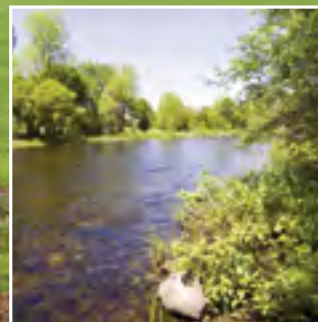




HUNGRY FOR CHANGE SERIES

# The Greening of Canadian Agriculture

POLICIES TO ASSIST FARMERS AS STEWARDS OF THE ENVIRONMENT



Claudia Schmidt, Al Mussell, Janalee Sweetland,  
and Bob Seguin

NOVEMBER 2012





MACDONALD-LAURIER INSTITUTE

*True North in Canadian Public Policy*



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# Executive Summary

Canadians are increasingly concerned about the protection of soil, air, and water quality, the reduction of greenhouse gas emissions, and the management of natural landscapes and species habitat. Farmers are among the largest group of private rural landholders who can influence environmental outcomes by providing ecological goods and services (EG&S). To date, the promotion of EG&S has not been a primary focus of agricultural policy in Canada. However, policies that enhance the greening of Canadian agriculture have gained prominence in the past decade. Election campaigns in the fall of 2011 demonstrated that greening Canadian agriculture is top of mind for provincial public policy.

This paper looks at the incentives for rural environmental protection and enhancement under current Canadian agricultural policy, and then compares it with different policy approaches in the European Union (EU), the United States (US), and Australia. Two common recurring themes are the adoption of a European environmental scheme using the cross-compliance and the natural capital approach. Cross-compliance refers to producers satisfying minimum environmental management requirements in order to maintain eligibility for government support. The natural capital approach attempts to attach a synthetic price to EG&S, and recommends using this as a base for remunerating farmers. These approaches are analysed in detail, since a number of publications have already analysed approaches using economic tools to enhance the production of ecological goods and services. A common theme observed in current programs designed to increase EG&S production is a gap between measurement of program uptake and the actual effects of the program.

*Farmers can influence environmental outcomes by providing ecological goods and services.*

The paper recommends a two step research program to facilitate the development of EG&S policies in Canada. First, past and existing projects aimed at enhancing EG&S should be evaluated in more detail so that a better understanding of the efficacy of past programs can be obtained. Secondly, future programs should allow for flexibility and learning from past experience. Growing Forward 2, a national agriculture and food policy framework developed by the federal, provincial, and territorial governments, offers the opportunity to experiment with variations in EG&S programs. Flexible, decentralized pilot initiatives, with a focus on follow up measurement, can help establish which types of programs work best over time. This approach offers the prospect of Canadian ecological goods and services policies that can evolve and improve with experience.



# Sommaire exécutif

Les Canadiens sont de plus en plus préoccupés par la protection de la qualité des sols, de l'air et de l'eau, par la réduction des émissions de gaz à effet de serre et par la gestion des paysages et des habitats naturels. Et les agriculteurs constituent le groupe le plus important de propriétaires ruraux pouvant influencer sur les résultats environnementaux en fournissant des biens et des services écologiques (BSE). Jusqu'à maintenant, la promotion de ces biens et de ces services n'a pas été au centre de la politique agricole canadienne, même si les politiques visant à écologiser l'agriculture prennent le devant de la scène depuis une décennie. Les campagnes électorales de l'automne de 2011 ont démontré que le développement vert de l'agriculture au Canada se poste à l'avant-plan des priorités de la politique publique provinciale.

Cette étude se penche sur les incitatifs prévus dans la politique canadienne actuelle pour protéger et valoriser l'environnement en région rurale, puis les compare à la diversité des options existant dans l'Union européenne (UE), aux États-Unis (É U) et en Australie. L'adoption du cadre environnemental européen caractérisé par le mécanisme de la conditionnalité et les approches du capital naturel constituent deux thèmes récurrents de ces comparaisons. La conditionnalité fait référence aux exigences réglementaires minimales en matière de gestion imposées aux producteurs pour qu'ils demeurent admissibles au financement public. L'approche du capital naturel tente de faire correspondre un prix synthétique aux BSE et recommande que la rémunération des agriculteurs se fonde sur ce dernier. Ces approches sont examinées en détail, car un certain nombre de publications ont déjà présenté des analyses fondées sur des outils économiques servant à améliorer la production de biens et de services écologiques. Le fossé entre la mesure de financement des programmes et celle de leurs retombées réelles est un trait commun des programmes actuels destinés à augmenter la production de BSE.

