 365 * 100 = \text{up } 26\%$ ; PEI farms:  $390 - 220 / 220 * 100 = \text{up } 77\%$ . Increases since 1995 do not use a trend line averaging procedure. Thus, NS:  $(461.39 - 408.94) / 408.94 = 13\%$ ; and PEI:  $(396.36 - 343.38) / 343.38 = 15\%$ .

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## ***Business Activity—Indirect Economic Benefits***

To analyze indirect economic benefits, the concept of a multiplier is useful.<sup>4</sup> The money that farmers spend to run their farms contributes to the economy directly by generating demand for goods and services used as farm inputs. But there are also secondary benefits to this spending, since each farm supplier in turn generates further economic activity as a result of the revenues earned from business dealings with farms. A related question is: how much of the money spent by farms stays in the local economy, and how much leaves?

To answer these questions and to determine the secondary benefits of economic activity, the multiplier is used. Multiplier effect assessments can also help determine how much initial farm spending remains within a particular geographic area to circulate and generate economic benefits locally, and how much is spent outside the region or in larger enterprises that are not locally owned. Because it is concerned to measure sustainable development (as defined in earlier GPI Atlantic reports), the Genuine Progress Index sees increased circulation of wealth within local communities as a positive trend.

The wider (secondary) economic impact of Nova Scotia's agriculture sector was estimated by ATi Consulting (2002:15) based on Statistics Canada data for 2000.<sup>5</sup> For every \$100 spent by Nova Scotia farmers in farm operating expenses, \$112 is generated in the agriculture sector of the provincial economy, and \$135 is generated in the agriculture sector of the Canadian economy, when direct, indirect, and induced benefits are combined.<sup>6</sup> Thus within the agriculture sector alone (which includes food processing, farm machinery, fertilizer and pesticide supplies, etc.), Nova Scotia farm activity has an expenditure multiplier of 1.12 within Nova Scotia and

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<sup>4</sup> See the glossary for more detailed information on the multiplier effect of economic activity. This term has to be carefully defined to determine how the multiplier is calculated, with different definitions and methodologies leading to different possible outcomes.

<sup>5</sup> For a description of the ATi methodology, see "Input-Output Model" in the Glossary.

<sup>6</sup> Direct, indirect, and induced effects are defined by Fullerton and McNeil as follows: "*Direct impact* is the increase in the output of a commodity, as producers react to meet an increased demand. As these producers increase their output, there will also be an increase in demand on their suppliers and so on down the supply chain; this is the *indirect impact*. As a result of the direct and indirect impacts, the level of income throughout the economy will increase, [and] a proportion of this increased income will be re-spent on final goods and services: this is the *induced effect*." Fullerton, D. and McNeil, S. 2004. *Farmers' Markets and their Economic Impact in Nova Scotia: Customer and Vendor Survey Analysis*. Produced for the Farmers' Markets of Nova Scotia Co-operative Limited. StFX University Enterprise Development Centre.

Definitions with farm examples are also given by ATi Consulting. 2002. *The Impact of Local Government on Farm Business in Nova Scotia*. ATi Consulting Project No. 50.5200. Nova Scotia Federation of Agriculture: "'*Direct expenditure*' refers to money spent directly by the sector on goods and services. Farm industry examples of a direct expenditure are the wages and salaries paid directly to the farm's employees or the fees for veterinary services, paid directly to a supplier of those services. '*Indirect expenditures*' are those expenditures that occur when the direct supplier of goods and services, in turn, purchases goods and services that are necessary to produce their particular good or service that is being supplied to the farm. In the case of veterinary services, for example, these purchases include the medication and equipment necessary to deliver the veterinary service to the farm. '*Induced effects*' result from the spending of income (wages and salaries) earned through direct and indirect effects on goods and services for the consumer."

1.35 within Canada.<sup>7</sup> It should be noted that these numbers are not additive, since the Canadian contribution includes the provincial one.

The available evidence indicates that most direct agriculture spending occurs within Nova Scotia, but the indirect and induced effects of that spending are higher outside the province than within, indicating that much of the benefit of agricultural business activity is leaking out of the province.

ATi Consulting (2002:18) also estimated the contribution of farms to the overall GDP. Using 1999 data and thus reporting in 1999 dollars,<sup>8</sup> the report authors found that, although Nova Scotia agriculture contributes \$199 million directly to the provincial GDP, the total contribution to GDP in Nova Scotia is actually \$389 million when indirect and induced activities are factored in (a multiplier of 1.95). When the indirect and induced effects are factored in for the Canadian economy as a whole, the total economic contribution of Nova Scotia farming is \$853 million (a multiplier of 4.29). Thus for every \$100 direct contribution of agriculture to the GDP in Nova Scotia, a total of \$195 is actually added to the GDP in the province and \$429 is added to the national GDP, when direct and indirect and induced benefits are combined.

It is interesting to note that Nova Scotia agriculture produces more total GDP effect in the rest of Canada than within the province—with just 45% of the total economic contribution of Nova Scotia farming remaining within the province. In other words, after the farmer spends the money needed to operate his or her farm, most of it leaves the province.

The spending and GDP figures above provide estimates of the flow of dollars from farms into the provincial economy, and of the proportion of direct, indirect, and induced economic activity generated by those dollars that remains within the province for further rounds of spending. For example, if a farmer buys a tractor from a Nova Scotia dealer, but if the dealer has bought that tractor from Ontario, only a small portion of the economic benefit (primarily the dealer margin) stays in Nova Scotia.

In a second example, if a farm hires a person to pick strawberries or milk cows, then that person will, in turn, spend a portion of his or her wages in the province, setting off a second round of spending. If that person buys groceries for \$100 at a locally owned store, then the store's margin is counted as a benefit to the local economy. If those groceries were sourced locally by the store, the local benefit increases. If they are sourced outside of the province, only the store's margin is counted as a benefit to the local economy. If the store itself is part of an externally owned chain and if most profits leave the province, then the local benefits are reduced proportionately. In estimating the provincial multiplier effect, several rounds of such spending are counted until

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<sup>7</sup> These multiplier ratios are derived by dividing the total agriculture industry expenditures stemming from Nova Scotia farm operating expenses (direct, indirect, and induced) by the direct industry expenditures (365.87/327.10—in millions of dollars) for NS and (440.04/327.10) for Canada. For a discussion of “direct,” “indirect,” and “induced” expenditures, see “Input-Output Model” in the Glossary. Please note that the apparent discrepancy between the ATi numbers here and those used elsewhere in this report is due to the fact that the GPI calculations add depreciation charges to farm operating expenses, whereas ATi does not do so.

<sup>8</sup> Note that, unlike figures in graphs and tables that have been converted to 2007 constant dollars, these numbers and those that follow from the ATi report are exactly as reported by ATi Consulting (2002) and are therefore in 1999 dollars, since the ATi study is based on 1999 data.

there is no more provincially spent money to be counted (i.e., it has all “leaked” out of the province).

If the provincial multiplier is low by comparison with the national multiplier, this means that most of the money spent by farmers and induced by farm spending leaves the province (as in the tractor example). The ATi Consulting (2002: 15;18) analysis shows that spending by Nova Scotia farmers generates more economic benefits in other Canadian provinces than in Nova Scotia. It would be useful to have this information over time and for a number of different provinces, since it is the comparison of multipliers (using a consistent methodology of course) that can provide the basis for a fruitful discussion on the degree to which farm activity in different jurisdictions benefits the local economy.<sup>9</sup>

A more recent Nova Scotia study (Roberts et al 2005) shows quite different total multiplier effects from the ATi Consulting (2002) study, thus illustrating the challenges of applying the multiplier effect analysis with consistency and comparability. Roberts et al. started with \$390.6 million in farm expenditures for the year 2004 (in 2004 dollars),<sup>10</sup> which does not include depreciation costs (that are included in Figure 4), thereby explaining the disparity between this expense figure and the \$461 million estimate in Figure 4.

According to the calculations of Roberts et al. (2005: 13; using a similar methodology to that used by the ATi Consulting study), \$390.6 million (2004\$) in annual farm expenditures generated:

- \$1.16 billion in gross spending, when \$339 million in indirect spending, and \$432 million in induced spending are added to direct farm expenditures.
- An estimated 10,281 person years of employment, comprised of 6,600 (direct FTE) person years of direct employment, 1,847 (indirect FTE) person years of indirect employment, and 1,831 (induced FTE) person years of induced employment.
- A total contribution to Nova Scotia’s GDP of \$400 million that includes \$174 million in direct GDP, \$56.4 million in indirect GDP, and \$170 million in induced GDP. This is very similar to the \$389 million estimate of ATi Consulting, and thus produces a similar provincial multiplier (2.30 for 2004 compared to ATi’s 1.95 estimate for 1999). (Note that the actual dollar figures are not entirely comparable since the ATi estimate is in 1999 dollars and the Roberts one in 2004 dollars.)

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<sup>9</sup> Although there are no similar figures to report here for PEI, Ian Mutch, president of the PEI Hog Marketing Board claims the Island hog industry puts \$30 million directly, and \$210 million indirectly, into the provincial economy (\$2002). Mutch’s estimate is reported in VanVliet, B. 2004. BSE crisis: PEI farmers looking for solutions. *Farm Focus* 31(2):8. In a similar analysis of the same industry for Nova Scotia, it has been reported that the pork industry in NS produces over \$30 million in sales annually, generating total economic activity of \$100 million and 1,500 full-time jobs. See Woolley, D. 2004. Pork prices increasing. *Farm Focus* May 26, 31(10):5, 8. It has not been possible at this juncture to ascertain the reasons for the disparity in these estimates and to investigate the methodologies used to derive each estimate—i.e., why the \$30 million hog industry in PEI generates \$240 million in total economic activity (direct plus indirect), while a similar-sized industry in Nova Scotia puts just \$100 million into the economy. Suffice to note here that the disparity illustrates the very different results that can be produced by different multiplier definitions and methodologies, as noted above.

<sup>10</sup> Note that, unlike figures in graphs and tables that have been converted to 2007 constant dollars, these numbers and those that follow from the Roberts report are exactly as reported by Roberts (2005) and are therefore in 2004 dollars, since the Robert study is based on 2004 data.

- An estimated \$154 million in contributions to Federal and Provincial tax revenues, based on \$68 million in provincial and \$86 million in federal revenues (all in \$2004).

Because the business, employment, and tax benefits associated with farming are often taken for granted, such valuations as those cited above by ATi Consulting (2002) and Roberts et al. (2005) are essential. Generally, we only acknowledge the importance of these more wide-ranging economic benefits of farming at times of crisis and when there is a sudden downturn in the farm sector, at which time effects are clearly felt beyond the farm gate. For example, companies involved in shipping livestock, restaurants in rural areas, farm workers, services to the cattle industry, and a variety of farm construction businesses were suddenly very hard hit by the BSE crisis, particularly in the Western provinces of Canada (Monchuk, 2004).

Surveys of farm spending habits, shown below, indicate that farmers themselves try to support local businesses, even though these local impacts are gradually lost the further removed the indirect and induced effects are from the original farm spending. A preliminary 2000 pilot survey of a small number of farmers in Kings County, Nova Scotia, showed that an average of 88% of farm expenses were spent in businesses within the county (Scott et al. 2000).<sup>11</sup> Although the survey sample size was far from adequate to draw statistical conclusions from this result, it does provide a rough estimate of at least a handful of Kings County farmers' spending patterns. A full survey would be necessary to determine more accurately where the farm expense money is going, as well as where it goes after this first round of spending (the multiplier effect).

A 2001 survey of 333 farmers in Nova Scotia (ATi Consulting 2002) further confirms that Nova Scotia farms have a strong local orientation as businesses. The ATi survey results, presented in Table 2 below, show that the majority of farm related expenditures are made locally (60%) and the vast majority provincially (92.5%), although the multiplier analysis discussed above shows that much of the indirect and induced economic benefit from these original expenditures is being experienced outside the province, as in the tractor example discussed previously. Thus, many local farm supply businesses sell items to farmers that are not manufactured in Nova Scotia, so that a significant proportion of provincial demand in fact stimulates manufacturing and other economic activity outside the province.

**Table 2. Farm Expenditures and Sales, Nova Scotia Farm Survey, 2001**

	Farm Expenditures (%)	Farm Sales (%)
Outside NS	7.5	13.7
Within NS	92.5	86.3
Nearest Centre	60.2	48.0

Source: ATi Consulting 2002. *The Impact of Local Government on Farm Businesses in NS*.

<sup>11</sup> Scott, Jennifer et al. 2000. *Agriculture in Kings County: Real Values and Real Progress: Report of the Preliminary Farmer Survey and Statistical Review*. GPI Atlantic. 18 July, 2000. Available from <http://www.gpiatlantic.org/pdf/communitygpi/communitypart3.pdf>. Accessed 9 July, 2008.

### *Type of Farm Affects Circulation of Economic Activity*

Several studies in the United States have found that smaller family farms and more industrial farms exhibit very different patterns in the circulation and distribution of economic activity. In Maine, for example, a small survey of 16 family farms found that more than half of them favour making their expenditures in local owner-operated businesses, and that they are willing to pay more to support such local businesses when making purchases (Barrett 2003).

A 1994 Iowa study found that the community economic impacts of farms are directly related to factors such as purchasing and marketing patterns and the location of profit centers. The study found that larger scale farms are more likely to travel further for farm inputs and to bypass local community suppliers, while smaller farms generally purchase a higher proportion of goods locally. According to Chism and Levins (1994), cited in Iowa Farmers Union (2003): “To the extent that large firms bypass local suppliers, this may have a negative impact on the number of local businesses and the economic viability of main street” (Iowa Farmers Union 2003 citing Chism and Levins, 1994).

In rural Illinois, two researchers found an inverse relationship between hog production concentration and retail spending in local communities. According to Gomez and Zhang (2000), cited in Iowa Farmers Union (2003):

Economic growth rates [. . .] were 55% higher in areas with conventional hog farms as opposed to those with larger hog operations, in spite of the fact that economic growth rates had been almost identical in all the studied communities before the advent of larger hog operations in the 1990s.

Similar results have been found in Western Canada. According to Qualman and Wiebe (2002: 12):

Because corporations take the profits before they can make their way back to farms and rural communities, farms and communities are becoming poorer and less numerous. The restructuring of the Canadian economy has accelerated the flow of wealth and capital from resource-producing rural areas to the management and service centres in large (mostly foreign) cities. This flow of wealth has drawn with it citizens forced to relocate to look for employment.

### *Tax*

In terms of tax revenues, the ATi Consulting analysis (2002:19) shows that Nova Scotia agricultural activity generates \$57.45 million in tax revenues for the province, and a further \$72.30 million in Federal revenues (\$1999).<sup>12</sup> As noted above, Roberts et al. (2005:13) estimated tax revenues of \$68 million in provincial taxes and \$86 million in federal tax revenues (\$2004).

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<sup>12</sup> These figures do not include property taxes generated from farms, which are noted separately below. Based on other statistics cited in the ATi Consulting report, the author assumes that the ATi tax information is based on the 2000 taxation year, although this is not stated explicitly in the ATi Consulting report.

In 2000, the NSFA estimated that farmers pay an additional \$2 million (\$1999) in property tax to municipalities each year (ATi Consulting, 2002:31). In sum, the contribution of farmers to the municipal, provincial, and federal tax base is substantial, revealing another key indirect economic benefit of farms that is frequently overlooked.

### *Tourism*

The value of agriculture to tourism is rarely acknowledged, let alone monetized. In order to assess this potential value, we would need to estimate the difference between the current level of tourism activity and the hypothetical level of tourism activity that would occur or be lost if the province had no farming. According to Robinson (1999:8):

The importance of agriculture to the scenic beauty of the Annapolis Valley and hence to recreational visitors and tourism-related businesses should be noted [ . . . ] . Both distant and day trip visits from nearby parts of the province are increased by the presence of the agricultural industry.

Many concrete examples can be cited of specific tourism activities that are entirely dependent on farming. In Nova Scotia, some farms regularly receive and host out-of-province bus tours. Oaklawn Farm in the Annapolis Valley has become a major county attraction, many farms offer bed and breakfast accommodations to tourists in attractive rural areas, and some farms even offer full farm vacation packages. County fairs such as the West Kings Community Fair that feature agriculture products and farm exhibits have become increasingly popular, are used to market rural areas to tourists, and have increased the appeal of Kings County to visitors. Indeed, it is impossible to imagine the highly popular Apple Blossom Festival in Kings County without the apple blossoms.

Based on a cursory review of tourism destinations in the Maritimes, and in the absence of available data on the subject, we have very conservatively estimated here that tourism in Nova Scotia would drop by 10% if there were no farms in the province, and it would likely drop in Prince Edward Island by 20% if there were no farms in PEI.

In the surveyed literature and interviews conducted in 2003, there is agreement that farms do indeed provide a scenic asset to both PEI and Nova Scotia that tourists largely enjoy for free. Although it is difficult to quantify the value that farms provide as both a public good and a contribution to tourism dollars, contingent valuation techniques might help create a possible estimate. For example, one of several ways to quantify the public interest in farms is to examine “farm culture” tourism to determine the number of annual visitors to various farm-related attractions and the amount of time such tourists spend at these attractions. Extrapolations might then be made based on these specific studies.

For example, at Orwell Corner Historic Village in PEI, 14,000 visitors pay admission to visit the site annually.<sup>13</sup> At Ross Farm Museum, 26,000 visitors go through the gates each year.<sup>14</sup> As well,

<sup>13</sup> *Prince Edward Island Tourism Indicators, Policy, Planning, and Research*, Tourism PEI, November 2003.

<sup>14</sup> Barry Hiltz. Farm manager. Personal communication. November 2003.

the LM Montgomery Land Trust pays up to \$30,000/ha to preserve agricultural land in PEI because of the importance to tourists of having scenic farm land on the Island.<sup>15</sup> Although we have not, in this study, attempted dollar valuations of the contribution of agriculture to tourism, such statistics could potentially be used in the future as the basis for province-wide extrapolations that could eventually provide contingent valuation assessments of the value of agriculture to tourism.

## Fair Prices

In every GPI interview and discussion conducted in 2003 both in Nova Scotia and in PEI on the subject of farm and community viability (Scott et al. 2003), the issue of farm product price was central. Every interviewee without exception raised the issue that the price of food was too low relative to the costs of producing it. A number of farmers mentioned that they have frequently sold hogs, apples, or beef for less than it cost to produce. Three years previously, in-depth conversations with eight farmers in Kings County, Nova Scotia, (Scott et al. 2000), revealed a frustration that they could no longer rely on the basic tenet that if one works hard, one's returns will be good. They had discovered that they could work very hard and still have a very poor net income.<sup>16</sup>

Figures 5 and 6 below show the differences in the 20-year trends (1986–2006) between the price indices for farm products, farm inputs, and food in grocery stores for both Nova Scotia and Prince Edward Island—with the trends indexed to 100 for 1986.

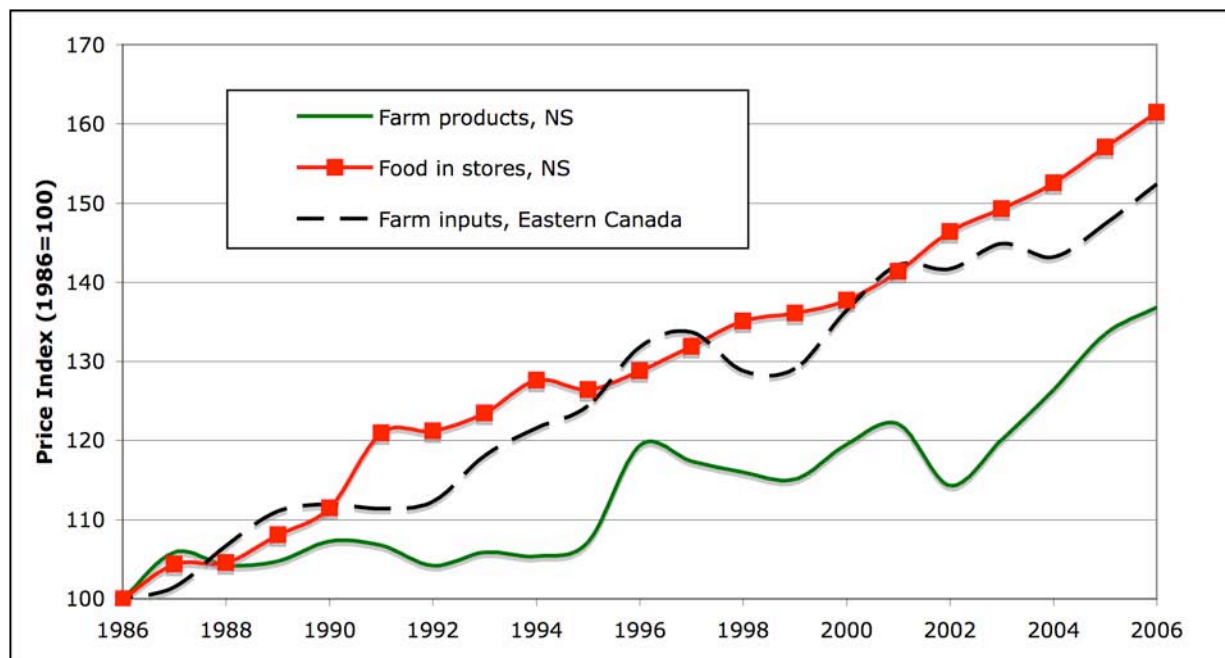
In Nova Scotia, despite some fluctuations, there was basically a growing gap from 1986 to 2002 between farm product prices on the one hand and farm price inputs and the price of groceries on the other hand—with the gap widest in 2002. Thus, in 2002, farmers were receiving 14% more for their products in current dollars than in 1986, while farm inputs were costing them 42% more (a 28 percentage point gap) and grocery food was costing consumers 46% more (a 32 percentage point gap). In other words, in real terms, it was costing farmers considerably more to farm without a commensurate gain in income. Yet, remarkably, depressed farm product prices were not reflected in cheaper food prices for consumers.