***Les agriculteurs peuvent influencer sur les résultats environnementaux en fournissant des biens et des services écologiques.***

Cette étude recommande un programme de recherche en deux phases pour faciliter le développement de politiques sur les biens et les services écologiques au Canada. Premièrement, les projets passés et en cours visant à améliorer la production de biens et de services écologiques devraient être évalués en détail pour mieux saisir leur efficacité. Deuxièmement, les programmes futurs devraient faire preuve de flexibilité et pouvoir intégrer l'expérience acquise. Le cadre de la politique nationale de l'agriculture et de l'alimentation « Cultivons l'avenir 2 », mis au point par les paliers fédéral, provincial et territorial de gouvernement, offre la possibilité d'explorer l'impact de variations dans les programmes de BSE. Flexibles, les initiatives pilotes décentralisées peuvent, en mettant l'accent sur le suivi, contribuer à repérer les programmes qui fonctionnent le mieux au fil du temps. Cette approche offre la possibilité d'élaborer des politiques de développement de produits et de services écologiques qui peuvent évoluer et s'améliorer au fil de l'expérience acquise.



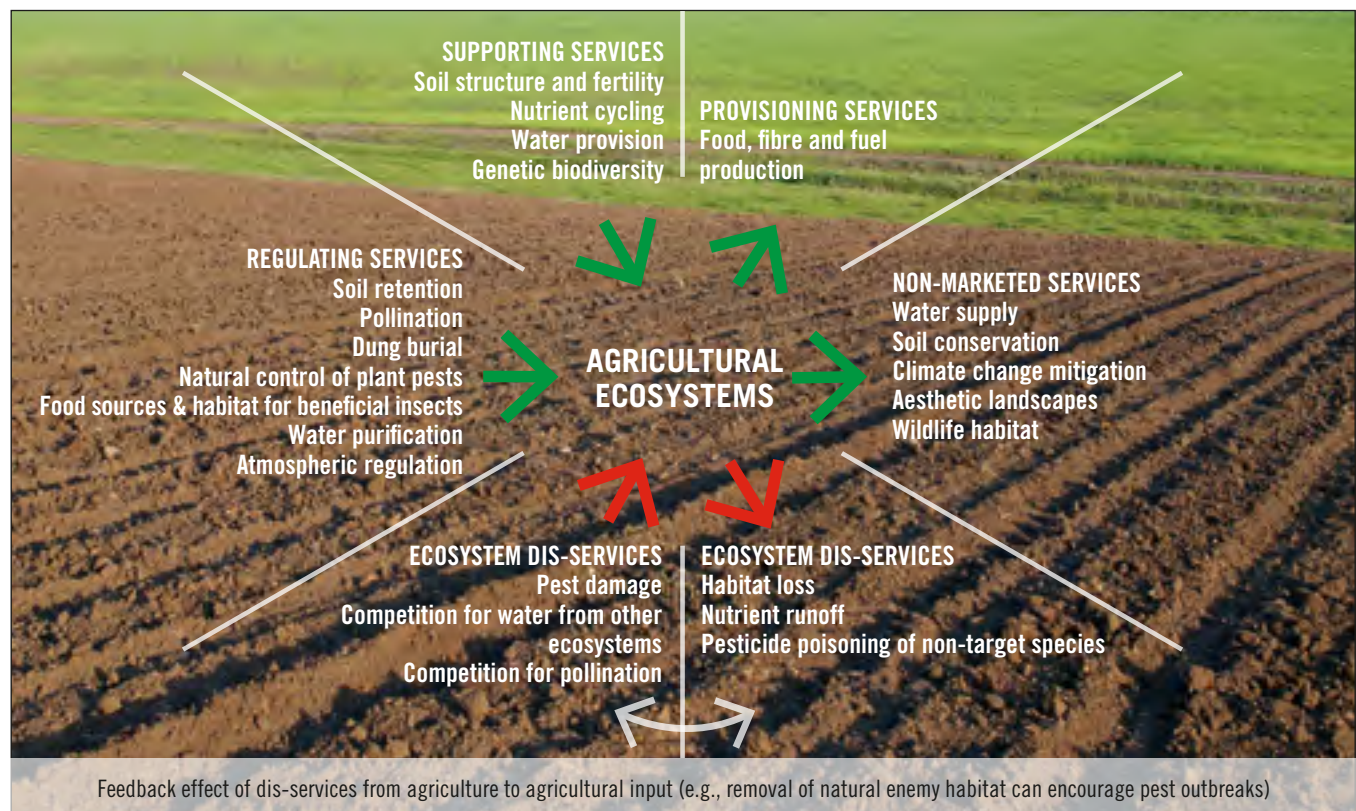
# Introduction

Canadians are increasingly concerned about protecting and managing natural environments. This concern is multifaceted and relates to natural landscapes and species habitats, as well as to the reduction of greenhouse gas emissions and the protection of soil, air, and water quality. As awareness increases, Canadians seek practical solutions to mitigating environmental problems. Farmers are among the largest groups of private rural landholders that can influence these environmental outcomes. Hence, through their stewardship of land and resources, farmers have a critical role to play in supplying ecological goods and services (EG&S).