Since 2002, farm product prices in Nova Scotia have climbed, but—relative to 20 years earlier—have still not kept pace in real terms with increases in farm input prices or prices of food in stores. Thus, relative to 1986, there was still in 2006 a 15 percentage point gap between farm product prices and farm input prices and a 24 percentage point gap with grocery store prices (Figure 5 below).

<sup>15</sup> Fullerton, G. 2007. "Who's Protecting Farmland?" *Rural Delivery* 31(8): 12–14.

<sup>16</sup> Scott, Jennifer et al. 2000. *Agriculture in Kings County: Real Values and Real Progress: Report of the Preliminary Farmer Survey and Statistical Review*. GPI Atlantic. 18 July, 2000. Available from <http://www.gpiatlantic.org/pdf/communitygpi/communitypart3.pdf>. Accessed 9 July, 2008.

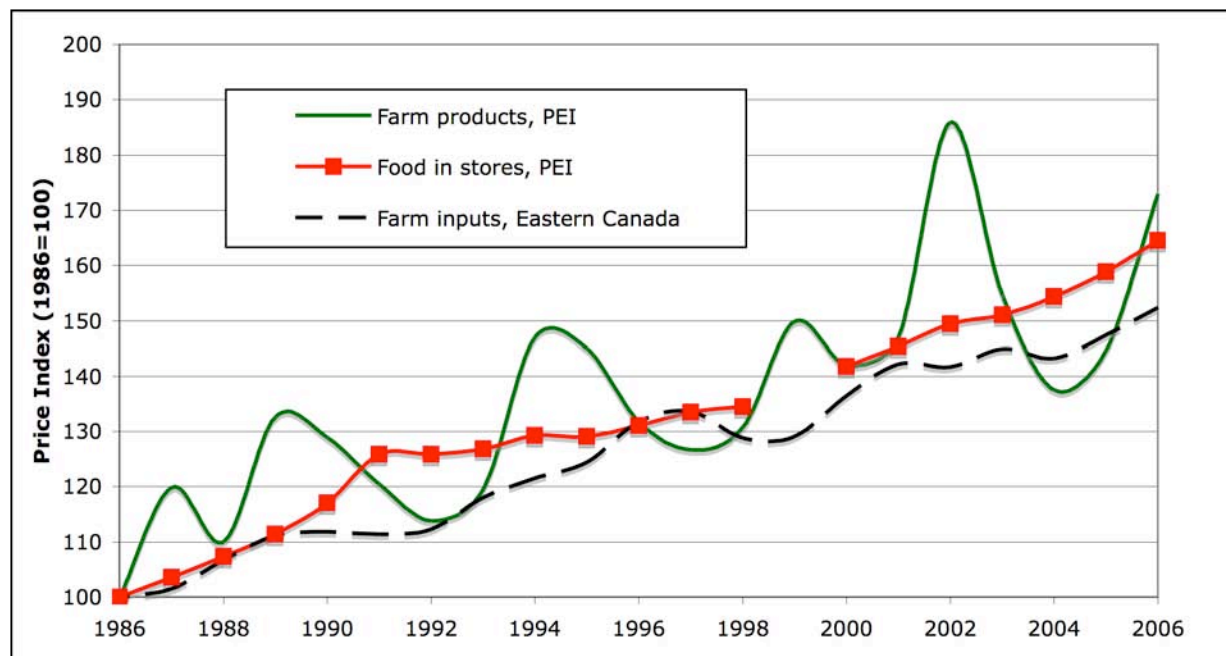
**Figure 5. Price Indices for Farm Products, Farm Inputs, and Food in Stores, Nova Scotia, 1986–2006 (1986=100)**



Sources: Derived from: Statistics Canada. 2008. Farm Product Price Index. Cat No. 21-007; McLaughlin and Robinson, 1999 Agricultural Statistics, 1995 Agricultural Statistics, 1992 Agricultural Statistics; Statistics Canada. CANSIM tables 002-0022 Farm Product Price Index, 328-0014 Farm Input Price Index, 328-0001 Farm Input Price Index, 326-0020 Consumer Price Index, Food Purchased from Stores. Indices converted to 1986 base year.

In PEI, the trends are much less clear, with farm product prices fluctuating a great deal (Figure 6 below)—similarly to farm net income (see Figure 7 below). However, overall, the gap between the price indices appears much less marked in PEI than in Nova Scotia, with the prices of farm products apparently keeping pace with the price of farm inputs—thus apparently rendering farming more viable in PEI than in Nova Scotia. Further investigation is required to assess the reasons for this disparity between the two neighbouring provinces and to determine whether particular policies or differences in the structure of farming can help explain the marked differences in the price index trends.

**Figure 6. Price Indices for Farm Products, Farm Inputs, and Food in Stores, PEI, 1986–2006 (1986=100)**



Sources: Derived from Statistics Canada. 2008. Farm Product Price Index. Cat No. 21-007; CANSIM tables 002-0022, 328-0014, 328-0001, 326-0020. Indices converted to 1986 base year.

Keeping farming costs low is particularly difficult when the pricing of inputs is not based on real “competition.” The National Farmers Union (NFU), referring to pricing tactics in Western Canada, maintains that many companies that sell farm inputs adjust prices to the farm product price index. According to the NFU, the consolidation of the farm input sector has occurred to such a degree that there is no longer market competition between the companies to gain market share (NFU 2003:13). Time and resources do not permit a more thorough investigation of this important issue at this time.

On the other side of the equation, farm product prices can be influenced by a number of factors. Market stability does exist in the dairy and poultry sectors in Nova Scotia and PEI due to the actions of marketing boards that regulate prices. However, other farm sectors have experienced considerable product price fluctuations, and little control over prices. While farmers are faced with fewer and fewer companies selling farm inputs as noted above, they are also dealing with fewer and fewer buyers of their product. Consolidation of the retail grocery and food processing sectors in Nova Scotia tends to threaten markets for many Nova Scotia farmers and to depress product prices.

To counter such adverse trends, to enhance market stability, and to ensure a fair price for their products, farmers interviewed by GPI Atlantic in 2003 volunteered several suggestions, including differentiating their product (e.g., by organic certification) and producing more value-added items for sale (e.g., selling sausages rather than live animals, or pies rather than raw berries). Several farmers also saw direct marketing to consumers (bypassing the large grocery

chains through greater reliance on farmers' markets, for example) as a viable option for those farms producing products that do not require pooling for processing (e.g., some vegetables, meats, fruits, and herbs). Such direct marketing strategies would not necessarily work for grains processed into flours, fruit processed into juice, or potatoes processed into French fries.

The formation of farmer and marketing cooperatives was also suggested by several interviewees as a means of controlling the amount of food dollars going back to the farm. Indeed, all these suggestions can be seen as forms of market diversification—which was found in the 2003 interviews to have become an increasingly popular topic among farmers.

Roberts et al. (2006:7) examined reasons why farm product prices (outside the organized marketing sectors) were not covering costs of production. They found that when farm product prices are determined by commodity markets outside the region, these product prices tend to be lower than is economical for Nova Scotia farmers because of the high feed and other input costs borne by these farmers. In addition, Roberts et al. (2006) observe that consolidation in the retail and processing sectors has left farmers with fewer choices.

In the future, Roberts et al. (2006:7-8) note that members of the food supply chain will be on

the same communication and certification system that creates the national or regional price that each supplier-farmer has to match, no matter whether they are located in Nova Scotia or California. This will become effectively an internal, corporation-specific commodity exchange system [ . . . ] . This type of system is becoming a reality in an accelerating trend as the food retail and processing sectors consolidate and seek increased efficiencies. Nova Scotia product price will be increasingly set in markets elsewhere by large monoculture farms that produce commodities at the lowest price possible [ . . . ] .

One response to this trend could be that the commodity exchange, rather than instituted and controlled by the retailers, would be created and maintained by the farmers themselves as a service to the retailers and/or wholesalers [ . . . ] . The impact of supply-chain consolidation to date has been to lower income for many farmers. Costs have increased for specialized packaging, food traceability, quality assurance programs, food safety programs and sundry other demands from processors and retailers with no compensating return from the marketplace.

[Their] inability to invest in improved technology has placed Nova Scotia farmers at a continuing competitive disadvantage to competitors, many of whom receive public financial support in amounts much greater than that received by the provincial agricultural industry. Transfer of existing farms to new generations becomes more difficult as returns to primary farm businesses decrease. The impact on the rural economy of a failure to ensure that the existing, and aging, generation of farmers is replaced by a new generation will be devastating. The rural businesses that supply the agricultural industry and process its production will disappear along with the farms that have supported them for generations, removing jobs and wealth from rural Nova Scotia.

This dire forecast points to the need to take very seriously the important suggestions and recommendations of farmers uncovered in the 2003 interviews and summarized briefly above, and—to the extent possible—to support those suggestions through effective policy initiatives and interventions.

## **Income, Equity, Debt**

A viable farm needs to produce a reasonable net income to thrive. The 2003 GPI Atlantic farm interviews (Scott et al. 2003) indicated a shared and widespread concern among farmers that they need to “make a living.” However, their expectations in that regard differed widely. For one person, “making a living” meant simply “to survive,” while for another it meant “giving a return on investment to owners or shareholders.” Some sample responses follow.

One PEI farmer remarked on the changing economics of farming: “At one time the farm sustained the whole family. Today it tends to take at least one off-farm income to have any kind of standard of living.” The farmer noted that even though his friend “makes more money and works half the hours,” this was not deterring him from farming: he commented that he himself is doing what he wants to do, has chosen to farm, and is in fact fulfilling his dream to farm. Yet, even though his income expectations are not high and he is not farming for the money, his farm still has to have minimal and sufficient viability to support his dream.

A Nova Scotia sheep producer asks a series of rhetorical questions that reveal a lot about his own view, motivations, and income expectations:

How hard are you willing to work, for how much money? How much do you want the kinds of things that you get out of life that sheep farming gives you? How much do you want to live on your farm and produce your own produce, and not be going to a nine to five job or trying to get into the rat race? How much is that all worth? And can you live on the amount of money that you’re bringing in?

According to a NS dairy producer:

We’re not wealthy in income terms, but we make a good living. On an hourly basis we probably don’t quite meet the industrial wage, but on a monthly basis we make about as much as an industrial worker. It might take more hours to do it, more risk and more investment, but we make a livelihood.

This particular farmer notes that the farm supports him and his family despite the fact that “the farm loses money almost every year.” For example, he points out that they get their own firewood, and that their mortgage is getting paid off: “We’re losing money on the farm, but in other ways it is saving us money to live here and support ourselves.”

Another farmer points out that in farming “viability is defined by the percentage of gross revenue the farmer keeps” and that his own net percentage is between 30 and 40%. He observes that when people earn more, they generally start spending more, which he has resisted. He warns that it is tempting to spend more to grow the business, with the hopes of increasing earnings. But he has taken a different path, which he believes better ensures viability: “Instead of getting bigger: get better. I’ve actually followed that advice.”

### *Net Farm Income*

Net assessments (expense to income ratio and net farm income) are far more realistic indicators of farm economic viability than the total farm cash receipts presented in Figure 3 above. Statistics Canada’s definition of net income is: Total cash receipts minus operating expenses after rebates plus income in kind minus depreciation charges (on buildings and machinery) plus value of inventory change.

In sharp contrast to total farm cash receipts, which have risen in the past 35 years, total net farm income shows a serious downward trend for the 1971–2007 period—so serious in fact that net farm income in both Nova Scotia and PEI is now hovering at the zero mark where income no longer covers expenses (Figure 7 below). Indeed, Figure 7 shows negative income for Nova Scotia in 2002, 2003, 2006, and 2007, and for PEI in 2001, 2003, 2004, 2005, and 2007—with all negative net income results in both provinces having occurred in the last six years for which data are available. Preliminary figures released in 2008 show negative average net incomes at their lowest levels ever for 2006 and 2007 in Nova Scotia, and for 2007 in PEI.<sup>17</sup>

Though farm income necessarily fluctuates according to weather patterns, commodity prices, and other factors, the 36-year trend lines show a clear and steep downward trend in net farm income.<sup>18</sup> Thus, while total farm cash receipts rose by an average of 6.7% in Nova Scotia in the 35-year period since 1971, net farm income in the province has gone down by an average of 91% during the same period. In PEI, cash receipts are up 29%, but net income is down 92% over this period.<sup>19</sup> The stark contrast between the gross and net income trends indicates clearly how misleading the former (conventional) indicator of agriculture sector health can be and how these conventional indicators presently obscure serious economic threats to farming in the Maritimes.

Figure 7 indicates that net income fluctuates a great deal more in Prince Edward Island than in Nova Scotia—just as we also noted a great deal more fluctuation in PEI than Nova Scotia in farm product price indices (Figures 5 and 6 above). Time and resources do not permit a more thorough examination of these different net income patterns at this time.

What is striking, however, is that, despite these sharp fluctuations and differing patterns, there is a remarkable consistency between the two provinces when the trends are averaged over a long

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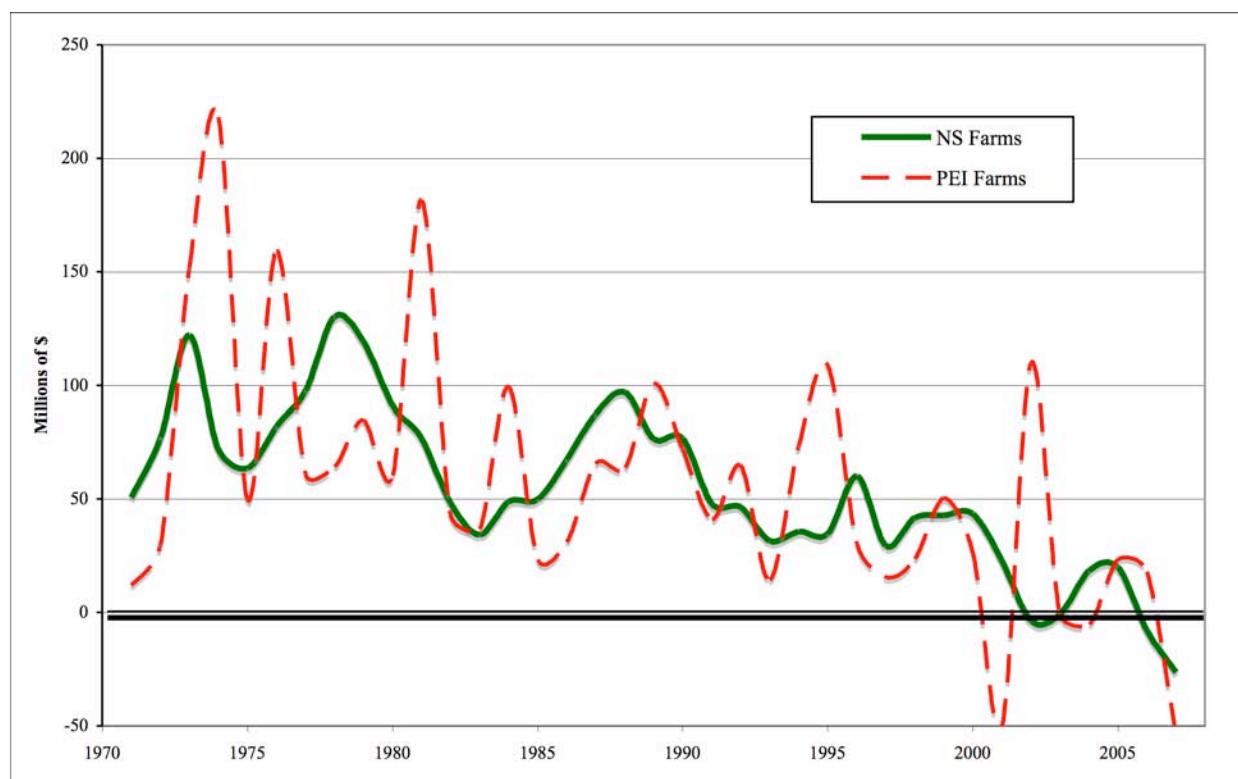
<sup>17</sup> Statistics Canada, Agriculture Economic Statistics—Net Farm Income, 2008, Cat. No. 21-010-X.

<sup>18</sup> Figures with trend lines are reproduced in the appendix, along with the data tables.

<sup>19</sup> Since 2007 net income figures became available on the eve of publication, they were inserted here just before this report went to press. Therefore the total farm cash receipt data are presented for the period 1971–2006 (the latest available at the time of writing), while net income data are presented for the period 1971–2007.

time period (36 years)—with both provinces showing declines in net farm income of a very similar order of magnitude (82% in NS and 86% in PEI) despite increases in total farm cash receipts in both provinces. Again, these long-term trends have been insufficiently reported and acknowledged, thus obscuring the economic crisis presently facing Maritime farms.

**Figure 7. Total Net Farm Income, PEI and NS, 1971–2007 (millions of \$2007)**



Source: Derived from Statistics Canada. Agriculture Economic Statistics. Net Farm Income. Cat No. 21-010-XIE (latest update May 2008).

Note: The definition of net income is: total cash receipts - operating expenses after rebates + income in kind - depreciation charges (on buildings and machinery) + value of inventory change.

Between 2001 and 2006, total net farm income in Nova Scotia averaged about \$10 million per year (\$2007). This translates into an annual per farm income of only \$2,635, based on the 3,795 remaining farms in Nova Scotia as reported in the 2006 Census of Agriculture. In PEI, total net farm income averaged about \$4.7 million per year (\$2007). This translates to an annual per farm income of only \$2,765, based on the 1,700 remaining PEI farms as reported in the 2006 Census of Agriculture. If the farm numbers were somewhat larger to reflect the 10-year average (3,850 for Nova Scotia and 1,800 for PEI), then the per farm net income would be even lower (about \$2,600 in both provinces).

The per farm results again illustrate that, despite the differing patterns of income fluctuation between the two provinces, there is remarkable consistency in the overall economic and financial

status of farms in the region. An average net farm income of just \$2,600 is clearly well below what is required to support a reasonable livelihood, and so far below the threshold of viability that this level of operation cannot be sustained over time.

While net farm income is a far more comprehensive, revealing, and therefore accurate indicator of farm viability than the conventional gross cash receipts indicator, even this net income measure, as currently defined by Statistics Canada, is incomplete because it does not count all expenses incurred by farmers. Farm operator and family labour and management costs are not counted, with unpaid farm labour thus not properly valued. If it were counted, given a dollar value, and factored into farm budgets on an hourly basis, such owner and family farm labour and management would generally fetch considerably less than the minimum wage—as revealed in many of the 2003 GPI interviews. By contrast, the GPI does give explicit value to unpaid work.

Neither are interest on equity (an opportunity cost), or changes in the land's productive capacity factored into net farm income equations. When *all* the costs of farming are counted, unregulated commodities such as apple production prove to have considerable negative income. The Nova Scotia Farm Management Analysis Project (FMAP) produced detailed business summaries from a number of apple operations. These allow different assessments of income to be made according to which costs are and are not included in the equation.

From an efficiency perspective, and using the full cost accounting approach of the GPI, it is preferable in the long run to assess business viability based on the most complete set of costs and benefits possible. The following analysis, presented in Table 3 below, and based on the FMAP apple industry data, is a step in the direction of such a comprehensive accounting approach, since it demonstrates how widely results can vary depending on which revenues and expenses are included in the equation. Though FMAP analyses are no longer carried out, for the reasons explained in the note below Table 5 below, there is, unfortunately, not yet a replacement for the valuable FMAP data, so sectoral data on these issues is now sorely lacking.

**Table 3. Five Different Ways to Measure the Net Income of Apple Operations (Average Annual Net Income per Farm, \$2007)**

Option	Calculation	“Income” <sup>20</sup>
1	<b>All revenues—some expenses.</b>  In this calculation, the expenses do not include building, equipment and machinery depreciation, inventory changes, unpaid operator and family labour, or interest on equity. They also do not include changes to the productive capacity of the land. The revenues include government subsidies.	\$ 5,335.34
2	<b>All revenues—additional expenses.</b>  In this case, the expenses include building, equipment and machinery depreciation, and inventory changes, but do not include unpaid operator and family labour, or interest on equity. They also do not include changes to the productive capacity of the land. The revenues include government subsidies.	(\$11,197.42)
3	<b>All revenues—most expenses.</b>  The expenses do include building, equipment and machinery depreciation, inventory changes, unpaid operator and family labour, and interest on equity. They do not include changes to the productive capacity of the land. The revenues include government subsidies.	(\$35,906.92)
4	<b>Food product revenues only—most expenses.</b>  This is the same as option three, but subsidies have been removed from revenues. This gives a more realistic picture of real <i>market</i> income from the actual sale of food products, and of actual farm economic viability independent of government subsidies.	(\$45,631.71)
5	<b>Food product revenues only—all expenses.</b>  This is the same as option four, but changes in the productive capacity of the land have been included. This would be the most realistic picture of real income from the actual sale of food products because it also includes all the major real costs of farming. In this option, soil-building programs or other major expenditures that can increase future productive capacity would be given credit. On the other hand, “running down the farm” (in allowing soil quality to degrade and deteriorate for example) would be shown as a loss.	Not currently calculated but a more appropriate GPI indicator.

Source: FMAP survey data of 14 fruit growers in Nova Scotia.<sup>21</sup>

<sup>20</sup> Figures in parentheses are negative values.

<sup>21</sup> NSDAF. 1998. *Tree Fruit Management Analysis Project 1997*. Nova Scotia Department of Agriculture and Marketing, Business Management and Economics Section, and the Nova Scotia Fruit Growers Association.

The reason that option five is here designated as the most desirable potential GPI indicator of net farm income is that efficient market mechanisms ensuring fair product prices are seen as preferable to regimes supported by government subsidies. The exclusion of government subsidies from revenues in options 4 and 5 above is by no means an argument against government subsidies to agriculture. On the contrary, so long as the market itself is inefficient in not pricing products properly according to the true and full costs of production, government subsidies will certainly be needed.

In that sense, option five remains the most appropriate and ideal GPI indicator of net farm income, not only because it points most directly to true market value, but also because it illustrates most graphically the magnitude of current market inefficiencies and therefore the magnitude of subsidy that is presently required to compensate for those inefficiencies. Ultimately, this option therefore points to the market reforms that are required to price products properly and fairly according to the actual costs of production.

Unfortunately, data on changes in the productive capacity of farmland are not yet sufficiently developed to allow an accurate calculation of income according to option 5 above. Proxy measures based on the cost of soil-building programs and other major expenditures required to increase future productive farmland capacity could potentially serve as temporary substitutes for measures of depreciation designed to assess productivity losses due to degradation and deterioration of soil quality. Time and resources did not permit such monetary estimates to be developed here, but they are strongly recommended for future updates of this work.

### ***Expense to Income Ratio***

The ratio of farming expenses to agricultural income is an important indicator of farm economic viability because it highlights the margin that farmers have to work with if they are not to go further into debt. Like the previous indicator on net farm income, the expense to income ratio also represents a *net* assessment rather than a *gross* one. Thus, the expense to income ratio tells us how much farmers are spending to operate their farms (e.g., the costs of labour, feed, fuel, pesticides, fertilizers, etc.) relative to their income from farm products. Operating expenses do not include operator wages. “Operator” is a term used to describe the person or people who own and run the farm. They are not “employees.”

The expense to income ratio is determined using the following formula:

$$\text{Expense to income ratio (\%)} = \frac{\text{total farm operating expenses and depreciation}}{\text{total farm cash receipts}} * 100$$

If the price index for farm inputs increases more steeply than the price index for farm products (see Figures 5 and 6), then expenses will rise relative to income unless costs can be reduced in other ways. The higher the expense ratio is, the narrower producer margins will be, and the more risky farming tends to become.

The minimum sustainability threshold for the expense to income ratio of a healthy farming sector is here estimated to be 80%, based on comparable NSDAF estimates (see below). An expense to income ratio of 100% would indicate a zero margin and no effective return on investment or on the farmer's time. An expense to income ratio higher than 100% indicates negative margins and absolute losses.

Farm financial analyses carried out by the NSDAF use a similar indicator called the "operating expense ratio."<sup>22</sup> That ratio, however, does not include interest and depreciation as expenses. An operating expense ratio, as defined by NSDAF, is considered to be "good" if it is less than 60%, and "poor" if it is over 75%.

GPI Atlantic's expense to income ratio *does* include interest and depreciation charges as expenses, which consequently raises the threshold for healthy farm viability to about 80%. (A ratio higher than 80% would indicate that the farm is getting into trouble financially.) Farm operating expenses and depreciation charges here include gross operating expenses (including crop insurance and stabilization premiums), minus rebates, plus depreciation on buildings and machinery. Depreciation or appreciation on land itself is not included.<sup>23</sup> We do include the interest and depreciation charges rather than leaving them out, because the costs associated with owning a farm and other capital equipment are actual legitimate costs that directly impact farm viability, and their inclusion therefore represents a more realistic reflection of real farming costs as actually experienced by the farmer.

The cost of unpaid labour and soil capital value should realistically also be reflected in the ratio, for the reasons explained in the discussion on Table 3 above, but they are not included at this point due to methodological and data challenges. Other social and environmental costs and benefits should also eventually be included in this expense to income ratio, in order to reflect the true cost of farming with greater accuracy.

The income side of the ratio is derived from "total farm cash receipts" (see Figure 3 above). This number includes receipts from all sales of farm products plus direct payments (subsidies) from government, but does not include off-farm income. Starting in 1996, income from Christmas tree farms and hatcheries was added by Statistics Canada to its farm cash receipt statistics.<sup>24</sup>

An expense to income ratio of 80% or less is particularly important for the farming sector in order to account for the inherent risks and fluctuations associated with farming above and beyond normal business risks and cycles. These risks include weather fluctuations, crop and livestock losses from pests and diseases, trade policy decisions, and the effects of production methods and policies (such as agricultural subsidies) in other countries. To accommodate these fluctuations over which local farmers have no control, a minimum 20% margin is considered

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<sup>22</sup> For example, NSDAF. 1999. *Farm Management Analysis Project Dairy Results: 1997*. Business Management and Economics Section, Truro: p.3.

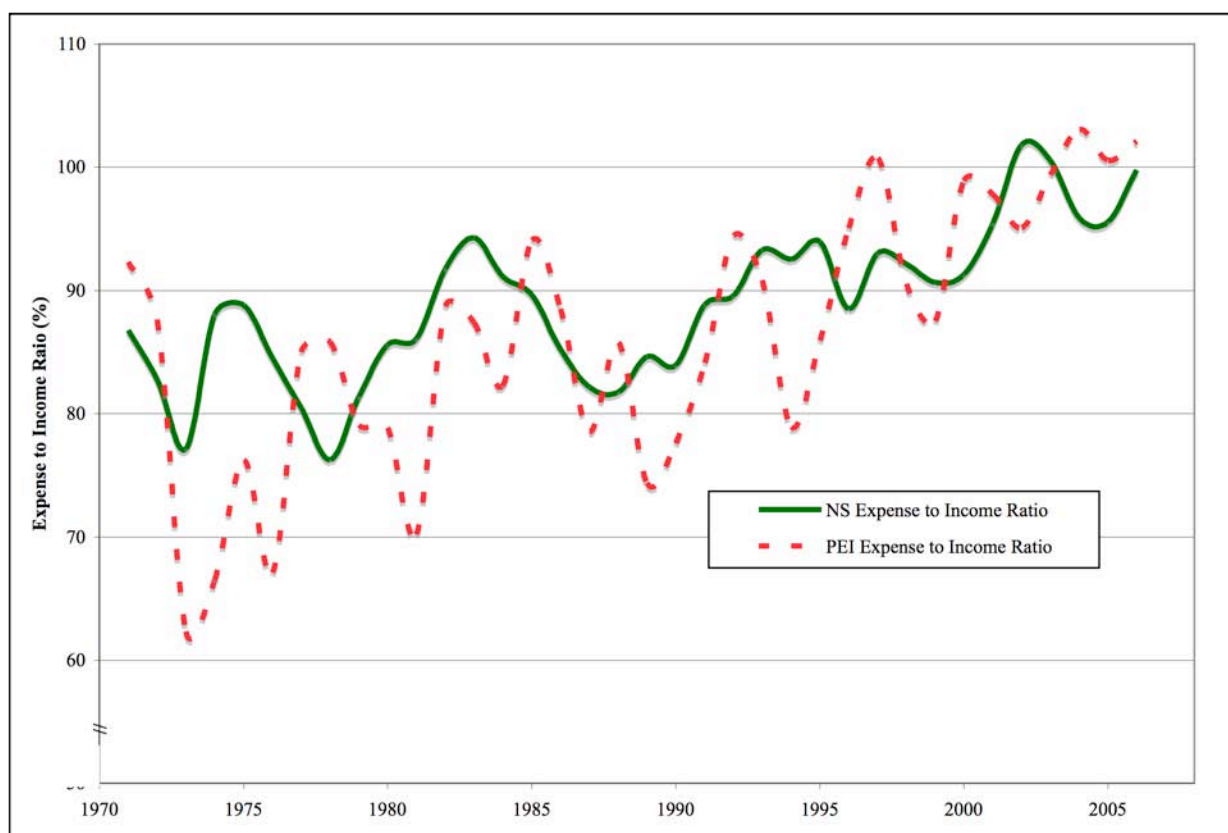
<sup>23</sup> Statistics Canada. 2008. *Agriculture Economic Statistics—Farm Operating Expenses and Depreciation Charges*. Cat No. 21-012-X, e.g., p.10 (May update). Available from <http://www.statcan.ca/cgi-bin/downpub/listpub.cgi?catno=21-012-XIE2008001>

<sup>24</sup> Ibid.

essential for a healthy farming sector. Figure 8 demonstrates just how sharp these fluctuations actually are in the NS farm sector, and even more particularly in the PEI farm sector.

In Nova Scotia, the expense to income ratio has increased by 18% (from an average of 82% in the 1970s to 97% in the last decade) as shown by the trend line spanning the 35-year period.<sup>25</sup> In PEI, the ratio has risen by 32% (from an average of 74% to 98%) during the same period (Figure 8 below). In both cases, the expense to income ratio now far exceeds the 80% threshold specified above for a healthy farm sector. This indicates that the prices paid to producers for their products are inadequate relative to rising input costs, and are not keeping pace with farm expenses.

**Figure 8. Expense to Income Ratio (%), NS and PEI Farms, 1971–2006**



Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics* Cat No. 21-011-XIE; 21-012-XIE. Latest update May 2007.

Whatever the case for higher or lower assessments of the sustainability threshold, the trend line over a 35-year period clearly indicates that farming in Nova Scotia and PEI is becoming less economically viable over time, and is reaching the 100% mark where negative margins and

<sup>25</sup> While not shown in Figure 8 below, the trend line is shown in the reproduction of the same figure in the appendix. The 1970s averages in these two sentences are calculated from this trend line.

absolute losses are forcing many farmers out of business.<sup>26</sup> Unless rapid and urgent action is taken to reverse the trends of the last 35 years, as they are dramatically illustrated in both Figures 7 and 8, farmers will abandon farming at increasing rates. Farmers will literally become an “endangered species” in this region.

It is necessary to make this somewhat dramatic statement with some forcefulness at this time, since earlier GPI presentations of these trends have not resulted in policy shifts that have effectively reversed those negative trends. Ample warnings were contained in GPI Atlantic’s 2001 report, *Farm Viability and Economic Capacity in Nova Scotia* (Scott 2001), which reported—based on the most recent data available at the time—that all key indicators of farm viability were in serious decline at that time. In the past seven years, since that report was published, the deterioration in farm viability has become substantially worse, as Figures 7 and 8 clearly show, rather than better.

An expense to income ratio now approaching 100%—compared to 91% just seven years ago—clearly indicates that the time for action has now run out, and that the region does not have another seven years to wait if it wishes to save farming as a Maritime tradition and institution. For this reason, GPI Atlantic has chosen to make the policy case here in much stronger terms than is common in other GPI reports—and more strongly particularly than in the earlier GPI Atlantic report on the same subject published seven years ago. Fortunately, a new awareness and understanding of these issues has emerged within government in recent years, so the potential for positive, corrective action is now very much greater than it was at the time of the original 2001 GPI report on this subject.

The composite provincial figures conceal important differences among different farming sectors. At the farm and sectoral level, we see that expense to income ratios vary significantly from one sector to the next, and from one year to the next (Table 4 below). Adjusting NSDAF data to add interest and depreciation charges as expenses, it is seen that tree fruit, beef, and hog farms have had expense to income ratios of close to 100% or even more (in the case of tree fruit and beef) in some recent years, indicating that they have very little margin or are losing money. Of the farm sectors studied, the dairy sector is closest to the viability threshold of 80% or less. This is no surprise as dairy farmers are well organized and have some control over supply and price through the use of marketing boards.

The overall provincial expense to income ratio trend in Figure 8 above indicates that if sectoral data were available to 2006, the more recent expense to income ratios for some sectors would be even higher than indicated in Table 4 below. For a more accurate and up to date evaluation of these sectoral data, it would be useful to have a more complete set of results for all years, all sectors, and both provinces.

Indeed, given the tipping point in economic viability faced by many Nova Scotia farmers—including loss of any margin and the prospect of absolute losses—as indicated by the trends depicted in Figures 7 and 8 above, any serious policy effort to address the present crisis will require such sectoral data, since policy interventions will need to be targeted where they are most

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<sup>26</sup> In some cases, farmers remain on their land even when losing money, but sell lots off their farms, if zoning regulations allow, in order to compensate for farming losses.

needed. As well, it is important to analyze what lessons can be learned from the relative economic stability and healthy expense to income ratio in the Nova Scotia dairy industry by comparison with those agricultural sectors afflicted with much less healthy returns, net incomes, and expense to income ratios. It is therefore a key recommendation of this report that NSDAF maintain annual sectoral data for this indicator for all key agricultural sectors.

These expense to income ratios in Table 4 below indicate that what producers in some agricultural sectors are getting for their products barely (if at all) covers what it costs them to produce those products.

**Table 4. Average Expense to Income Ratio (%), Surveyed Nova Scotia Farms**

Farm type	Number of farms sampled	Year	Expense to income ratio (%)*	Expense to income ratio (%) with direct payments and contributions excluded**
Dairy	N/A	2001	79	81.5
	N/A	2000	80	83.5
	N/A	1999	81	86
	71	1998	83	86.5
	76	1997	77	81
Tree Fruit	9	2001	92	102
	11	2000	108	124
	10	1999	96	104
	12	1998	100	102
	14	1997	108	115
	15	1996	108	110
	14	1995	103	104
Hog (far-row to finish)	18	2001	88	90.5
	21	2000	91.5	94
	25	1999	95.5	119
	26	1998	98	122
	24	1997	95	95
Beef (cow/calf)	N/A	2001	92.5	104.5
	N/A	2000	99	110
	38	1999	96	110.5
	36	1998	100	107.5
	11	1997	153	167
Blue-berry	N/A	2001	101	--
	N/A	2000	78	--

Source: Derived from NSDAF. Various dates. *Farm Management Analysis Project*.

\* Note: The NSDAF expense to income ratio data have been adjusted to add interest and depreciation charges as expenses, as explained above.

\*\* Note: As also noted in relation to Table 3 above, the exclusion of government subsidies from revenues in the last column is by no means an argument against government subsidies to agriculture. On the contrary, so long as the market itself is inefficient in not pricing products properly according to the true and full costs of production, government subsidies will certainly be needed.

As noted earlier, price indices for farm products and farm inputs in Nova Scotia (Figure 5 above) show a sharp and steady rise in the price of farm inputs since the mid-1980s in comparison to farm product prices, which have risen much more slowly and seen long periods of stagnation (from 1987–1995 and again from 1996–2003). As well, increases in the price of food in stores have sharply outpaced farm gate prices, indicating that food sector profits are accruing to other sectors in the food system rather than to producers.

Sectoral breakdowns of these trends too are necessary in order to assess whether input prices and retail food sector prices are more disparate and out of line with product prices in some sectors than in others, in order to target policy initiatives where they are most needed, and to take effective corrective action.

### ***Return on Investment***

Return on investment is a very basic and revealing indicator of farm economic viability. Farmers invest heavily in their farm businesses, but rarely do they get the kinds of returns sought by mutual or pension fund investors, for example—despite the long hours of work necessary to run a farm. This indicates that there is an opportunity cost to farm sector investment that is rarely taken into account in considerations of farm finances, economic viability, and agriculture sector income and returns. In other words, the same dollar that a farmer invests in a piece of new equipment, for example, would likely yield a considerably higher return of he or she invested it in mutual funds, real estate, or the stock market.

Return on investment figures for farms surveyed in Nova Scotia by the NSDAF's *Farm Management Analysis Project (FMAP)*<sup>27</sup> are derived in the following way:

$$\text{Return on investment (or equity) (\%)} = \frac{\text{net income} - \text{value of unpaid labour}}{\text{total assets} - \text{total liabilities}} * 100$$

Return on investment (or equity) measures the return to the owner on his/her investment (or equity) in the business. The higher the percentage determined by the equation above, the greater the return on investment (or equity). The level of investment is determined by the formula: total assets – total liabilities.

Unfortunately, and to the best of our knowledge at the time of writing, comprehensive return on investment figures for all agricultural sectors and for the provincial farm sectors as a whole, are not available for either Nova Scotia or Prince Edward Island, despite their great importance in assessing farm economic viability.

Return on investment figures are available for surveyed farms in some sectors in Nova Scotia. These figures show that only dairy farmers are making a reliable return on investment, while tree fruit farmers have no return at all and are losing money. The investment return for hog producers has fluctuated sharply, with good returns in 2000 and 2001, but negative returns in 1998, 2002, and 2003 (Table 5 below).

If return on investment is below other investment opportunities (such as guaranteed investment certificates, mutual funds, pension funds, or other businesses) then in the long term, people will likely be unwilling to invest in unprofitable farming operations—particularly where a large investment of several hundred thousand dollars is required. This has already been identified by the Nova Scotia Federation of Agriculture (NSFA) as a serious problem.<sup>28</sup>

<sup>27</sup> NSDAF. Various dates. *Farm Management Analysis Project*. For example, see p.3, Dairy Results: 1998.

<sup>28</sup> Laurence Nason. Executive Director, Nova Scotia Federation of Agriculture. Personal communication. 2007.

By comparison with the returns on investment in Table 5 below, trustee pension funds brought in an average return on investment of 10.2% for the period between 1995 and 1999.<sup>29</sup> The food retailing and processing sectors brought in an average operating return on long term capital assets of just over 12% from 1990 through 1998 (Roberts et al 2005). The dairy industry has matched those rates of return, with an average annual return of 12.2% based on the NSDAF figures listed in Table 5 below (though the 28.4% return for the small number of 18 farms surveyed in 2005 may skew that percentage up more than warranted.) However, the other two agricultural sectors monitored (hogs and tree fruit) have fallen far short of this rate of return, and some sectors, like tree fruit farms, have seen no return at all.

The viability threshold for return on investment is here set at “more than 5%” (recognizing that even that is quite low, and therefore represents a lower bound estimate). Ideally, returns would be about 10% to make farming competitive with other investment options. The NSDAF’s Farm Management Analysis Project (FMAP) reports set the return on investment target at 7%.

Considering that farming returns are frequently less than 5% and are in many cases negative, particularly in agricultural sectors like fruit tree farming, it is worth considering whether any other industry would survive in similar circumstances. Such inter-industry comparisons are necessary both in order to take seriously the economic threats to the long-term survival of family farming and agriculture in Nova Scotia and PEI and also to focus on social capital in agriculture, which may well provide the only real clues as to why farming has survived this long in the Maritimes in the face of such dramatic declines in economic viability

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<sup>29</sup> Statistics Canada. 2000. *Trusteed Pension Funds*, Cat No. 74-201-XPB, p.17. July 2008. (Available from [www.statcan.ca/english/freepub/74-201-XIB/0009874-201-XIB.pdf](http://www.statcan.ca/english/freepub/74-201-XIB/0009874-201-XIB.pdf))

**Table 5. Average Return on Investment (%), Surveyed Farms, Nova Scotia**

Farm type	Number of farms sampled	Year	Return on investment (%)
Dairy	18	2005	28.4
	22	2004	14.6
	77	2003	6.7
	79	2002	3.5
	N/A	2001	13.4
	N/A	2000	13.6
	N/A	1999	11.2
	71	1998	9.0
	76	1997	9.0
Tree fruit	9	2001*	-3.7
	11	2000	-25.7
	10	1999	-4.6
	12	1998	-12.1
	14	1997	-29.3
	N/A	1995	-27.7
Hog (farrow to finish)	N/A	2003	Less than zero
	14	2002	Less than zero
	18	2001	31.9
	21	2000	24.6
	25	1999	4.9
	24	1998	Less than zero
	26	1997	9.7

Source: Derived from NSDAF. Various dates. *Farm Management Analysis Project (FMAP)*.

Note: Tree fruit farming financial statistics have not been maintained under the FMAP since 2001, and indeed all FMAP reporting has been discontinued. This is particularly unfortunate in the light of the dire financial circumstances afflicting this agricultural sector, as indicated by the negative return on investment figures shown here. These data should rightly prompt more assiduous data collection and monitoring rather than less until these adverse circumstances are reversed.

Despite the need for good data in this area, there were problems with the FMAP that led to its discontinuation. First, it was very costly—about \$300,000/year for just 300 farms. Second, farm samples were too small and therefore not properly representative of the sector as a whole. Third, farmer interest in the program was not sufficient for the farmers to submit the financial information themselves, and the FMAP therefore relied on government representatives to go to the farms themselves to collect the information, thus making the program very expensive. Fourth, the program was never universal but was confined to dairy, tree fruit, beef, blueberries, and hogs. Finally, another reason the FMAP was not representative had to do with its history: it started in the 1950s as part of an extension program to help dairy farmers with bookkeeping and accounting. But the best growers were not on the program, which was designed to help those who were “having trouble.”<sup>30</sup>

While the FMAP may not have been the best vehicle to collect valid statistical information on issues like return on investment—for all the reasons noted above—this does not obviate the need for information on such

<sup>30</sup>Laurence Nason. Executive Director, Nova Scotia Federation of Agriculture, and Alan Grant, Department of Agriculture, Business Management and Economics division. Personal communication. 8 July, 2008.

vital indicators of farm economic viability. Fortunately, alternatives are currently under investigation. Alan Grant, Department of Agriculture, Business Management and Economics division, has suggested building a consensus cost of production approach, in which a model farm is built to represent the average Nova Scotia farm within each sector—an approach currently being pilot tested with honey and grape farmers.<sup>31</sup>

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### ***Debt to Net Farm Income Ratio***

In GPI Atlantic's 2003 interviews with farmers and farm community residents in Nova Scotia and PEI, one Nova Scotia farm leader remarked that it was unfortunate that many farmers now have to "live on their equity." In other words, farmers take out mortgages on farms that have already been paid for, in order to live, support their families, and keep farming. The Nova Scotia farm leader stated that the equity in farms that has been built up over many years is increasingly being cashed in. To determine the validity of this statement and to assess whether it is supported by factual and historical evidence, trends in farm debt to net farm income ratios and solvency ratios are therefore examined here.