*Canadians seek practical solutions to environmental problems.*

Agriculture and Agri-Food Canada (2005) defines ecological goods and services as “the benefits that humans derive from our ecosystems [which] include water supply and regulation, erosion control, climate regulation, food production, raw materials, and recreational activities.”<sup>1</sup> Zhang et al. (2007) emphasize that agriculture is both a provider and a beneficiary of EG&S (see figure 1). Farmers provide additional goods and services that do not traditionally trade in the marketplace, such as air purification through carbon sequestration, clean water, wildlife, and endangered species habitat and flood control through protection of wetlands and establishment of forests and vegetated buffers.

**FIGURE 1 ECOSYSTEM SERVICES AND DIS-SERVICES TO AND FROM AGRICULTURE**



Source: Zhang et al. (2007).

In fact, farmers are the largest suppliers of greenhouse gas (GHG) offset credits and a primary supplier of phosphorus credits for water quality trading (Campbell 2010). At the same time, ecosystems may also provide dis-service (such as habitat loss or nutrient run off) to agriculture and vice versa. However, if it is well managed, agricultural land can provide additional services to society and reduce dis-service.

There are opportunity costs for the provision of such ecological goods or services. For example, farmland has a large potential to supply wildlife habitat. However, such provision can require costly tradeoffs on the part of the farmer, such as delaying haying to protect nesting of bird species, establishing hedgerows, crop losses, wetland restoration, and others. In some cases, these costs have to be borne partially or completely by farmers.

### *Payments for EG&S have gained more attention in the past two decades.*

Payments for EG&S have gained more attention in the past two decades. A payment scheme for EG&S or ecosystem services (PES) is defined as a voluntary, conditional agreement between at least one buyer and one seller over a well-defined continually provided environmental service. The buyers are usually governments, conservation agencies, non-governmental organizations, private organizations, or firms (Walls and Riddle 2012). There are a number of publicly and privately supported programs in place that support and encourage the production of EG&S. Baylis et al. (2008) describe public programs that support the provision of ecological services as either programs that target the reduction of negative externalities (such as soil erosion or nutrient run-off) or provision of positive externalities (scenic vistas, water filtering). Most countries have some form of agri-environmental programs in place that encourage the production of EG&S. These differ based on their target (focusing on either negative or positive externalities) and approaches (environmental programs are part of the respective agricultural policies versus single program activities).

### *Agri-environmental programs in most countries encourage the production of EG&S.*

Recent provincial election platforms in Canada suggest that governments are interested in policies that promote EG&S production, but ongoing debate as to how to allocate government funds most effectively has resulted in few policy suggestions thus far. The purpose of this paper is to provide an overview of Canadian policy options. In this context, the discussion aims to fulfill three specific objectives:

- Determine what incentives for rural environmental protection and enhancement exist under the current Canadian policy environment and to compare these with an overview of environmental policies that have been implemented in the EU, US, and Australia.
- Provide an assessment of Canadian EG&S proposals and prospects.
- Develop recommendations to encourage the enhancement of EG&S in Canada.

These objectives are addressed in three broad sections below. The first section provides an overview of the Canadian agricultural and environmental policy environment. The next section discusses the environmental and EG&S policies that are in place in the EU, US, and Australia. The final section of the paper discusses current EG&S policy proposals and makes recommendations for the enhancement of EG&S production in Canada.