Figures 9 and 10 show that, while total net income for farms in NS and PEI has been declining over time (as already seen in Figure 7 above), total debt has been rising. For the first time historically since data collection for this time series began 35 years ago, negative total net farm incomes (less than zero) have been reported, for Nova Scotia farms in four of the last six years, and for PEI farms in five of the last seven years. As noted earlier, total net farm income for PEI farms shows a more volatile trend (higher highs and lower lows) than for farms in Nova Scotia. But for both provinces, the trend is unmistakably downwards.

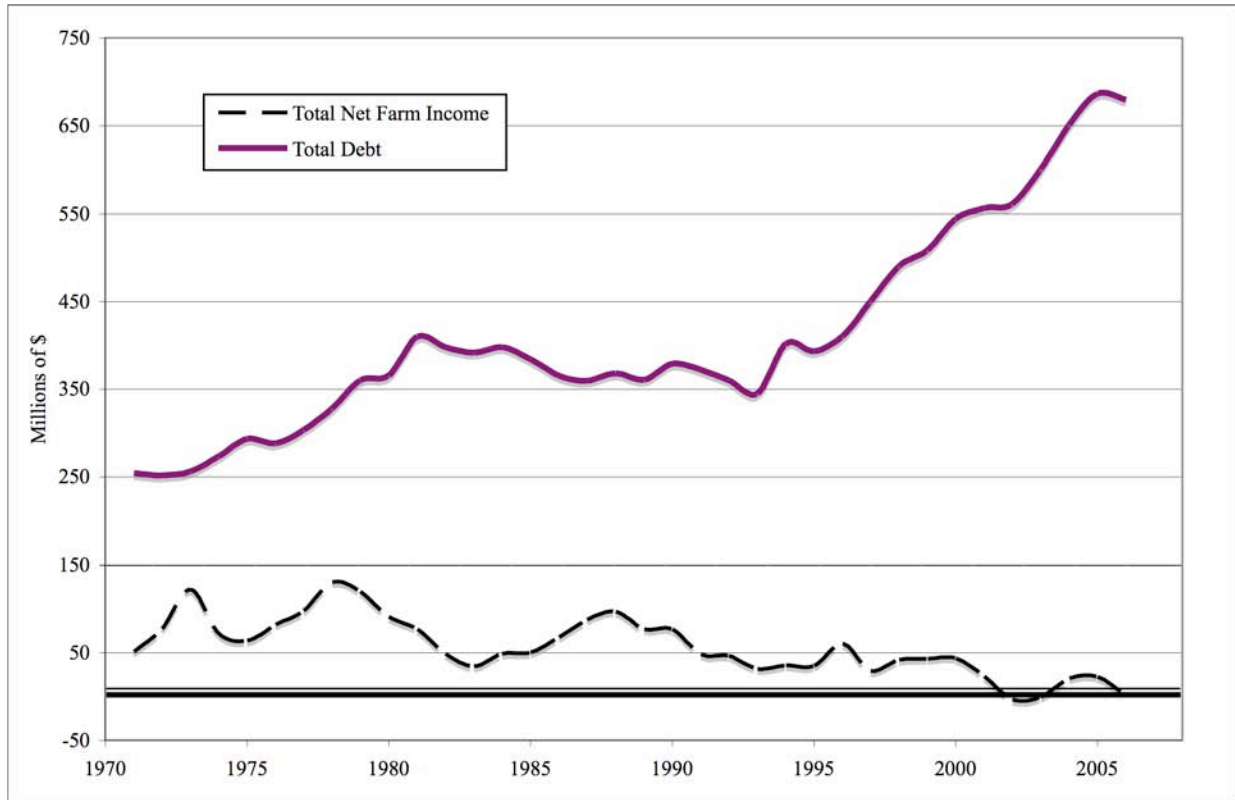
While net farm income has been declining, total farm debt has risen very sharply indeed in both Nova Scotia and Prince Edward Island particularly since the early 1990s. Over the 35-year period from 1971 to 2006, debt increased by 146% in Nova Scotia, and by 445% in PEI.<sup>32</sup> Figures 9 and 10 below—for Nova Scotia and PEI respectively—use the same scale in order to make comparisons easier and more visually clear.

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<sup>31</sup> Alan Grant. Department of Agriculture, Business Management and Economics division. Personal communication. 8 July, 2008.

<sup>32</sup> Rates of increase are calculated using trend lines for the graphs below. Trend lines are not shown for these graphs, but they are reproduced with trend lines in the appendix to provide a reference for these calculations. The trend lines are used to calculate the overall percentage increases, because they even out the many fluctuations and provide straight line trends that incorporate all the information in the fluctuating data lines. For Nova Scotia, the trend line for Figure 9 starts at \$240 million and ends at \$590 million. Therefore,  $(590-240)/240 * 100 = 146\%$ . So, debt rose by 146%. For PEI, the trend line for Figure 10 starts at \$110 million, and goes up to \$600 million. Therefore,  $(600-110)/110 * 100 = 445\%$ .

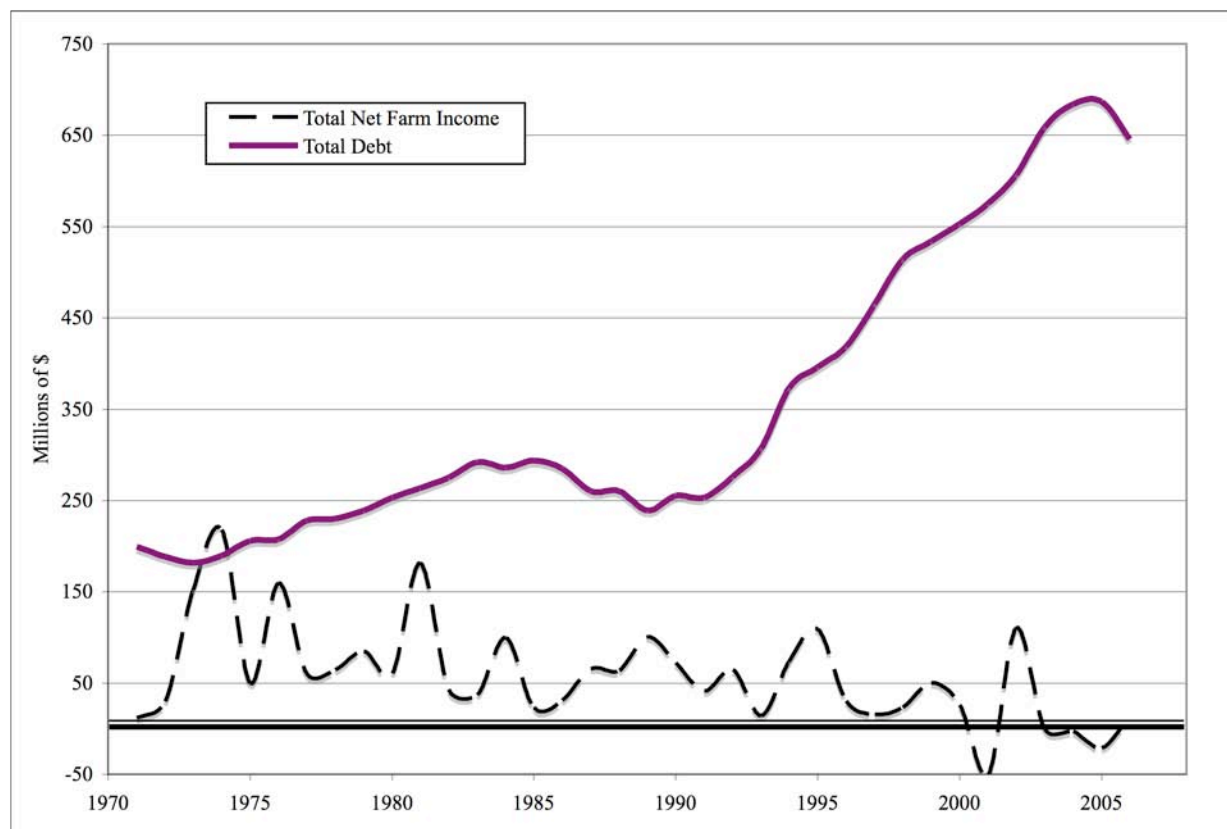
**Figure 9. Total Net Farm Income and Total Debt, NS Farms, 1971–2006 (millions of \$2007)**



Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. Cat No. 21-010-XIE; 21-014-XIE (latest update May 2007).

Note: Figures 9 and 10 use the same scale to make comparisons easier. Figure 9 shows a net income value below zero for 2002, 2003, and 2006.

**Figure 10. Total Net Farm Income and Total Debt, PEI Farms, 1971–2006 (millions of \$2007)**



Source: Derived from Statistics Canada. 2007. Agriculture Economic Statistics. Cat No. 21-010-XIE; 21-014-XIE (latest update May 2007).

Note: Figure 10 shows a net income value below zero for 2001, 2003, 2004, and 2005.

As GPI Atlantic’s recent (2008) report on household debt indicates, debt is not necessarily a signal of financial stress or insecurity provided (1) that it is used to leverage asset accumulation in excess of debt (the definition of “wealth”); and (2) that ability to service the debt is not compromised by income levels that are inadequate to make regular payments. Mortgages are a good example of the former condition, where regular mortgage payments generally leave home owners with an asset that gradually appreciates in value. The second condition—ability to service debt and make payments—is examined here.

The debt to net farm income ratio (see Figure 11 below) is an indicator of the risk adopted by the farming sector relative to the net income it generates. Conventional analysis uses debt to equity ratios or interest payments as a percentage of revenue as indicators of *ability to make payments* on the debt.<sup>33</sup>

<sup>33</sup> *Farm Management Analysis Project*, Nova Scotia Department of Agriculture and Marketing (NSDAM). Business Management and Economics Section. For example, see p.3, Dairy Results: 1998.

Indeed, any in-depth examination of the long-term viability of farming requires a close examination of total farm debt over time relative to total net income as at least one key indicator of farming viability. If debt is going up relative to net income, this signals not only a declining capacity to make payments on debt, but may also indicate long-term industry trends of significance both to policy makers and to the health of the agricultural sector in particular.

Figure 11 below indicates that total farm debt rose by 146% in Nova Scotia and by 445% in PEI between 1971 and 2006 without any commensurate rise in net farm income. On the contrary net farm income fell sharply during this period (Figures 7, 9, and 10 above). This could indicate that the industry is not robust, that production is suffering, that Maritime farms may be over-capitalized, or that farmers are suffering from income-depressing prices that are not keeping pace with farm input costs. It is likely that a combination of several of these factors has been responsible for raising the debt to net income ratio of Maritime farmers over time.

The total debt to net farm income ratio is derived using the following formula:

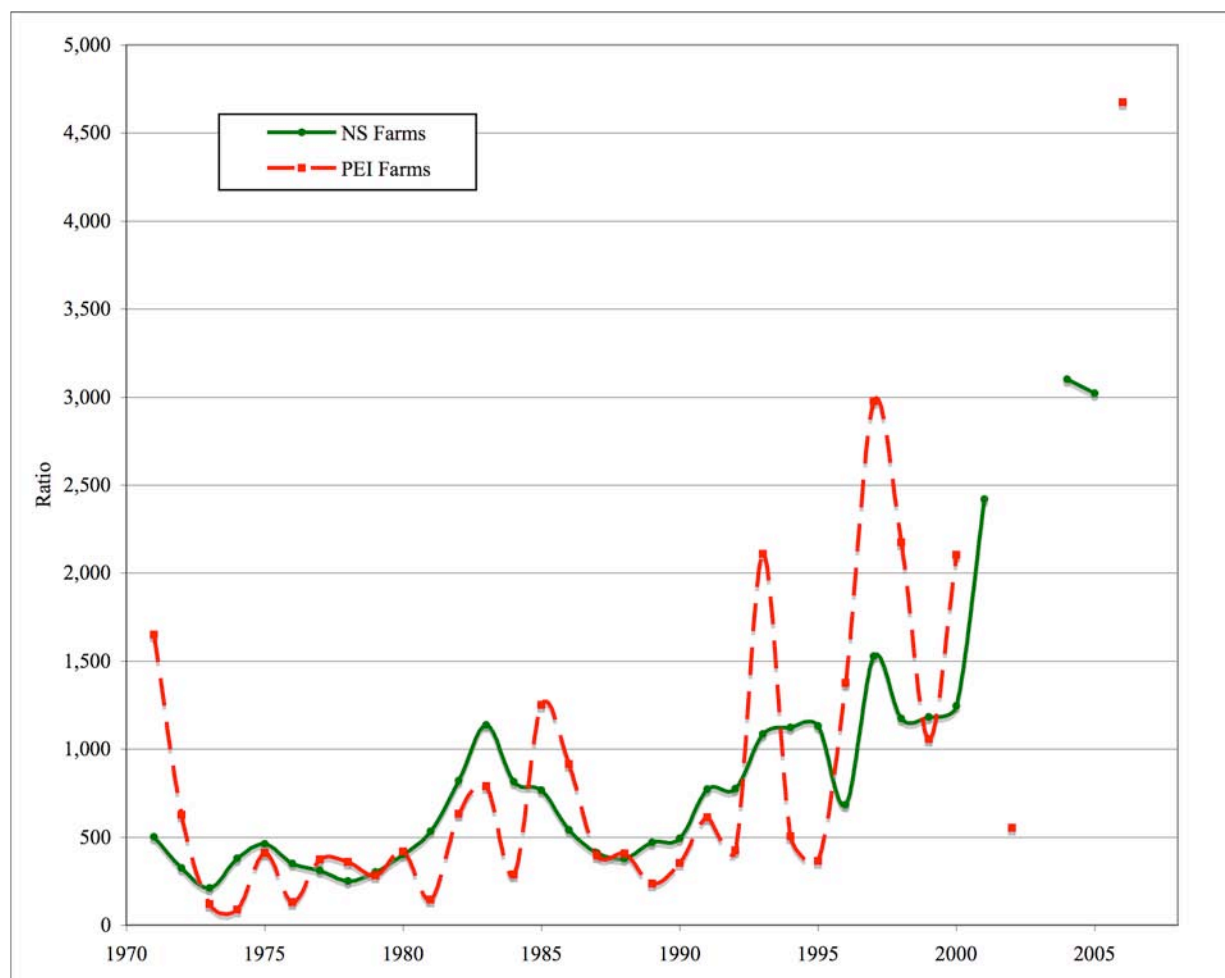
$$\text{Total debt to net farm income ratio (\%)} = \frac{\text{total farm debt}}{\text{total net income}} * 100$$

Based on historical records, the ratio of debt to net income is here estimated to average 600% or less for a healthy farming sector. In other words, total outstanding farm loans in any given year would not exceed six times total net farm income in that year. This 600% threshold was achieved in both provinces in the 1970s and in part of the 1980s, but has been far exceeded on a continuous basis since the early 1990s (see Figure 11). In Nova Scotia, the debt to net income ratio more than doubled in the 1990s and appears to have doubled again in recent years.

Unfortunately, however, the debt to net income ratios for 2001 to 2006 cannot be shown consistently because net incomes for many of those years (2002, 2003, and 2006 in Nova Scotia, and 2001, 2003, 2004, and 2005 in PEI) were negative, as they also were in 2007 in both provinces. This inability to chart farm debt to net farm income ratios illustratively in recent years obscures how sharply the gap between debt and income has continued to grow, though the 2006 data point shown for PEI in Figure 11 below gives at least some indication of how huge the gap has become and of the depths of the present farm debt crisis in the Maritimes.

Thus, the farm debt to net farm income ratio in PEI for the most recent available year (2006) was an astonishing 4700% nearly 8 times the recommended 600% threshold for a healthy farm sector. A ratio of this dimension not only points to clear lack of financial health and economic viability, but can even be characterized as “out of control.”

**Figure 11. Debt to Net Income Ratio, NS and PEI Farms, 1971–2006**



Source: Derived from Statistics Canada. 2007. Agriculture Economic Statistics. Cat No. 21-010-XIE; 21-014-XIE (latest update May 2007).

Note: The ratios for 2001 to 2006 cannot be shown consistently because net incomes for those years were sometimes negative.

In the long run, an ascending debt to income ratio over time indicates that farmers are accepting higher risks (and going deeper into debt) in order to bring in the same amount of net income. The risk-prone nature of farming particularly dictates that total debt should not be too high relative to income, as unpredictable fluctuations due to weather, pests, crop and livestock diseases, trade decisions, and sudden commodity price changes may further imperil farmers' ability to make payments.

It should be noted that the 600% viability threshold for the debt to income ratio is an estimate for the provincial farming sector as a whole. At the sectoral and individual farm level, however, this threshold will vary—particularly according to the security of farm income. Supply-managed dairy and poultry farms, because of their steadier and more secure incomes, would likely be able to weather relatively high debt levels, unless interest rates increase significantly. Non supply-

managed sectors such as fruit or hog farms, on the other hand, are potentially at risk of default at considerably lower levels of debt, because their incomes are more marginal and tend to fluctuate unpredictably with changing weather, market, and price conditions.

Just as we noted significant sectoral disparities in expense to income ratios (Table 4 above) and in returns on investment (Table 5 above), so Table 6 below indicates the significant disparities that exist both among different farm sectors in Nova Scotia and within those sectors from one year to the next. It is important to understand that the debt to income ratio (like other ratios) can change due to changes in either the nominator (in this case debt) or denominator (income). As rapid year-to-year changes in debt levels are unlikely, it is much more likely that sharp year-to-year fluctuations in debt to income ratios, as seen in Table 6 below and Figure 11 above, are attributable to the vicissitudes of farm income. Thus a drought year, unexpected disease, or crop failure might wipe out income very rapidly, just as good weather and a bumper crop might boost income in a particular year—with either eventuality sharply changing the debt to income ratio for that year.

For farms surveyed as part of the Nova Scotia Department of Agriculture and Fisheries' Farm Management Analysis Project (FMAP), the dairy sector had an average debt to net farm income ratio for the nine years in which data were collected (1997–2005) that was about 59% higher than the viability threshold of 600%. Using the most recent available debt to income ratio for the 18 Nova Scotia dairy farms for which data were available in 2005—1115%, which is much more reflective of debt to income ratios in the most recent years (2002–2005; Table 6 below)—it is seen that this is actually 86% higher than the estimated viability threshold of 600%. For the reasons explained above, the supply-side management of this agricultural sector may make it more feasible for Nova Scotia dairy farmers to sustain these higher debt levels than for other agricultural sectors in Nova Scotia, though ratios twice the viability threshold, as in recent years, would likely put significant strains even on more secure supply-managed sectors.

Thus, the data in Table 6 indicate cause for concern even in the relatively more stable dairy sector. For the five years from 1997–2001, the average debt to net income ratio for Nova Scotia dairy farmers was 798%—one-third higher than then 600% recommended threshold. By contrast, the average debt to net income ratio for Nova Scotia dairy farmers in the most recent four years for which data are available (2002–2005) was 1153%—92% higher than the 600% recommended threshold, and 44% higher than in the previous five years. Either higher debt levels or lower incomes in the dairy sector, or a combination of both, appear to have created greater potential difficulties in servicing debt in the dairy sector in recent years than in earlier years.

However, the greatest cause for concern in terms of capacity to make regular payments on debt is in the non-supply managed agricultural sectors, where income frequently fluctuates dramatically from one year to the next. As Table 6 below and the FMAP results indicate, there are some years in which hog and tree fruit farmers may have had very serious trouble servicing their debt loads, because of marginal and even negative net incomes. In fact, the debt to income ratio for hog farmers in 2002 and 2003 could not be reported because their net income for those years was negative. Similarly, the ratios for 1997 and 2000 could not be reported for tree fruit farmers because their net income for those years was also negative.

**Table 6. Average Debt to Net Farm Income Ratio (%), Surveyed Farms**

Farm type	# of farms sampled	Year	Debt to net income ratio (%)
Dairy	18	2005	1115
	22	2004	1111
	77	2003	1275
	79	2002	1111
	Not given	2001	752
	Not given	2000	814
	Not given	1999	801
	71	1998	828
	76	1997	793
Hog (farrow to finish)	18	2001 <sup>34</sup>	612
	21	2000	824
	25	1999	1739
	26	1998	4325
	24	1997	1376
Tree fruit	9	2001	966
	10	1999 <sup>35</sup>	1419
	12	1998	16,115*

Source: NSDAF. Various dates. *Farm Management Analysis Project*.

Note: 2001 was the last year in which the FMAP reported financial data for tree fruit farmers, and all FMAP reporting has now been discontinued for the reasons explained in detail in the note below Table 5.

\* Since debt to income ratios can change according to changes in either the nominator or denominator, and since debt does not fluctuate so dramatically on a year to year basis, sharp year-to-year fluctuations in debt to income ratios like this one for tree fruit farming (mostly apples) in 1998 are only logically explainable by huge declines in income. Thus, for tree fruit farmers, in 2001, average debt was \$178,471, divided by net income of \$18,477 \*100 = 966%. In 1999, average debt was \$146,939, divided by net income of \$10,358.20 \*100= 1,419%. In 1998, average debt was \$124,249, divided by net income of \$771.26 \*100 = 16,115%, confirming that the dramatic change in the ratio is entirely attributable to plummeting incomes in 1998.

This is further confirmed by examining farm receipts. In 2001, total gross farm revenue in this sector was \$224,299. In 1999, total gross farm revenue was \$198,674. In 1998, total gross farm revenue was \$130,240. When expenses are examined, it is clear that in 1998 revenues in tree fruit farming simply sank too close to the level of expenses to produce a viable income.

The particular circumstance leading to this very dramatic result for 1998 indicated in Table 6 above was the serious drought experienced by Nova Scotia in three consecutive years—1997–1999, though 1999 farm losses were ameliorated somewhat by relief funding from the province’s \$20-million five-year Weather-Related Relief Program, which began on April 1, 1999.

<sup>34</sup> The ratio for hog farmers for 2002 and 2003 could not be reported because net income for those years was negative.

<sup>35</sup> The ratio for tree fruit farmers for 1997 and 2000 could not be reported because net income for those years was negative. The FMAP did not continue to report on the finances of tree fruit farmers after 2001.

Unfortunately, 2001 was the last year in which the FMAP reported financial management data for tree fruit farmers. As noted earlier, the FMAP has been discontinued altogether largely because it was felt to be too expensive relative to the benefits generated, and because most farmers were not willing to submit financial information on their own to make the program less expensive by avoiding the cost of government representatives visiting farms to collect the data. As well, the sample sizes were too small and did not produce sufficiently representative data. More detailed notes on the FMAP and the reasons it was discontinued are in the note below Table 5 above.

It should also be noted here that similar sector-level analyses are also not possible for Prince Edward Island, since these data are not reported there on a sectoral basis.<sup>36</sup>

GPI Atlantic's 2001 report, *Farm Viability and Economic Capacity in Nova Scotia* (Scott 2001) —based on the most recent data available at the time—reported on the burgeoning farm debt crisis recorded in this section roughly at its mid-point. Sadly, seven years later, we must report that the trend reported in 2001 continued unabated to 2005—with net income continuing to fall while debt continued to climb dramatically.

We are stating the case for decisive policy intervention much more strongly throughout this report than we did seven years ago both in the hope that these results will this time provoke effective action and because the crisis these results depict is now so deep and so acute that seven more years of “business as usual” practices may well see the virtual demise of farming in the Maritimes. If family farming is a tradition, institution, and source of food security and social capital deemed worthy of preservation, then the need for action is truly urgent at this pivotal point in time.

GPI Atlantic is not accustomed to making a policy case so explicitly. Indeed, as in the vast majority of other and earlier GPI reports, we very much prefer to let the evidence speak for itself in the hope that policy makers will use it to inform policy. As noted earlier, the capital accounting approach of the GPI, which assesses depreciation in society's human, social, natural, and economic assets, is designed as an early warning instrument that should trigger corrective action long before a crisis ensues. However, if these early warning systems are not effectively incorporated into policy, we have no choice but to use a blunter and perhaps more sledgehammer approach to making the case for intervention.

In this case, and put very bluntly, the evidence both here and above very clearly indicates that we simply cannot afford to wait another seven years till the next GPI update of these results appears if we want to see farming survive in the Maritimes. If current trends continue in the directions demonstrated here, and if no decisive action is taken very quickly to stem and reverse those trends, our GPI report seven years hence will more likely be an obituary than an update. Fortunately, as noted earlier, a new awareness and understanding of these issues has emerged within government in recent years, so the potential for positive, corrective action is now very much greater than it was at the time of the original 2001 GPI report on this subject.

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<sup>36</sup> Colleen Younie. PEI Department of Agriculture. Personal communication. December 2003.

### *Solvency Ratio*<sup>37</sup>

From a capital accounting perspective such as that adopted in the GPI, the “solvency ratio” is a good indicator of the long-term health of the agriculture sector and of the economic viability of farmers, because it is essentially a stock assessment. This solvency ratio is obtained by dividing total liabilities (debt) by total assets (capital value of farms). The capital value of farms here includes the value of farmland and buildings, machinery and equipment, and livestock. If the solvency ratio is high or is increasing in the long term, this indicates that farms that are becoming less viable.

In 2006 Nova Scotia and PEI farms had solvency ratios of 0.399 and 0.390 respectively—up by 106% in Nova Scotia and by 143% in PEI over the 35-year period since 1971.<sup>38</sup> Figure 12 below shows that, during the time period under examination, the solvency ratio began rising from 1980, but has been rising particularly sharply since 1990. Solvency ratios in 2006 in both Nova Scotia and PEI were 160% higher than in 1980 and double the 1990 level. This clearly indicates that Nova Scotia and PEI farms are becoming much less sustainable over time, with the rate of farm debt increase rapidly outstripping any appreciation in the capital value of farms.

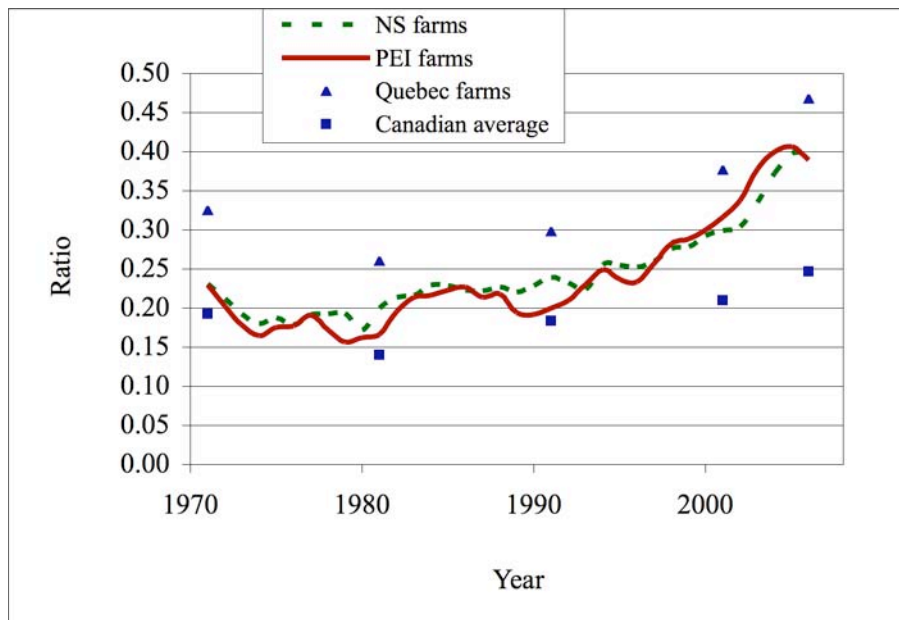
Figure 12 also shows that farms in Quebec have even higher debts relative to capital value than farms in Nova Scotia and PEI. However, the average Canadian farm solvency ratio for 2006 of 0.247 is much lower than for farms in NS and PEI—38% lower than in Nova Scotia and 37% lower than in PEI. The Canadian solvency ratio—while it has also risen, reflecting economic challenges faced by farmers nationwide—has increased much less sharply since 1990 than in Nova Scotia and PEI. Time and resources did not permit a thorough investigation of this disparity.

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<sup>37</sup> Given the rapid accumulation of farm debt in recent years, and the financial, economic, and debt crisis faced by an increasing number of farmers, as outlined in this report, it has been suggested that this “solvency ratio” should properly be named the “insolvency ratio.”

<sup>38</sup> A with all other percentage increases in this report, these are calculated from the trend lines. The graphs with the trend lines are reproduced in the appendix so that the basis for the calculations can be clearly identified. Thus, according to the trend lines: PEI:  $(34-14)/14*100=143\%$  increase; NS:  $(33-16)/16*100=106\%$  increase. Given the large fluctuations in farm finances, it is important to use the trend lines to calculate the average rates of increase, rather than simply the start and end dates shown in the graphs, which may well reflect anomalies in those particular years, since the trend lines reflect the average rate of change for the period as a whole.

**Figure 12. Solvency Ratio, Nova Scotia, PEI, QC, and Canadian farms 1971–2006**



Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. Cat No. 21-013-XIE; 21-014-XIE.

## 5. Conclusions and Recommendations

At the end of a section that points to a very serious economic and financial crisis in Maritime agriculture, it is most important to come back to the clear conclusion of the first indicator—namely that farms in Nova Scotia and PEI are very good at generating wealth, and generate considerable economic activity for the local (provincial) economy. While the results of some previous indicators might lead analysts to conclude that the era of Maritime farming is over, and to write off the industry as unviable, the reality is that the economic activity generated by farms continues to provide both direct and spin-off jobs, and to support rural communities in very substantial ways despite the fact that we are losing farms in both provinces. This indicates that there are more than sentimental reasons to save farming as a Maritime tradition and institution, and that the economic benefit lost by the demise of farming in the region would be considerable.

Multiplier studies can shed light on where economic activity occurs after it is generated. In Nova Scotia, a multiplier study using 1999 and 2000 data showed that Nova Scotia farm activity had an expenditure multiplier for the agriculture sector alone of 1.12 within the province and 1.35 within Canada. The GDP multiplier (counting indirect and induced activity for the economy as a whole) was 1.95 within Nova Scotia and 4.29 within Canada. The rather scant available evidence seems to indicate that, in its initial stages, the economic activity generated by Nova Scotia farms effectively circulates within the region where it is generated, but that the benefit gradually dissipates beyond the province the further removed the generated activity is from its origin. Further comparative studies for other years, places, and industries are required to assess the relative economic impact of Maritime farming.

Roberts et al. (2005) note that most of the economic activity generated by farms in Nova Scotia occurs in rural areas:

The relative stability of this economic engine has insulated rural economies against the fluctuations experienced in other industries (e.g., fisheries, forestry, tourism). Even when farm revenues decrease, expenditures are relatively fixed by the requirements of production systems so that the economic activity from those expenditures is comparatively stable even though revenue may be volatile from year to year.

In other words, even when farms are losing money and in dire economic circumstances, they continue to generate economic benefit, particularly for the rural communities in which they are located. This is a vital point to consider in this analysis, as it indicates that public investment in the health and viability of farming will yield considerable returns for the economy as a whole. Conversely, it shows that a continuation of the current adverse trends in viability that are rapidly pushing many farms beyond the tipping point of survival will have serious impacts on the region's rural economies, communities, livelihood, and tax base.

It is notable (and alarming) that all the indicators of farm economic viability examined demonstrate the same adverse trends. For example, the comparative Nova Scotia price indices showed that farm product prices are not keeping pace with either farm input prices or the price of food in stores. If it is costing farmers more to farm without higher commensurate prices for their products, and if profit-taking is occurring elsewhere in the food industry (notably in the retail or processing sector rather than the production sector), those realities inevitably lead to diminishing margins for farmers. In Prince Edward Island, the price index situation is less clear because the PEI farm product price index is so variable. Ideally, the indices for all three factors (farm products, food in stores, and farm inputs) would be roughly the same, indicating that product prices are keeping pace with farming costs and that food industry profits are more evenly shared among different sectors of the industry.

The comparative Nova Scotia price index results were tested against several other indicators. For example, the expense to income ratio is another way of expressing the price/cost squeeze that farmers report experiencing. In both Nova Scotia and Prince Edward Island, the expense to income ratio results showed a clear and steady increase in farming expenses relative to total farm cash receipts, especially since the late 1980s.

Since total farm cash receipts, on their own, are incomplete measures of farm economic wellbeing, those results were also tested against a series of net (rather than gross) income data. Again, the results clearly showed that total net farm income has been declining over time (in constant dollars) in both Nova Scotia and Prince Edward Island. Disturbingly, we also noted that while net farm incomes are going down in both provinces, debt levels and therefore debt to net farm income ratios are increasing sharply

What is particularly disturbing from an equity perspective is that, even while net farm income has been going steadily down, the total value of the products produced by farms in both provinces has been going up, again indicating that farmers are not seeing the fruits of their own labour and that profit-taking and the benefits of farm work are being realized elsewhere in the food industry. In other words, the serious economic problems of the Maritime farm industry are not due to lack of productivity or declining capacity, but are structural problems that are—at least in large part—related to changes in the structure of the food industry, including increasing consolidation in the farm input and food retail sectors. In a sense, this is good news, as the problems of the farm industry are therefore much more amenable to effective policy interventions and structural reforms than if they stemmed from fundamental productivity issues.

There are many reasons for declining net farm income. In their analysis of the Nova Scotia situation, Roberts et al. (2005:17) conclude that

Nova Scotia agriculture maintained a reasonable level of profitability for many years within the context of a more diversified industry. However, the producer was closer to the consumer at that time. The processing, wholesaling and retailing sectors were less consolidated and producers could often sell their product to individual grocery stores. The competition for that supply was further away from Nova Scotia than it is now in terms of the distance that it is feasible to transport food.

The income-related indicators in this report have been supplemented by two other key indicators of business health that are essential components of the GPI capital accounting approach—solvency (which relates directly to capital stocks) and return on investment (that relates stocks with consequent flows). While the debt to income ratio assesses capacity to service debt, the solvency ratio is useful for assessing debt levels relative to overall farm capital value. The solvency ratio (which some have remarked should properly be called the insolvency ratio) has been going up for both provinces, indicating that farm debt has been climbing faster than farm capital values.

Unfortunately, despite their great importance in assessing farm economic viability, comprehensive return on investment figures for all agricultural sectors and for the provincial farm sectors as a whole are not available for either Nova Scotia or Prince Edward Island. The sparse return on investment figures that are available for some years in select Nova Scotia agricultural sectors show shockingly low (and often negative) returns for tree fruit and hog operations, while supply-managed dairies are seen to have reasonable returns. In light of the negative return on investment figures reported for tree fruit farming from 1995–2001, and the dire financial circumstances facing that particular sector as revealed in several indicators, it is particularly unfortunate that financial statistics have not been maintained for tree fruit farms since 2001.

Indeed, for the reasons explained below Table 5 above, the entire NSDAF Farm Management Analysis Project (FMAP) has since been suspended and not yet replaced by a more cost-effective, representative, and comprehensive financial monitoring system. Without more comprehensive and consistent province-wide and sectoral data on returns on investment, it is very difficult to draw definitive statistical conclusions for this measure across farms in both provinces.

The measures explored in this section of the report provide a range of perspectives on different aspects of farm economic viability in Nova Scotia and Prince Edward Island, and all of them should be considered as a whole. Together they very clearly point to a serious and escalating crisis in Maritime farm viability that threatens the future of the industry and may spell the virtual demise of farming in the region unless decisive corrective action is taken without delay.

## Results in Relation to 2001 GPI Farm Viability Report

There is a vital lesson to be learned from the results in this report, particularly in light of GPI Atlantic's 2001 report *Farm Viability and Economic Capacity in Nova Scotia* (Scott 2001), which reported—based on the most recent 1999 data available at the time—that all key indicators of farm viability were in serious decline. It is noteworthy that, at the time that original GPI farm viability report was published, the data did not yet show net farm income in negative territory, though the trends were certainly headed in that direction. Thus, while the *absolute* figures at the time still showed marginal economic viability for Nova Scotia farms (on average), the *relative* trends pointed towards a developing crisis.

The 2001 GPI report warned explicitly that:

All five indicators of farm economic viability (net farm income; expense to income ratio; return on investment; debt to net farm income ratio, and dependency ratio) in the Nova Scotia farm sector show that farm viability in Nova Scotia is being seriously eroded, and independence is being undermined. These disturbing trends are occurring even while farm cash receipts are growing, and while standard economic growth measures fail to signal problems. Yet, if current trends continue unabated, the future of Nova Scotia agriculture is clearly at risk [ . . . ].

Nova Scotia farmers are spending more to produce food and getting less for their products. They are going deeper into debt and having more trouble making payments on their debt. In many cases farmers are no longer breaking even, are working other jobs to keep their farms, and may be forced to sell their land. Put simply, many Nova Scotia farmers can no longer afford to farm [ . . . ]. If current trends continue [ . . . ] major parts of the province's agriculture sector will disappear."<sup>39</sup>

Among other results, the 2001 GPI report noted: "Net farm income has declined by 46% since 1971, despite an increase in farm output and total farm cash receipts—the conventional measures of farm economic health." As this update indicates, these and other troubling trends noted in the 2001 report have indeed continued unabated, as have the underlying causes of these trends—the public's demand for the cheapest price for food regardless of its origin, continued consolidation among retailers and processors, and global commodity pricing and trade agreements.

Conventional GDP-based measures conceal such vital trends. A key purpose of the more comprehensive GPI accounting system is to provide an early warning system of potentially troubling trends so that corrective interventions can be undertaken before development of a real (and potentially irreversible) crisis. For example, had a GPI natural resource accounting system been in place in the late 1980s, publicly tracking the health of Atlantic groundfish stocks, corrective action might have been undertaken in sufficient time to avoid the subsequent collapse of those stocks and the resultant loss of 40,000 fishery-related jobs. Instead, the conventional GDP-based statistics—showing record fish landings and a booming fishing industry—sent highly misleading (and hugely costly) messages to policy makers, economists, fishermen, and the general public.

In that case, too, the problem was largely in confusing gross receipts with economic health (which can only be assessed through a net accounting mechanism). Thus GDP and economic growth-based statistics reported what was extracted from the ocean in gross terms (fish landings and gross fishing industry receipts) without accounting for what was left behind. A proper capital accounting system would have distinguished flows from stocks, and tracked fish landings (a flow) in relation to the health of the groundfish stocks.

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<sup>39</sup> Scott, Jennifer. 2001. *Farm Viability and Economic Capacity in Nova Scotia*. GPI Atlantic. Halifax. Available from <http://www.gpiatlantic.org/pdf/agriculture/farmviability.pdf>. Accessed 9 July, 2008. A summary press release of key results from this report is at: [http://www.gpiatlantic.org/releases/pr\\_farm\\_viability.htm](http://www.gpiatlantic.org/releases/pr_farm_viability.htm).

Once the GPI and its full cost accounting mechanisms are fully incorporated into government and business accounting systems, key evidence will be more readily and publicly available to federal, provincial, municipal, corporate, and community leaders to inform policy and suggest corrective action when troubling trends are identified. Since this was not yet the case in 2001, the adverse trends reported in the 2001 GPI farm viability report received inadequate attention in all quarters and did not spur sufficient public, government, industry, and corporate action to reverse those trends and enhance the economic viability of farming in Nova Scotia. Instead, those adverse trends were allowed to continue, with net farm income, for example, falling into negative territory and remaining there for long enough to prevent a recovery for many farmers.

Today, the absolute and relative results have converged sufficiently, as indicated in Figure 7 and other graphs above, that the farm sector in both Nova Scotia and PEI must be considered in crisis—with farming as potentially “endangered” a species as the Atlantic groundfish stocks. Certainly for many farmers, their negative net income and incapacity to maintain economic viability have already created an irreversible situation that has forced many to abandon farming or to sell off portions of their farms. Fortunately, a new awareness and understanding of these issues has emerged within government in recent years, so the potential for positive, corrective action is now very much greater than it was at the time of the original 2001 GPI report on this subject.

It could be argued that net farm income statistics have indeed been available to policy makers from Statistics Canada sources, just as scientists from the Department of Fisheries and Oceans did indeed have data on the health of Atlantic groundfish stocks well before the collapse of those stocks. The issue, however, is not availability of statistics, but rather the overwhelming dominance of the conventional GDP-based economic growth statistics and their misuse as the core provincial and national measures of progress. So long as key measures like fish stock estimates, net farm income, greenhouse gas emissions, and other GPI indicators remain on the sidelines and are not incorporated into the core measures used to assess national and provincial progress, they will not be highlighted and will receive insufficient policy attention.

It is precisely the function of the GPI, not so much to come up with brand new measures, but rather to shine the spotlight on existing measures by bringing them firmly into the core accounting and measurement system of the province and country. That is the purpose of a full capital accounting system that takes into account the value of social, natural, and human capital in addition to the produced capital conventionally considered. This more comprehensive approach naturally focuses on *net* rather than *gross* results, since it balances a far greater range of social, economic, and environmental indicators, and thus enables trade-offs to be clearly identified.

## Recommendations

Ideally, all the indicators presented here will be carefully monitored by policy makers on a continuous basis. However, in light of limited data availability for some indicators at the present time and of challenges interpreting data in which year-to-year fluctuations are sometimes huge, and if the indicator set presented above must be narrowed down to fewer key indicators, it is recommended here that perhaps the most important indicators of farm economic viability that should be carefully maintained and regularly monitored over time are:

- the multipliers
- net farm income
- expense to income ratio
- debt to net farm income ratio

The good news is that—even though not currently included in the core GDP-based measures of progress and provincial accounts, and therefore not regularly reported to the public or incorporated into decision-making processes—data for provincial farm viability measures are in fact readily available from Statistics Canada. The problem, in other words, has much less to do with data availability than with where the spotlight is officially shone. The consequences of a misguided focus on GDP-based measures and on gross farm cash receipts, and of failing to shine the spotlight on the trends presented above, can be very serious indeed. A social and economic sector may literally collapse “behind the curtains” so to speak, and out of public view.

Despite the general availability of key Statistics Canada data, there are nevertheless some important improvements in data collection that are possible and that would greatly assist more in-depth analyses of farm economic viability. Such detailed analyses are actually essential to inform policy and to target particular initiatives efficiently and cost-effectively.

In particular, we have noted in several places the key importance of sectoral data and analyses, since some agricultural sectors (notably supply-managed dairy and poultry) are clearly doing a lot better than other sectors like tree fruit farming, beef, and hogs. Not only are effective interventions in one sector not necessarily the best medicine for another sector, but the successes of some sectors and strategies can potentially provide models for others if judiciously applied. For both reasons, sectoral data and analyses can be highly useful. For example:

- the supply management that has provided relative financial stability for dairy and poultry farmers might have applicability in other sectors;
- direct marketing methods (through farmers’ markets for example) have brought improved product prices for some farmers; and
- the shift to organic farming has reduced pesticide, fuel, and fertilizer input costs for others.

These and other initiatives in particular sectors and among particular groups of farmers hold wider promise for improved viability in other sectors, but the effectiveness and economic impact

of price-related initiatives can best be studied through detailed sectoral data and analyses, for which data are currently sparse.

For such reasons, some substitute for the Nova Scotia FMAP studies should not only be found without delay, but expanded from the very limited number of sectors covered by the FMAP to all key agricultural sectors, since such analyses are very important for assessing the economic and financial health of individual farm sectors within the province. Based on the reasons for the suspension of the FMAP explained in the note below Table 5 above, it is clear that any substitute will have to be not only cost-effective but also more representative of each farm sector than was the case.