# The Canadian Policy Environment

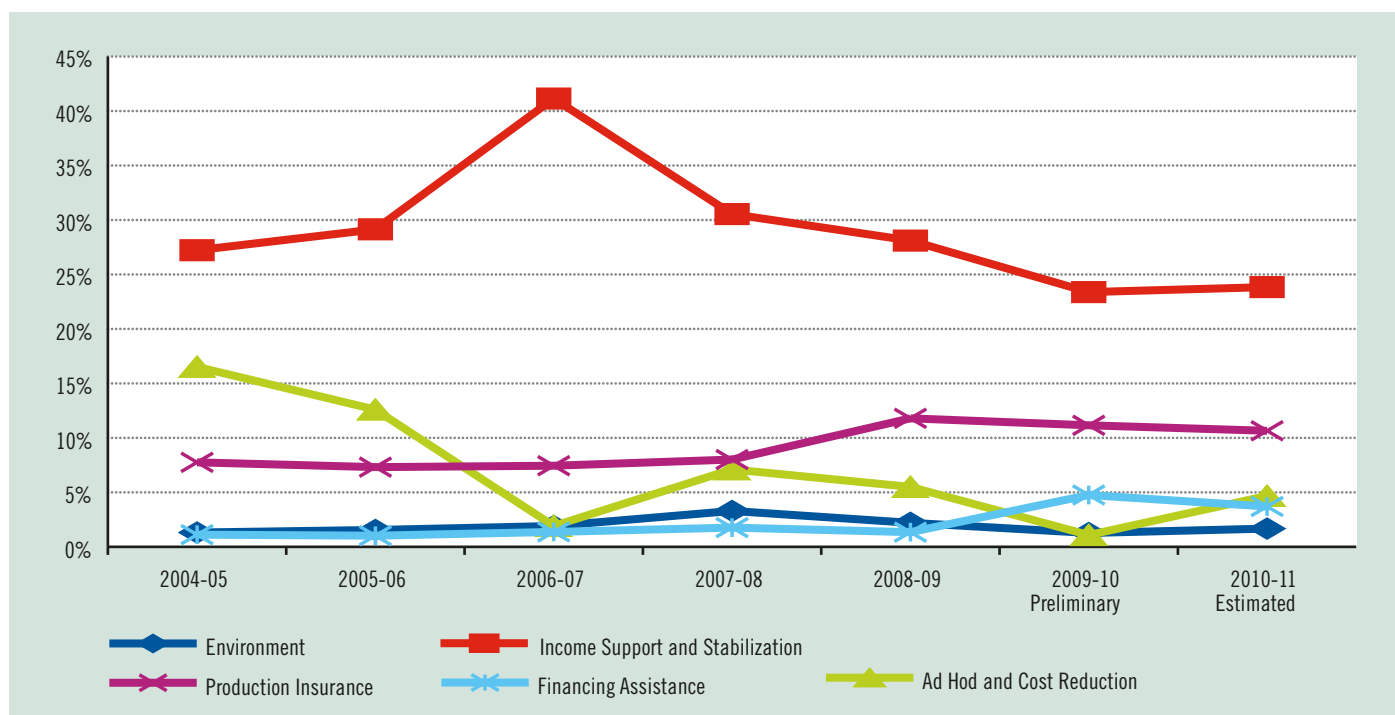
This section provides an overview of agricultural and environmental policy and programs aimed at EG&S production in Canada. The Canadian Constitution sets agriculture as a shared federal-provincial-territorial responsibility. Under Section 92(10), agriculture is designated a concurrent jurisdiction. As a result, agriculture policies and programs fall into federal, provincial/territorial, or joint jurisdiction between the levels of government. The major example of the latter is the Growing Forward framework, which contains a 60:40 cost sharing for agricultural programs between the federal and provincial governments.

## Agricultural Policy

*About half of agriculture program spending has been in business risk management.*

Agricultural policy has a broad reach in Canada, with roles in food inspection and food safety regulation, marketing regulation, research, extension, environment, input assistance, and business risk management. In practice, about half of program spending in agriculture has been in business risk management. Figure 2 shows government spending on a selection of programs as a proportion of total agriculture spending from 2004-05 to present. To provide a more detailed overview of the agricultural spending, the appendix shows total agriculture spending by federal, provincial, and territorial governments for all program categories.

**FIGURE 2 SHARE OF SELECTED AGRI-FOOD PROGRAMS OF THE COMBINED FEDERAL/PROVINCIAL/TERRITORIAL EXPENDITURES**



Source: AAFC, Farm Income, Conditions and Government Assistance Data book, 2010.



Growing Forward 2 is the second five year national agriculture and food policy framework developed by the federal, provincial, and territorial governments to establish a funding agreement for a variety of national and bilateral programs. These are designed to assist the business risk management (BRM) needs of Canada's primary producers, as well as a series of bilateral initiatives between the Government of Canada and individual provinces/territories to assist the growth and prosperity of the agri-food sector through initiatives on innovation, competitiveness, sustainability, and market development. The Growing Forward 2 framework was agreed upon by the federal, provincial, and territorial Ministers of Agriculture on September 14, 2012.

Under Growing Forward provincial governments have had more flexibility to design programs suited to provincial needs while achieving national outcomes than was provided under the previous federal-provincial-territorial agreement (OECD 2011). Governments are currently working on Growing Forward 2, which will replace the expiring agreement, which provides an opportunity for greater consideration of EG&S policies to address environmental concerns.