In the research for this report, a similar sectoral analysis for PEI farm sectors (analogous to Nova Scotia's FMAP) was not found, so such sectoral studies should also be undertaken without delay in PEI in light of the financial threats faced by PEI farmers, as revealed in this report. Indeed, for some indicators, like trends in total farm debt, the trend away from viability has been even more dramatic in PEI than in Nova Scotia, indicating a very serious need to understand before it is too late which agricultural sectors on the Island have been most acutely affected by these potentially dire financial circumstances.

In the midst of the adverse economic conditions and circumstances revealed in this report, it is again important to place those results in the larger context of the substantial economic benefit provided by Maritime farms. To that end, and in order to assess the positive aspects of rural and farm community viability, it would be very useful indeed to have more regular and consistent multiplier studies across a number of farm types, sectors, industries, and jurisdictions to assess the degree to which particular industries stimulate local rather than distant economic activity and thus benefit the local and provincial economy. For effective comparisons, and to track genuine progress over time in this field, a coordinated series of multiplier studies should be carried out in a number of provinces, on a regular basis, and using consistent methodologies.

If the local multipliers are then found to be better in one area than another, or for one sector than another, it would then be well worth investigating what is causing the more beneficial local circulation of economic activity. Such an analysis would certainly suggest creative policy interventions designed to stimulate local, provincial, and regional economies.

As a necessary first step, this present report has been largely descriptive in nature, with only very limited reference to either explanatory factors or consequent policy interventions. However, further studies should focus on the reasons why Maritime farm viability is in such sharp decline. Kelco (2006), for example, shows that concentration in the food retail sector, farm input industries, commodity markets, and global trading have all eroded the viability of agriculture.

Interviews with farmers and farm community members in Nova Scotia and PEI (Scott et al. 2003) have indicated that the path to restored farm economic viability would include market diversification, and import replacement. Indeed, from those interviews, four key recommendations to improve farm and farm community economic viability emerged:

- A focus on market diversity to improve competition (and therefore prices) for food products.
- Regulation designed to prevent excessive mergers of companies in the food system.
- Sufficient supply management to ensure that food prices not fall below a reasonable cost of production.
- Stimulation of increased demand for local products (e.g., through local procurement policies).

With regard to the fourth recommendation, current high gas prices actually present a remarkable window of opportunity, as escalating transportation costs should make local food more competitive. But the increased reliance on food imports of recent decades is based on an extraordinarily complex web of conditions—including trade, labour, food safety, infrastructure, concentration, and environmental issues—that will take enormous willpower to unravel and overcome. One farmer noted that the changes required to restore viability to Maritime farming will involve everybody in the food chain—not only policy makers in government—and suggested that a good starting point might be thousands of ordinary Maritimers loudly boycotting imported food and vowing to buy and eat local.

Limited time and resources required a targeted focus on the descriptive trends in this report—simply to establish definitively as a first step, and based on hard data and solid evidence, that a crisis in farm economic viability in fact exists. Time and resources did not therefore allow a deeper exploration of either the explanatory dimensions of the crisis, or of the range of policy options required to reverse the present trends and restore farm economic viability. Because the evidence very clearly shows the present crisis to be both dire and acute, the need for such explanatory and policy-focused studies—quickly translated into effective action—is urgent. Existing trends show that “business as usual” is no longer an option, that time has in fact run out, and that the consequence of any delay may very well be the effective demise of family farming in the Maritimes.

For this reason, and particularly because a GPI study seven years ago provided clear early warning signals of the present crisis, GPI Atlantic has made much stronger statements about the need for immediate action than is customary in GPI analyses or than we have made previously. However, the function of the GPI is not simply academic, and its stated purpose is to provide good and comprehensive evidence in order to inform policy and public behaviour. In light of the fact that the 2001 GPI Atlantic report, *Farm Viability and Economic Capacity in Nova Scotia* (Scott 2001)—based on the most recent data available at the time—did not lead to decisive policy interventions to stem and reverse the adverse trends reported at that time, we have no choice but to make the case for intervention more forcefully and explicitly at this time.

Simply put, the adverse viability trends reported by GPIAtlantic seven years ago have not only continued largely unabated but have in some cases escalated dramatically to the point of no return. Certainly we no longer have the luxury to wait seven more years to act. By the time of the next GPI update of these data, it may very well be too late, with declining income, negative financial returns, absolute losses, unbearable debt loads, and outright insolvency forcing so many farmers out of business that the revival of farming in the Maritimes may no longer be possible.

The extraordinary resilience of Nova Scotia and PEI farmers—which is explored in the discussion of social capital in the accompanying report—has to this point, and almost miraculously, kept more farmers on the land than would be deemed possible by an examination of the economic statistics alone. Indeed, the accompanying exploration of social capital is partly undertaken precisely because the economic conditions and statistics alone cannot explain why Maritime farmers stay on the land and keep farming. In similarly adverse economic circumstances, many other industries would have died and disappeared long ago, as indeed many have. But even the hardest, most resilient, and determined farmers will be unlikely to survive any continuation of the trends of the past 15 years.

Based on the evidence examined, it is very reasonable to conclude that we have reached a tipping point in farm economic viability, where urgent and decisive action could possibly still save the tradition and institution of farming in Nova Scotia and PEI before it reaches a breaking point of irreversible decline and eventual demise.

This blunter and more forthright statement of the facts and conclusions will hopefully lead to actions that will enable the next seven-year GPI farm viability update in 2015 to report on rising net farm incomes, sharply declining expense to income, debt to income, and solvency (debt to capital) ratios, markedly improved returns on investment and overall farm economic viability, and stability (if not increase) in the number of farms in Nova Scotia and PEI.

On the policy front, we have already pointed to a highly promising new awareness and understanding within government in recent years of the issues raised in this report. As noted above, this indicates that the potential for positive action to reverse the adverse trends highlighted in this report and to restore viability to farming in Nova Scotia and PEI is now very much greater than it was at the time of the original 2001 GPI report on this subject. And there is much that non-government groups can do to work with farmers to restore viability and maintain farming as a key feature of Maritime life and culture. Businesses (including the large retailers), universities, schools, hospitals, and other institutions can institute local procurement policies, and ordinary Maritimers can make more conscious food choices by buying local products and insisting that their grocery stores carry them.

## 6. Appendix

**Appendix Table 1. NS Farm and Crop Area; Number of Farms (1921–2006)**

<b>Year</b>	<b>Number of farms</b>	<b>Area in farms (ha)</b>	<b>Land in crops (ha)</b>
1921	47,432	1,911,553	278,448
1931	39,444	1,740,970	252,408
1941	32,977	1,544,542	233,072
1951	23,515	1,284,347	193,221
1956	21,075	1,123,262	168,444
1961	12,518	902,609	133,188
1966	9,621	749,435	127,129
1971	6,008	537,777	98,322
1976	5,434	493,293	111,667
1981	5,045	466,023	112,782
1986	4,283	416,507	109,512
1991	3,980	397,031	106,231
1996	4,453	427,324	112,364
2001	3,923	407,046	119,219
2006	3,795	403,044	116,609

Sources: number of farms from:

[www.statcan.ca/english/freepub/95F0302XIE/2001001/tables/html/optab13.htm#11](http://www.statcan.ca/english/freepub/95F0302XIE/2001001/tables/html/optab13.htm#11); area in farms from:

[www.statcan.ca/english/freepub/95-629-XIE/1/1.5.htm#11](http://www.statcan.ca/english/freepub/95-629-XIE/1/1.5.htm#11); land in crops from:

[www.statcan.ca/english/freepub/95F0302XIE/2001001/tables/html/optab13.htm#TFtn](http://www.statcan.ca/english/freepub/95F0302XIE/2001001/tables/html/optab13.htm#TFtn).

Notes: The definition of a census farm has changed between 1921 and 2001. These changes affect the comparability of data among censuses. For a summary of these changes, see Census Farm in the Glossary. For each of the censuses conducted between 1921 and 1976, land in crops included field crops, vegetables, fruits and nursery crops. Since 1981, the definition of land in crops has been expanded to include sod. None of the data include land area for Christmas trees.

**Appendix Table 2. PEI Farm and Crop Area; Number of Farms (1921–2006)**

Year	Number of farms	Area in farms (ha)	Land in crops (ha)
1921	13,701	492,293	186,690
1931	12,865	482,062	201,175
1941	12,230	473,024	190,344
1951	10,137	443,254	172,481
1956	9,432	431,178	169,603
1961	7,335	388,562	158,277
1966	6,357	375,135	161,216
1971	4,543	313,482	142,200
1976	3,677	295,839	158,448
1981	3,154	283,024	158,280
1986	2,833	272,433	156,498
1991	2,361	258,875	154,103
1996	2,217	265,217	170,361
2001	1,845	261,482	175,488
2006	1,700	250,859	171,296

Sources: number of farms from:

[www.statcan.ca/english/freepub/95F0302XIE/2001001/tables/html/optab13.htm#11](http://www.statcan.ca/english/freepub/95F0302XIE/2001001/tables/html/optab13.htm#11); area in farms from:

[www.statcan.ca/english/freepub/95-629-XIE/1/1.5.htm#11](http://www.statcan.ca/english/freepub/95-629-XIE/1/1.5.htm#11); land in crops from:

[www.statcan.ca/english/freepub/95F0302XIE/2001001/tables/html/optab13.htm#TFtn](http://www.statcan.ca/english/freepub/95F0302XIE/2001001/tables/html/optab13.htm#TFtn).

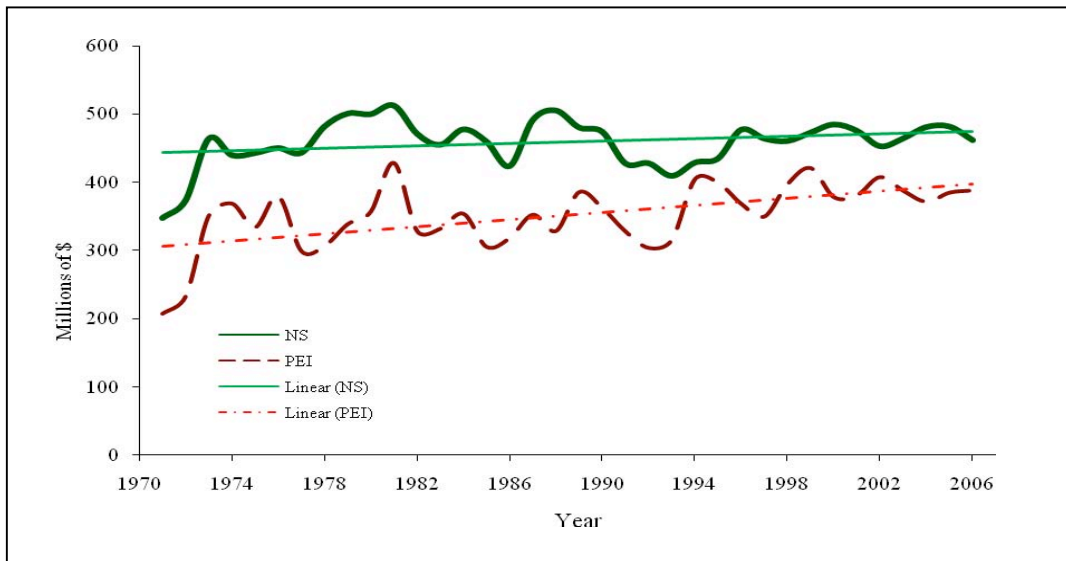
Notes: The definition of a census farm has changed between 1921 and 2001. These changes affect the comparability of data among censuses. For a summary of these changes, see Census Farm in the Glossary. For each of the censuses conducted between 1921 and 1976, land in crops included field crops, vegetables, fruits and nursery crops. Since 1981, the definition of land in crops has been expanded to include sod. None of the data include land area for Christmas trees.

**Appendix Table 3. Total Farm Cash Receipts and Operating Expenses, NS and PEI Farms, 1971–2006 (Millions of \$2007)**

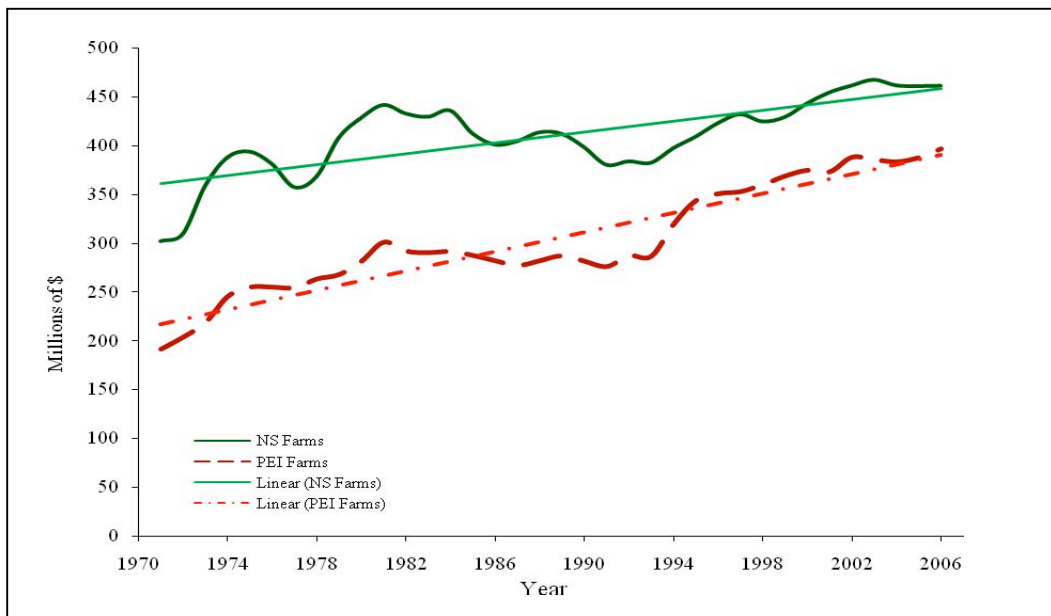
Year	Cash receipts of NS farms	Cash receipts of PEI farms	Operating expenses of NS farms	Operating expenses of PEI farms
1971	347.75	207.51	301.72	191.56
1972	373.76	232.78	309.17	203.88
1973	464.50	351.00	358.53	218.90
1974	440.20	368.99	387.72	245.58
1975	443.38	334.32	393.66	254.96
1976	450.74	379.98	380.96	254.99
1977	443.76	299.43	357.12	254.45
1978	482.52	306.90	368.15	263.38
1979	501.44	338.77	408.06	267.88
1980	500.52	357.05	428.35	281.53
1981	513.16	428.57	441.63	300.96
1982	471.65	328.80	432.84	291.76
1983	455.49	332.10	429.39	290.26
1984	478.25	354.12	435.87	291.39
1985	460.01	305.55	412.27	287.37
1986	424.32	318.56	400.92	281.96
1987	492.15	352.64	404.35	277.07
1988	505.91	328.87	413.56	282.03
1989	480.90	385.69	411.95	287.08
1990	474.64	362.58	398.26	281.48
1991	427.98	328.23	380.19	276.05
1992	428.40	304.00	383.72	287.06
1993	409.75	315.44	382.27	286.52
1994	429.27	404.47	397.23	319.29
1995	435.30	399.65	408.94	343.38
1996	477.75	368.69	422.90	350.48
1997	464.57	349.98	432.10	352.60
1998	461.03	397.24	424.68	359.73
1999	473.44	421.06	429.14	368.50
2000	485.44	378.58	443.18	374.43
2001	476.05	381.21	454.40	372.84
2002	453.37	407.78	461.56	387.73
2003	464.91	387.81	467.52	385.36
2004	481.58	371.72	461.72	383.13
2005	482.36	385.01	461.00	387.26
2006	462.38	388.21	461.39	396.36

Sources: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. Farm Cash Receipts. Cat. No. 21-011 and CANSIM tables 002-0005.

**Appendix Figure 1. Total Farm Cash Receipts, NS and PEI Farms, 1971–2006 (Millions of \$2007), with Trendlines**



**Appendix Figure 2. Total Farm Operating Expenses, NS and PEI Farms, 1971–2006 (Millions of \$2007), with Trendlines**



Sources for Figures 3 and 4: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. Farm Cash Receipts. Cat. No. 21-011 and CANSIM tables 002-0005.

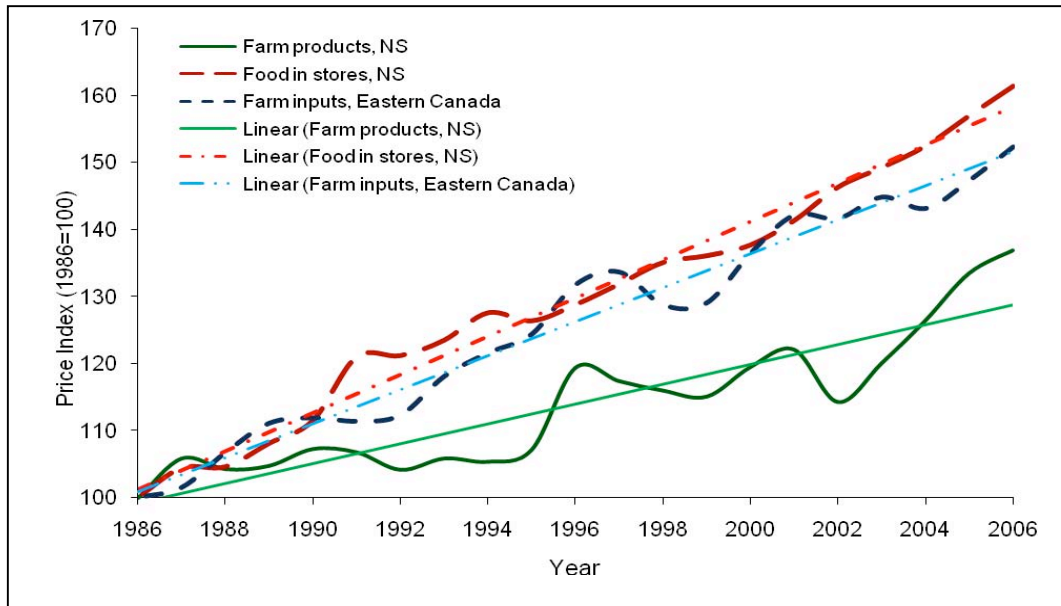
**Appendix Table 4. Price Indices for Farm Products, Farm Inputs, and Food in Stores, NS and PEI, 1986–2006 (1986=100)**

<b>Year</b>	<b>Farm products, NS</b>	<b>Food in stores, NS</b>	<b>Farm products, PEI</b>	<b>Food in stores, PEI</b>	<b>Farm inputs, Eastern Canada</b>
2006	136.9	161.4	173.0	164.5	152.4
2005	133.5	157.1	144.7	158.8	147.4
2004	126.4	152.5	137.6	154.3	143.2
2003	120.1	149.3	154.7	151.0	144.9
2002	114.3	146.4	185.9	149.4	141.7
2001	122.1	141.4	147.1	145.4	142.2
2000	119.5	137.7	142.0	141.8	136.5
1999	115.1	136.1	149.9	--	129.1
1998	116.0	135.1	130.8	134.5	128.8
1997	117.4	131.9	126.7	133.5	133.7
1996	119.4	128.8	131.8	131.1	131.8
1995	107.2	126.4	145.0	129.1	124.4
1994	105.4	127.6	147.0	129.3	121.6
1993	105.9	123.5	119.6	126.9	118.1
1992	104.2	121.2	113.8	125.9	112.3
1991	106.8	121.0	120.5	125.9	111.4
1990	107.3	111.5	128.9	117.1	111.9
1989	104.8	108.1	132.6	111.4	111.1
1988	104.3	104.6	110.1	107.4	106.7
1987	105.9	104.4	119.9	103.6	101.5
1986	100.0	100.0	100.0	100.0	100.0

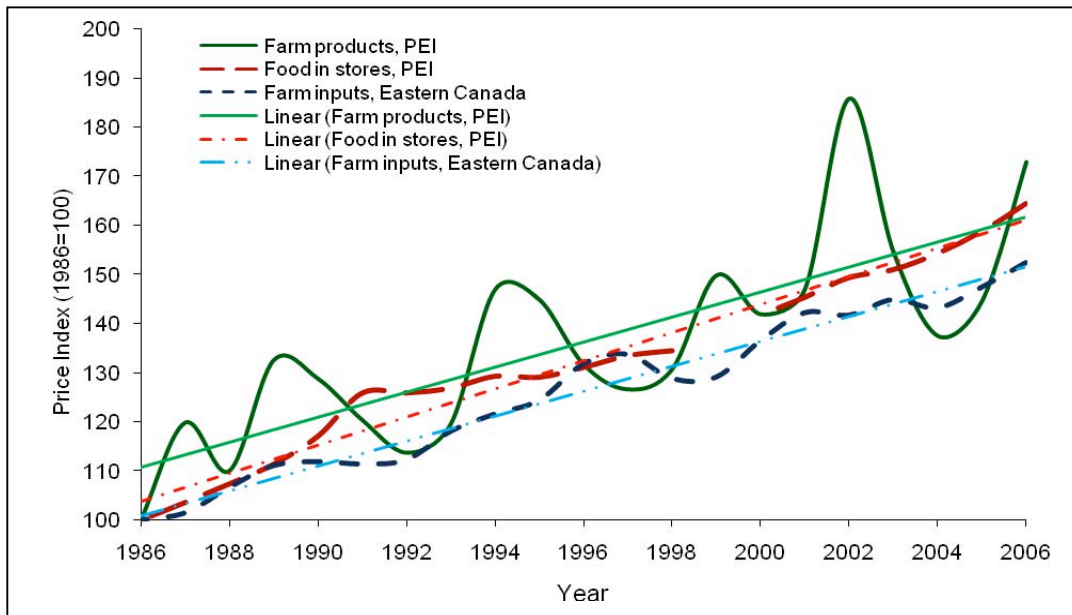
Sources: Derived from Statistics Canada. 2003. *Farm Product Price Index*, Cat No. 21-007-XIB 3(11); McLaughlin and Robinson, 1999, 1995, 1992; Statistics Canada. 2003; CANSIM tables 002-0022; 328-0014; 328-0001; 326-0020.

Note: Indices constructed by author based on raw data from the sources listed.

**Appendix Figure 3. Price Indices for Farm Products, Farm Inputs, and Food in Stores, Nova Scotia, 1986–2006 (1986=100), with Trendlines**



**Appendix Figure 4. Price Indices for Farm Products, Farm Inputs, and Food in Stores, PEI, 1986–2006 (1986=100), with Trendlines**



Sources for Figures 5 and 6: Derived from Statistics Canada. 2003. *Farm Product Price Index*. Cat No. 21-007-XIB 3(11); McLaughlin and Robinson, 1999, 1995, 1992; Statistics Canada. 2003; CANSIM tables 002-0022; 328-0014; 328-0001; 326-0020.

Note: Indices constructed by author based on raw data from the sources listed.

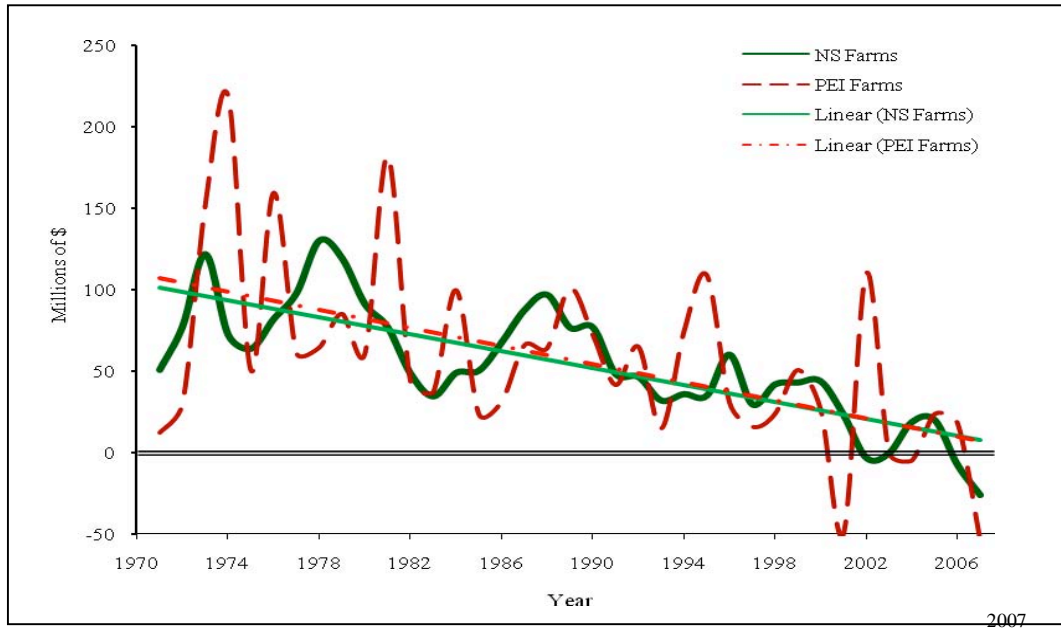
**Appendix Table 5. Total Net Farm Income, NS and PEI, 1971–2007 (millions of \$2007)**

<b>Year</b>	<b>Total net farm income, NS farms</b>	<b>Total net farm income, PEI farms</b>
1971	50.73	12.08
1972	77.43	30.13
1973	121.95	152.16
1974	72.26	218.33
1975	63.69	50.16
1976	82.04	159.22
1977	97.95	60.93
1978	130.26	64.37
1979	119.36	84.97
1980	91.18	60.51
1981	76.95	181.64
1982	48.47	43.39
1983	34.43	36.99
1984	48.86	99.48
1985	50.18	23.48
1986	67.57	31.14
1987	87.44	65.69
1988	96.93	64.00
1989	76.70	100.73
1990	76.90	72.14
1991	48.15	41.35
1992	46.44	64.85
1993	31.84	14.59
1994	35.76	73.96
1995	34.80	108.75
1996	60.11	30.43
1997	29.48	15.65
1998	41.73	23.67
1999	42.93	50.49
2000	43.67	26.29
2001	23.00	-49.90
2002	-3.45	109.85
2003	-0.64	-0.30
2004	18.55	-5.01
2005	19.83	23.49
2006	-7.71	18.06
2007	-26.37	-53.77

Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics. Net Farm Income*. Cat No. 21-010-XIE (latest update May 2008).

Note: The definition of net income is: Total cash receipts - operating expenses after rebates + income in kind - depreciation charges (on buildings and machinery) + value of inventory change.

**Appendix Figure 5. Total Net Farm Income, NS and PEI, 1971–2007 (millions of \$2007), with Trendlines**



Source: Derived from Statistics Canada. 2008. *Agriculture Economic Statistics*. Cat No. 21-013-XIE; 21-014-XIE (latest update May 2007).

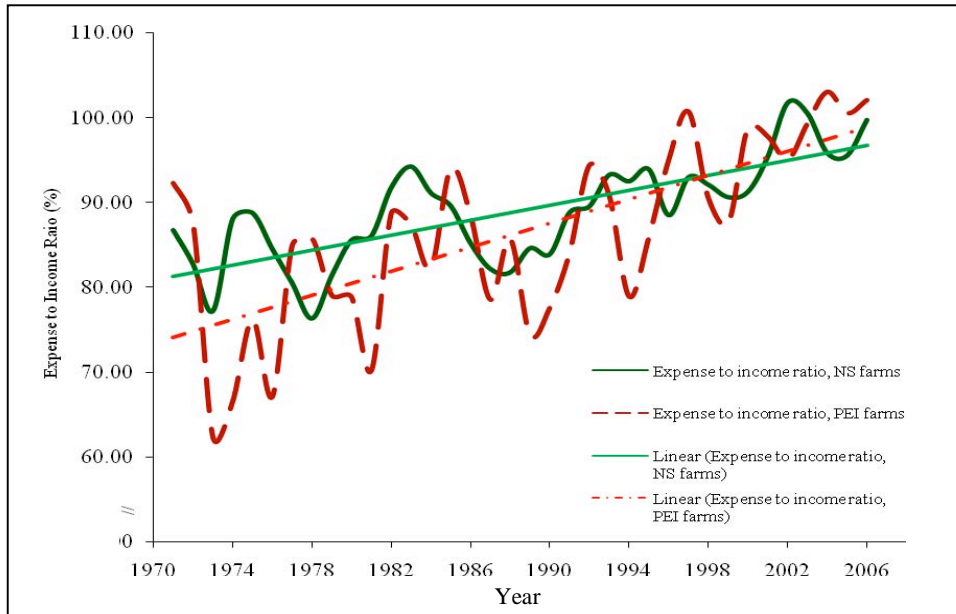
Note: The definition of net income is: Total cash receipts - operating expenses after rebates + income in kind - depreciation charges (on buildings and machinery) + value of inventory change.

**Appendix Table 6. Expense to Income Ratio (%), NS and PEI Farms, 1971–2006**

<b>Year</b>	<b>Expense to income ratio, NS farms</b>	<b>Expense to income ratio, PEI farms</b>
1971	86.75	92.32
1972	82.72	87.58
1973	77.19	62.36
1974	88.08	66.55
1975	88.79	76.26
1976	84.52	67.12
1977	80.48	84.98
1978	76.30	85.82
1979	81.38	79.07
1980	85.58	78.85
1981	86.06	70.22
1982	91.77	88.74
1983	94.27	87.40
1984	91.14	82.29
1985	89.62	94.05
1986	85.21	88.51
1987	82.16	78.57
1988	81.75	85.76
1989	84.61	74.43
1990	83.91	77.63
1991	88.83	84.10
1992	89.57	94.43
1993	93.29	90.83
1994	92.54	78.94
1995	93.94	85.92
1996	88.52	95.06
1997	93.01	100.75
1998	92.12	90.56
1999	90.64	87.52
2000	91.30	98.90
2001	95.45	97.80
2002	101.81	95.08
2003	100.56	99.37
2004	95.88	103.07
2005	95.57	100.56
2006	99.78	102.11

Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. Cat No. 21-013-XIE; 21-014-XIE (latest update May 2007).

**Appendix Figure 6. Expense to Income Ratio (%), NS and PEI Farms, 1971–2006, with Trendlines**



Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. Cat No. 21-013-XIE; 21-014-XIE (latest update May 2007).

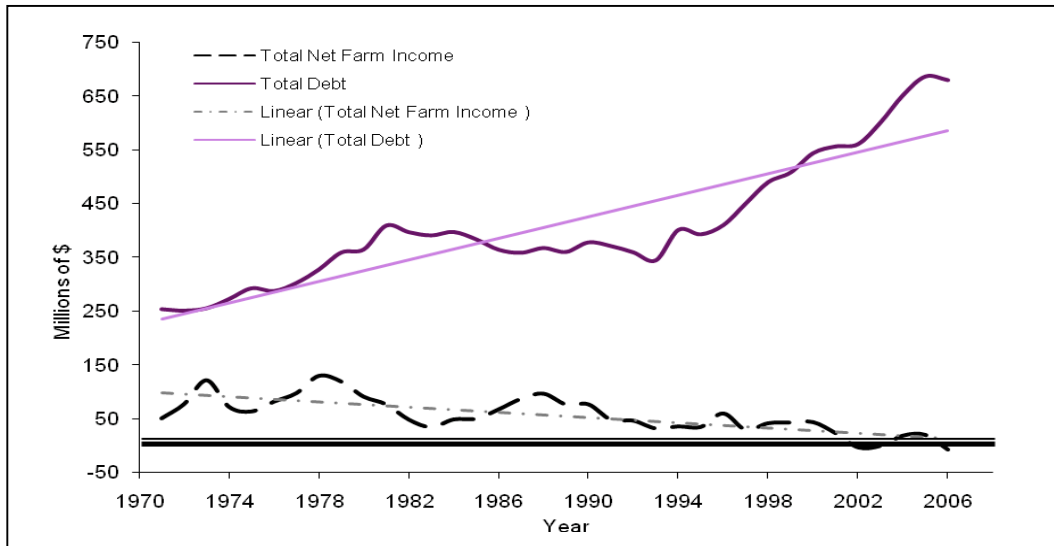
**Appendix Table 7. Total Net Farm Income and Total Debt, NS and PEI Farms, 1971–2006**  
(millions of \$2007)

Year	Total farm net income, NS	Total farm debt, NS	Total farm net income, PEI	Total farm debt, PEI
1971	50.73	254.90	12.083	199.38
1972	77.43	252.09	30.13	188.48
1973	121.95	256.61	152.16	182.13
1974	72.26	273.56	218.325	189.87
1975	63.69	293.67	50.157	206.23
1976	82.04	288.45	159.218	207.98
1977	97.95	303.50	60.927	227.94
1978	130.26	328.38	64.367	230.20
1979	119.36	360.04	84.974	239.07
1980	91.18	365.75	60.513	253.33
1981	76.95	410.06	181.64	263.46
1982	48.47	397.79	43.387	274.95
1983	34.43	391.77	36.987	292.39
1984	48.86	398.11	99.484	286.35
1985	50.18	384.42	23.478	293.77
1986	67.57	365.24	31.142	285.21
1987	87.44	359.52	65.694	260.51
1988	96.93	368.32	64.001	260.57
1989	76.70	361.03	100.731	238.95
1990	76.90	378.83	72.141	255.56
1991	48.15	372.01	41.346	253.49
1992	46.44	360.30	64.85	276.37
1993	31.84	345.46	14.586	307.77
1994	35.76	401.94	73.964	373.25
1995	34.80	393.65	108.745	396.26
1996	60.11	410.71	30.431	418.87
1997	29.48	450.71	15.646	465.64
1998	41.73	490.48	23.666	514.49
1999	42.93	508.45	50.49	533.96
2000	43.67	544.28	26.29	553.41
2001	23.00	556.74	-49.9	575.72
2002	-3.45	561.01	109.85	607.07
2003	-0.64	601.26	-0.302	659.09
2004	21.01	651.82	-2.963	684.14
2005	22.71	686.57	-21.205	686.75
2006	1.33	679.82	13.81	645.67

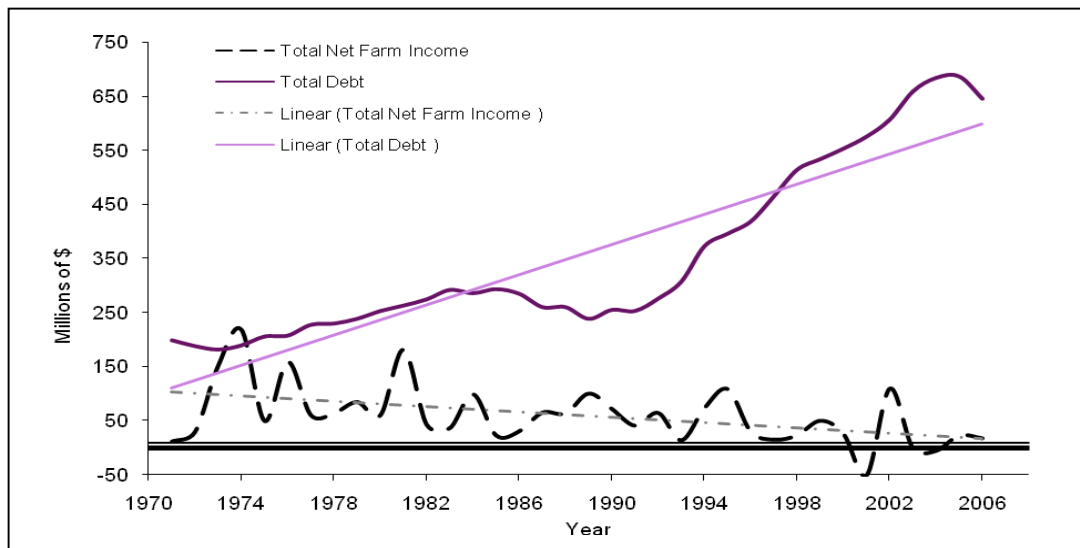
Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. Cat No. 21-013-XIE; 21-014-XIE (latest update May 2007).

Notes: Author uses the same scale for each province to make comparisons easier. NS shows a net income value below zero for 2002, 2003, and 2006. PEI shows a net income value below zero for 2001, 2003, 2004, and 2005.

**Appendix Figure 7. Total Net Farm Income and Total Debt, NS Farms, 1971–2006 (millions of \$2007), with Trendlines**



**Appendix Figure 8. Total Net Farm Income and Total Debt, PEI Farms, 1971–2006 (millions of \$2007), with Trendlines**



Source for Figures 9 and 10: Statistics Canada. 2007. *Agriculture Economic Statistics*. Cat No. 21-013-XIE; 21-014-XIE (latest update May 2007).

Notes: Author uses the same scale for each province to make comparisons easier. NS shows a net income value below zero for 2002, 2003, and 2006. PEI shows a net income value below zero for 2001, 2003, 2004, and 2005.

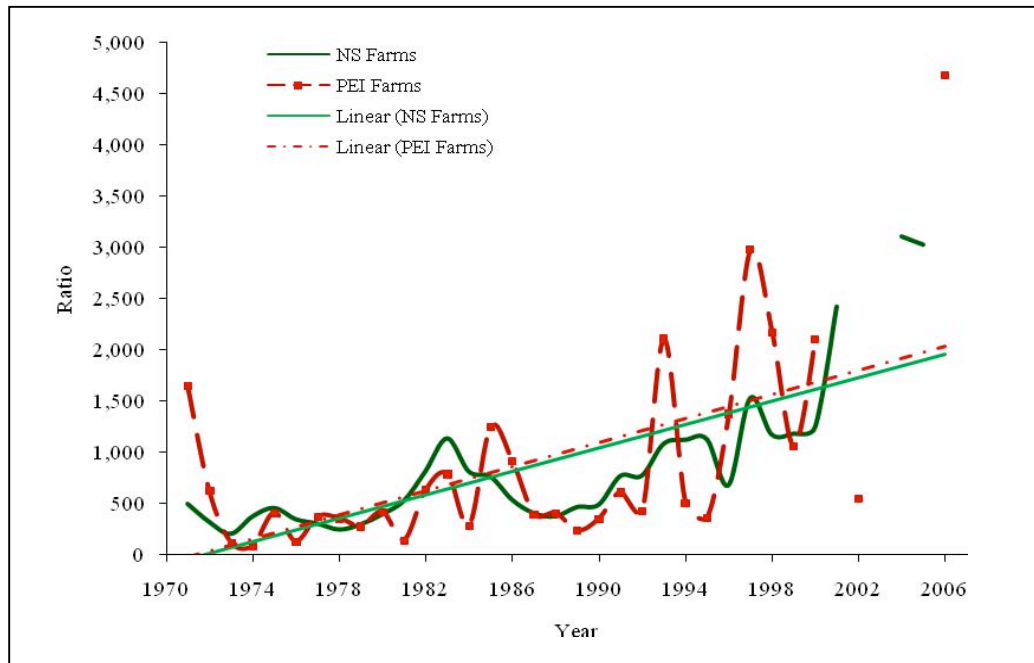
**Appendix Table 8. Debt to Net Income Ratio, NS and PEI Farms, 1971–2006**

<b>Year</b>	<b>Debt to net farm income ratio, NS</b>	<b>Debt to net farm income ratio, PEI</b>
1971	502	1650
1972	326	626
1973	210	120
1974	379	87
1975	461	411
1976	352	131
1977	310	374
1978	252	358
1979	302	281
1980	401	419
1981	533	145
1982	821	634
1983	1138	791
1984	815	288
1985	766	1251
1986	541	916
1987	411	397
1988	380	407
1989	471	237
1990	493	354
1991	773	613
1992	776	426
1993	1,085	2110
1994	1,124	505
1995	1,131	364
1996	683	1376
1997	1,529	2976
1998	1,175	2174
1999	1,184	1058
2000	1,246	2105
2001	2,421	--
2002	--	553
2003	--	--
2004	3,102	--
2005	3,023	--
2006	--	4675

Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. Cat No. 21-013-XIE; 21-014-XIE (latest update May 2007).

Note: The ratios for 2001 to 2006 cannot be shown consistently because net incomes for those years were sometimes negative.

**Appendix Figure 9. Debt to Net Income Ratio, NS and PEI Farms, 1971–2006, with Trendlines**



Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. Cat No. 21-013-XIE; 21-014-XIE (latest update May 2007).

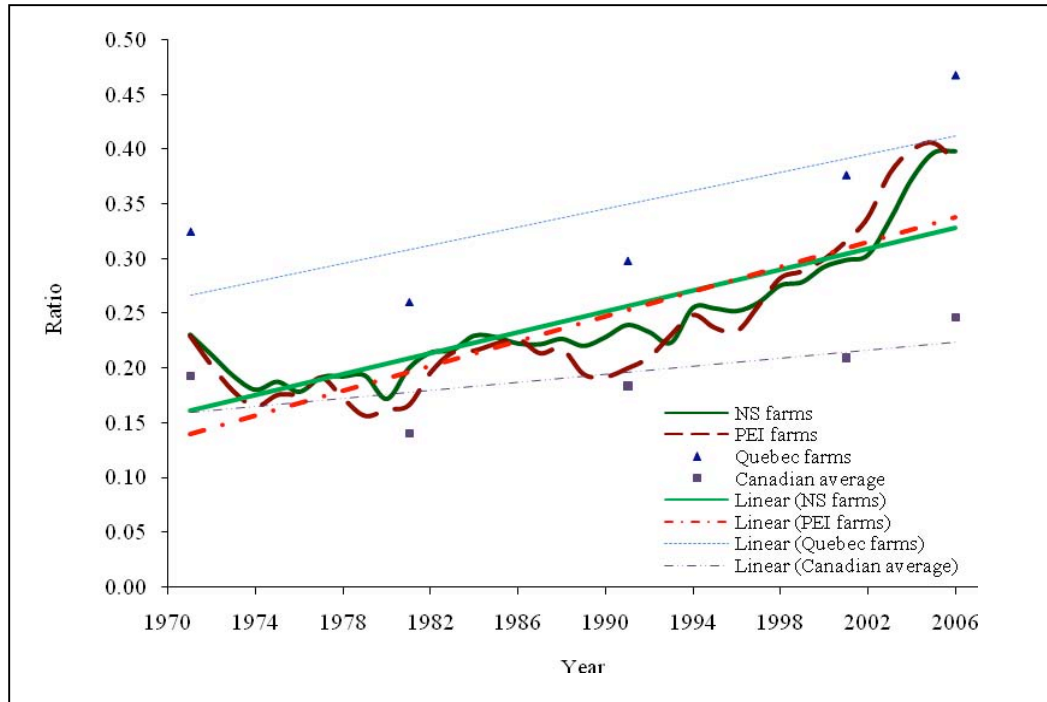
Note: The ratios for 2001 to 2006 cannot be shown consistently because net incomes for those years were sometimes negative.

**Appendix Table 9. Solvency Ratio, NS, PEI, QC, and Canadian farms 1971–2006**

<b>Year</b>	<b>NS farms</b>	<b>PEI farms</b>	<b>Quebec farms</b>	<b>Canadian average</b>
1971	0.231	0.230	0.325	0.193
1972	0.212	0.202	--	--
1973	0.193	0.179	--	--
1974	0.180	0.165	--	--
1975	0.188	0.176	--	--
1976	0.178	0.177	--	--
1977	0.192	0.191	--	--
1978	0.193	0.172	--	--
1979	0.193	0.156	--	--
1980	0.172	0.162	--	--
1981	0.200	0.166	0.261	0.140
1982	0.214	0.196	--	--
1983	0.217	0.214	--	--
1984	0.230	0.216	--	--
1985	0.228	0.223	--	--
1986	0.223	0.227	--	--
1987	0.222	0.214	--	--
1988	0.227	0.218	--	--
1989	0.221	0.195	--	--
1990	0.229	0.192	--	--
1991	0.240	0.200	0.299	0.184
1992	0.233	0.210	--	--
1993	0.224	0.231	--	--
1994	0.255	0.249	--	--
1995	0.255	0.237	--	--
1996	0.252	0.234	--	--
1997	0.260	0.257	--	--
1998	0.276	0.283	--	--
1999	0.279	0.289	--	--
2000	0.293	0.300	--	--
2001	0.299	0.316	0.377	0.210
2002	0.304	0.338	--	--
2003	0.335	0.378	--	--
2004	0.373	0.400	--	--
2005	0.397	0.406	--	--
2006	0.399	0.390	0.468	0.247

Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. Cat No. 21-013-XIE; 21-014-XIE.

**Appendix Figure 10. Solvency Ratio, NS, PEI, QC, and Canadian farms 1971–2006, with Trendlines**



Source: Derived from Statistics Canada. 2007. *Agriculture Economic Statistics*. Cat No. 21-013-XIE; 21-014-XIE.

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## 8. Glossary of Terms and Acronyms

**“Agriculture and Related Services”:** This is a phrase used by many sources, including Statistics Canada, to refer to the sector of the economy comprised of farms, horticultural specialties such as mushroom products, greenhouse products, and nursery products, as well as services used by farmers where the service provider comes to the farm. Examples of service providers include veterinary services, farm animal breeding services, custom field work services, and agricultural management and consulting services. “Agriculture and Related Services” covers Standard Industrial Classification (SIC) codes 011 to 023. This sector does not include farm input industries, distribution, processing, or retailing of food, unless that happens on a farm and unless the business is classified as a farm. (From Statistics Canada, <http://www.statcan.ca>. Accessed July 2003.)

**Appreciative Inquiry:** As described by one of the interviewers in the 2003 GPI farm interviews (Scott et al. 2003) who has experience in this technique, appreciative inquiry is a method of learning how to pay attention to what has heart and meaning. It is a provocative approach to life, inquiring into the “art of what's possible,” beginning with a discussion of what works for some person or group (appreciation), leading to a positive image of the future, and inspiring collective action. The appreciative inquiry model affirms people, identifies what is compelling, and thereby accelerates learning. Appreciative inquiry is a rigorous approach that does not gloss over problems but uses them as learning opportunities (Wendy Johnston, personal communication).

**Capital** (as applied to farms): Farm capital value includes the value of land and buildings, livestock and poultry, and machinery and equipment. (*Statistics Canada Agriculture Economic Statistics—Value of Farm Capital*. Cat. No. 21-013-XIE.)

**Census farm** (summary definition): A census farm is an agricultural operation that produces at least one of the following products intended for sale: crops (field crops, tree fruits or nuts, berries or grapes, vegetables, seed), livestock (cattle, pigs, sheep, horses, exotic animals, etc.), poultry (hens, chickens, turkeys, exotic birds, etc.), animal products (milk or cream, eggs, wool, furs, meat), or other agricultural products (greenhouse or nursery products, Christmas trees, mushrooms, sod, honey, maple syrup products). The definition of a census farm was expanded for the 1996 Census of Agriculture to include commercial poultry hatcheries and operations that produced only Christmas trees. Across Canada, a total of 138 commercial poultry hatcheries and 1,593 operations producing only Christmas trees were counted for the first time as census farms. (From Statistics Canada, <http://www.statcan.ca>. Accessed July 2003.)

**Efficiency:** This is one of the most important indicators in agriculture, particularly in reference to economic and ecological issues. Some measures of production provide information only on gross income, or gross production, while other measures look at production in terms of the inputs needed to sustain it. Therefore, net income may be seen as an indicator of economic efficiency, while net production is an indicator of ecological efficiency. Net income is calculated as gross income minus expenses. Net production is production minus purchased inputs.

In both cases it is important to remember that the resources upon which the production depends must not be compromised if productive capacity is to be maintained in the long term. This is recognized in most net income calculations by including a depreciation figure as an expense. Including depreciation of buildings or equipment as an expense recognizes the need to re-invest constantly in these productive tools. Likewise, in net production calculations, monitoring of and investments in soil quality, water quality, or livestock health should also be included. Otherwise the drive to achieve greater net production can lead to degradation of the resource base upon which production depends.

Many farmers recognize that productive efficiency can be improved by an increase in the internal cycling of resources on the farm or in the neighbourhood, which in turn can lead to a reduced requirement for purchased inputs. Examples include use of manure instead of synthetic fertilizers, or encouragement of beneficial insects to reduce use of toxic insecticides. Because it so directly affects livelihood and farm viability, there has been much debate and discussion about efficiency in agriculture, as seen in the 2003 GPI farm interviews (Scott et al. 2003: *Farm and Community Viability: Report on Interview Results*. Available from <http://www.gpiatlantic.org/pdf/agriculture/farmviab.pdf>).

As the GPI report on social capital in agriculture demonstrates, social capital in the form of cooperation among farmers and between farmers and consumers and communities also presents opportunities for gaining efficiencies on farms and in communities that are often invisible in conventional economic indicators of production efficiency. For example, when farmers cooperate to rotate land or share equipment, this can significantly increase both economic and ecological efficiency.

The following definition of ecological efficiency emerged from the 2003 GPI farm interviews: To remain viable, farms have to be “productive.” Ecological efficiency, therefore, is the ability to maintain or increase that productivity in the long term, while minimizing synthetic inputs and pollution, and maximizing system cycling of nutrients and other benefits.

The 2003 GPI farm interviews attempted to elicit as broad a view and understanding of efficiency as possible that included a wide range of factors of production—including human resources. The interviews therefore also explored the concept of *human capital efficiency*. As with economic or ecological efficiency, efforts were therefore made to assess how human capital efficiency might be properly evaluated.

Measures of human capital efficiency will differ significantly if the goal is more production per person or if it is to involve as many people in agriculture as possible. If the goal is the latter—to involve people—then efficiency measures will need to account for the trade offs between human capital and other capital inputs (equipment, mechanized process). As well, such measures will need to consider the best uses of time, in order to make the most efficient use of human contributions.

In sum, a consideration of indicators of efficiency in agriculture produces various ways of measuring efficiency, as seen in the table below. As noted below, different types of efficiency

will have priority depending on particular conditions and circumstances, and on the supply, availability, and cost of different resources and factors of production.

### 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 to reduce energy impacts on climate change.)	Efficient designs, technologies, alternative energy
Waste efficiency	Decrease landfill waste and 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 or input for another production area	Efficient designs, minimize excess work and off-farm inputs
Input use efficiency	Increase production earnings per unit of off-farm input expense, <i>while maintaining productive capacity</i>	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 and conservation of nature's services for nutrient recycling, pest control, water recycling and filtration, etc.	Design, habitat, ecological knowledge

**Farm Operating Expenses and Depreciation Charges:** These include gross operating expenses (including crop insurance and stabilization premiums), minus rebates, plus depreciation on buildings and machinery. Depreciation or appreciation on land is not included.<sup>40</sup>

**Gross Domestic Product (GDP):** The market value of goods and services produced by labour and property within the country in question, regardless of the nationality of the producer. In 1991, GDP replaced Gross National Product (GNP) as the primary measure of production in the U.S., and is today the principal measure of economic activity globally. Gross National Product (GNP) is the market value of goods and services produced by the labour and property supplied by the residents of a country, regardless of where they are located. (Bureau of Economic Analysis, <http://www.econmodel.com/classic/terms/gdp.htm>. Accessed December 27, 2003.) Thus, a Canadian working overseas contributes to Canadian GNP, while a Japanese firm with a plant in Canada contributes to Canada's GDP.

**Growth and Development—the Difference:** Growth refers to the quantitative increase in the scale of the physical dimension of the economy, the rate of flow of matter and energy through the economy, and the stock of human bodies and artefacts, while development refers to the qualitative improvement in the structure, design and composition of physical stocks and flows, that result from greater knowledge, both of technique and of purpose. (Daly 1994)

**Indicators:** Here we cite a definition of indicators used by Charles et al. (2002) in the GPI Fisheries and Marine Environment Accounts, since it represents one of the most comprehensive approaches to indicators in the literature. Although the following refers to marine and fishery-related indicators, we have tried to apply the following approach to the GPI Soils and Agriculture Accounts.

In the GPI Fisheries and Marine Environment Accounts, indicators are described as tools used to help managers, scientists, fishery participants, other ocean users, and the public to visualize the state of the marine environment and the fishery, and to discuss issues of common interest and concern. The indicators used in these Fisheries accounts are intended to enable policy makers and the general public to track the state of Nova Scotia's fisheries and marine ecosystems over time, with these trends providing insight into where current practices may lead in the future.

Each indicator in the GPI Fisheries and Marine Environment Accounts measures one particular aspect of the overall system—some dealing with the state of the marine ecosystem, others with the socioeconomic aspects of the fisheries and the wellbeing of coastal communities, and others with the institutional integrity of fishery and ocean management. Some of the referenced indicators are “observable” and “measurable” (such as fish stock population size or the employment rate in the fisheries industry), while others are more subjective (as in a survey, in which results may be reported on a scale from 1 to 10).

In the GPI Fisheries and Marine Environment Accounts, ecological indicators incorporate (a) the long-standing concern of ensuring that harvests are sustainable, in the sense of avoiding depletion of the fish stocks, (b) the broader concern of maintaining the resource base, non-

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<sup>40</sup> Statistics Canada. *Agriculture Economic Statistics*. Cat No. 21-012-XIE.

commercial species, and overall biodiversity at levels that do not foreclose future options, and (c) the fundamental task of maintaining or enhancing the resilience and overall health of the ecosystem.

Socioeconomic indicators in the GPI Fisheries and Marine Environment Accounts focus on measuring how well society is maintaining or enhancing overall long-term socioeconomic welfare—with measures based on a blend of relevant economic and social indicators. These indicators deal with such aspects of socioeconomic welfare as generation of sustainable net benefits, reasonable distribution of those benefits, and maintenance of the system’s overall viability within local and global economies. Each indicator in this grouping is typically measured at the level of individuals, and aggregated across the given fishery system.

Community indicators in the GPI Fisheries and Marine Environment Accounts revolve around the desirability of sustaining communities for their contribution to sustainability in the marine environment and the fishery system, as valuable in their own right, and as more than simple collections of individuals. Hence, indicators in this grouping focus on the maintenance or enhancement of the economic and socio-cultural wellbeing of coastal and fishery-dependent human communities, as well as on their overall cohesiveness and long-term health. (Charles et al. 2002.)

This model has been applied in these GPI Soils and Agricultural Accounts—to the extent possible—to rural and agricultural communities in Nova Scotia and Prince Edward Island. This application not only allows a broad and multi-dimensional analysis of the region’s agricultural sector but in the future will also facilitate sectoral comparisons within the GPI framework itself.

**Input-Output Model:** Based on Statistics Canada’s Input-Output tables, ATi Consulting (2002) developed an input-output model for the purpose of determining the impacts of the agriculture sector on the Nova Scotia economy and on employment in the province. Results from this ATi study are reported in the accompanying Economic Viability report for the Nova Scotia GPI Soils and Agriculture Accounts. According to ATi Consulting (2002: 13-14), its proprietary model was

derived from Statistics Canada’s Input-Output tables that are, in turn, based on the Canadian System of National Accounts [ . . .]. The model [ . . .] is based on data from the System of Accounts at the Large Level aggregation, using 161 industries or sectors. Expenditure data is entered into the model, which is then run to extract retail, wholesale, and transportation margins. The expenditures are then reallocated to the appropriate industries according to the national accounting framework.

All expenditure data entered into the model is adjusted by an import coefficient. This is done to remove or “leak” those portions of industry expenditure that are not produced in the province being analysed. The remaining expenditure made in the province is further allocated to the industries that produce the given commodity. In turn, producing industries will consume other commodities to produce the given good or service.

Through successive rounds, the model continues to run until there is no money left as a result of the leakages through imports, taxes, and savings. At this point, all calculations stop and the total impacts, by industry and by province, are added up from the results of where some proportion of a Nova Scotia expenditure is accounted for by “imports” from other areas of Canada. The proportions, or import coefficients, are accounted for by the model and based on the system of National Accounts.

In the simulation for the effect of agriculture expenditures, the

data from Statistics Canada’s Agriculture Economic Statistics, Farm Operating Expenses and Depreciation Charges for 2000 [were used]. The beginning expenditure of \$327 million was allocated through the modeled sectors as indicated above. Individual expenditures in any one sector were then adjusted downward to reflect portions of the given expenditures that occur in NS and the proportions that occur outside of the province. Once all adjustments were made to the input data, direct NS spending was reduced from \$327 million to \$313.5 million. The products not produced in NS are left in the model to enable the model to capture the retail, wholesale, and transportation margins that accrue.

The results of this input-output model are then reported by ATi Consulting (2002: 14) as direct effects, indirect effects, and induced effects. In the case of expenditures, the following definitions were applied.

*Direct expenditure* “refers to money spent directly by the sector on goods and services. Farm industry examples of a direct expenditure are the wages and salaries paid directly to the farm’s employees or the fees for veterinary services, paid directly to a supplier of those services.”

*Indirect expenditures* “are those that occur when the direct supplier of goods and services, in turn, purchases goods and services that are necessary to produce their particular good or service.”

*Induced effects* “result from the spending of income (wages and salaries) earned through direct and indirect effects on goods and services for the consumer.”

These terms (direct, indirect, induced) were also applied by ATi Consulting (2002) to employment, GDP, and other measures without similar explanations.

**Labour Force:** The number of people 15 years and older, estimated through surveys to be working in a particular industry or in the economy at large, or actively seeking work. Because the labour force includes both employed (full-time and part-time) and unemployed persons, it yields quite different results from measures based on “person years of employment,” which refers to the total annual hours worked in a particular industry or in the economy at large, divided by 2000 hours/year (40 hours over 50 weeks). According to Statistics Canada, “those neither currently supplying nor offering their labour services are referred to as persons not in the labour force.” (Statistics Canada. 2008. *Guide to the Labour Force Survey 2008*. Catalogue no. 71-543-G. Available from <http://www.statcan.ca/cgi-bin/downpub/listpub.cgi?catno=71-543-GIE2008001>. Accessed 27 July, 2008.)

**Monetization:** The Genuine Progress Index attempts to assign monetary values to key components of natural, human, and social capital that are not generally valued in conventional economic accounts. But what is the economic value of strong community bonds, or of equipment sharing between farmers, for example? Neither of which is currently valued in GDP-based statistics but both of which are seen in this study to have significant economic and social value.

Because market values are not designed to capture such “intangibles,” estimation efforts in the field of social capital will necessarily be rough. Nevertheless, the effort is necessary, since failure to count such presently unvalued benefits produces even grosser inaccuracies and resulting policy distortions, as these benefits are currently given an arbitrary value of zero in the conventional accounting ledgers. The GPI valuation efforts at least attempt to count and thus acknowledge the existence of those benefits, thereby bringing them to the fore to allow proper discussion.

In a sense, the necessity to assign monetary values to non-market benefits for the purpose of bringing attention to such benefits may be seen as a sad commentary on the priorities of our society, since it reveals the extent to which material values dominate the policy and public arenas. Nevertheless, such economic valuation is essential in this day and age—and in these GPI Soils and Agriculture Accounts—in order to highlight and acknowledge those aspects of farms and of farming communities that have in fact been demonstrated to have vital value to Maritimers.

The GPI assesses the economic value of social and environmental assets by imputing market values to the services provided by our stock of human, social, and environmental capital. However, this valuation effort should be understood as a strategy rather than goal, since monetization itself does not have any inherent value. Indeed, money is designed to capture market transactions and must be acknowledged as a poor tool to assess human, social, and ecological values. Until such values are fully integrated into the decision-making process in their own right, however, monetization has temporary *strategic* utility in order to ensure that such vital non-market values receive proper policy attention. It is a temporary measure, necessary only as long as financial structures, such as prices, taxes, and monetary incentives, continue to provide the primary cues for the actual behaviour of businesses, consumers, and governments. From this perspective, monetization is a useful tool to communicate with the world of conventional economics, not a view that reduces profound human, social, and environmental values to monetary terms.

In sum, monetization is a necessary step in light of the dominance of the materialist ethic, in order to overcome the tendency to undervalue the services of unpaid labour, natural resources, and other assets conventionally regarded as “free”; to make their contribution to prosperity clearly visible; and to bring these social and environmental assets more fully into the policy arena. Monetization also serves to demonstrate the linkages and connections between non-market and market factors, such as the reality that depletion of a natural resource will eventually produce an actual loss of value in the market economy. Despite this utility, monetary values can never be taken as a literal description of reality.

As the grip of market statistics on the policy arena is hopefully and gradually loosened, the desired direction for the GPI is to return to the direct use of a wide range of key time use, environmental quality, economic, and social indicators as direct guides to decision-making. This will also allow for greater accuracy and precision than reliance on derivative economic values. For this reason, all economic valuations in GPI reports are based on underlying physical indicators, and the Nova Scotia GPI includes a wide range of non-monetary assessments, such as an ecological footprint analysis, in which no attempt at monetization is made. To assess the impact of human activity and consumption patterns on the environment, for example, the use of land values in the footprint analysis is actually a far more direct method of assessing environmental impacts than the use of monetary values.

While the assignment of monetary values to non-market assets may appear absurd and even objectionable from many perspectives, it must be acknowledged that we do currently and conventionally accept economic valuation for a range of non-market values in a number of areas. For example, society accepts the necessity for monetary court awards for grief and suffering due to crime or accidents, and insurance companies assign monetary values to life and limbs as necessary measures to compensate actual human losses. We pay higher rents for dwellings with aesthetically pleasing views, and we sell our time, labour, and intelligence often to the highest bidder—even though the value of all such assets is clearly far beyond what can be captured by the monetary prices assigned to them. Yet prices are assigned, nevertheless, in order that value is at least acknowledged. Similarly, in a world where “everything has its price,” monetizing social and environmental variables in the GPI assigns them greater value in the policy arena and provides a more accurate measure of progress than excluding them from our central economic accounts and core measures of progress.

**Multifactor Productivity:** While *productivity* is defined as how much output is produced per unit of input, *multifactor productivity* is defined as the increase in output relative to the increase in a bundle of inputs that include both labour and capital. (Statistics Canada, *Productivity Growth in Canada*, 2001.)

**Multiplier:** This is the number used to multiply a dollar amount in order to develop an estimate of economic impacts beyond the original expenditure. It can also be used with respect to income and employment. Please see the entry on Input-Output Model to see how the multiplier is determined.

Employment multipliers increase with the size of the local economy specified. Thus, larger jurisdictions tend to have higher multipliers than small jurisdictions, as there is greater scope for self-sufficiency and therefore fewer economic leakages (Robinson 1999: 9).

Fullerton and McNeil (2004: 25) report that the economic impact of Farmers’ Markets [in Nova Scotia] was originally determined using customer surveys to estimate likely economic multipliers, which were then applied to the customer sales data. Vendor data were used to verify the results, although vendor sales data were not very detailed (and thus not terribly accurate), due in part to confidentiality issues. According to Fullerton and McNeil:

Multiplier effects account for the additional results of an economic activity through direct, indirect, and induced impacts. [The multiplier] measures the additional effects of an economic activity elsewhere in the economy. For example, a sale of a farm product at the market has upstream effects of employment and purchases for the farm and effects through purchases of goods and services as a result of this employment. Economic multipliers are calculated using input-output models and are specific to economic sectors and geographic regions.

According to one simple definition of direct, indirect, and induced impacts:

*Direct impact* is the increase in the output of a commodity, as producers react to meet an increased demand. As these producers increase their output, there will also be an increase in demand on their suppliers and so on down the supply chain; this is the *indirect impact*. As a result of the direct and indirect impacts, the level of income throughout the economy will increase, [and] a proportion of this increased income will be re-spent on final goods and services: this is the *induced effect*. (Fullerton and McNeil, 2004)

See also **input-output model** (above) for a more detailed description of these impacts and how a multiplier was calculated by ATi Consulting (2002) for Nova Scotia agriculture.

**Net Farm Income:** Defined as total cash receipts minus operating expenses after rebates plus income in kind minus depreciation charges plus value of inventory change. (Statistics Canada, 2003. *Agriculture Economic Statistics*. Cat. No. 21-010-XIE.)

**NFU:** National Farmers Union.

**Non-farm work:** Income-generating work that either takes place off the farm or that takes place on the farm property but is not related directly to the farming operation. Examples of work that takes place on the farm but is not related to the farm operation could include construction, hairdressing, accounting, and many other types of home-based businesses. (Martz and Brueckner 2003)

**NS:** Nova Scotia.

**PEI:** Prince Edward Island.

**Person Years of Employment:** Total annual hours worked, divided by 2000 hours/year (40 hours multiplied by 50 weeks).

**Productivity:** “[A] measure of how much output is produced per level of input. *Multifactor productivity* is the increase in output relative to the increase in a bundle of inputs that include both labour and capital.” Statistics Canada, *Productivity Growth in Canada, 2001*.

**Solvency Ratio:** Equal to total liabilities divided by total assets. It is very similar to the debt to equity ratio.

**Wealth:** The origin of the word “wealth” derives from “weal” (well-being) and “th” (the condition of). Today, people associate the word with simply monetary assets, or items that can be sold for money. However, the standard definition of wealth, as used by Statistics Canada and other agencies, is assets minus debts. In other words, wealth can be defined as those assets that remain after all debt has been paid off.

Anielski (2003) seeks to measure “genuine wealth.” He notes:

We currently measure economic well-being according to how much money we spend either as individuals or publicly, often on regrettable things like prisons, cleaning up environmental spills, or constructing missiles and tanks. Yet, we fail to account for the assets (life capital) that “make life worthwhile” nor do we account for their depreciation.