### ***Growing Forward 2 will provide for more consideration of EG&S policies.***

Canada has a number of regulations that influence marketing of farm products. The Canadian Dairy Commission and the Farm Products Marketing Council oversee national supply management for dairy, chicken, turkey, eggs, and hatching eggs. Provincial legislation allows the formation and regulation of provincial marketing boards. Marketing assistance for farm products is provided by both federal and provincial governments. Examples include market analysis and international development services provided by the federal and some provincial governments, and marketing and branding initiatives for locally (within province) produced food in many provinces. Trade policies for agriculture are also an important aspect of marketing policies. While the federal government is responsible for overall trade policy, provincial governments also conduct trade missions in order to increase market access for their products. In 2009, the federal government formed the Market Access Secretariat in order to coordinate federal trade strategy with that of industry, provinces, and territories (OECD 2011).

The following is a brief overview of existing elements of agri-food policy.

**RESEARCH:** Both federal and provincial governments fund agricultural research in both their own research stations, as well as through grants to universities, research institutions, and other organizations.

**FOOD INSPECTION AND REGULATORY:** In conjunction with Health Canada, the Pest Management Regulatory Agency, and the Canadian Grain Commission, the Canadian Food Inspection Agency (CFIA) has regulatory approval authority for foods, fertilizers, pesticides, grain varieties, feed ingredients, and plant materials. The CFIA is also responsible for inspection of federally inspected food manufacturing facilities, export authorization, feeds, and plant materials. The Canadian Grain Commission provides inspection for western grains and grains for export grown throughout Canada. While some provinces have established standards and food inspection for processing plants at a provincial level, their food regulatory function is relatively limited (Mussell et al. 2010).

**EXTENSION AND RENEWAL:** Extension services are provided, particularly at the provincial level. The recent trend in extension/renewal services is that they are provided on a targeted program basis designed to provide training, education, and farm management planning.

**FARM INPUT ASSISTANCE:** Both provincial and federal governments offer tax credit and subsidy programs for farm inputs and capital investments. Agricultural credit is provided under the *Canadian Agricultural*

*Loans Act* and Farm Credit Canada is a Crown corporation that provides business and financial services to small and medium farm related businesses. Individual provinces also offer financing assistance, for example Agriculture Financial Services Corporation in Alberta.

**BUSINESS RISK MANAGEMENT:** Under the Growing Forward framework there are a number of programs designed to assist farmers with the risks associated with farming. These are over and above ad hoc programs created for disaster assistance. There are four BRM programs: AgriInvest (subsidizes farm savings), AgriStability (provides support for income declines), AgriInsurance (provides insurance against natural threats), and AgriRecovery for ad hoc disaster assistance. The AgriRecovery framework is a new process to assess disaster situations and provide further assistance as needed to help impacted farmers recover (OECD 2011). Support for BRM programs also exists at the provincial level and is increasing. Quebec, Ontario, and Alberta have programs that provide payments at the commodity level when prices fall below the cost of production set in the program.

**ENVIRONMENT:** Provincial and federal governments regulate and fund initiatives relating to agriculture and environment. Parts of the environmental pillar are programs like the Environmental Farm Plan and support for Best Management Practices (BMP). These programs have been in existence for many years and have provided incentives to farmers to maintain and enhance environmental farm practices. Under the current framework (AAFC 2012a), federal initiatives are funded for agri-environmental science (science based responses to water and climate change), knowledge and information tools (BMP evaluation at the watershed scale), and performance measurement and reporting (quantifiable agri-environmental performance indicators and GHG accounting).

Regulation of environmental impacts of agriculture usually occurs at the provincial level, while both levels of government provide programs for environmental initiatives (AAFC 2012b). (Refer to figure 2 for more information on the breakdown of spending on environmental programs.)

***Funding for environmental programs appears small in comparison to income support and stabilization.***

The funding for environmental programs appears small in comparison to income support and stabilization. It should be noted that spending on environmental programs averaged 1.89 percent over that period and has remained fairly constant. Income support and stabilization still is the major part of the budget expenditures (OECD 2011).

## Other Regulations

There are also a number of regulations that influence the provision of EG&S, such as the *Ontario Endangered Species Act* and the federal *Species At Risk Act* (SARA). In Canada, natural resources like wildlife and fish are held in trust on behalf of citizens by provincial governments, but the federal government also has some jurisdiction in national parks and wildlife areas. The habitat in which these resources exist is a mix of private land, Crown land that is leased for use by the private sector, and Crown land managed by government. The private sector owns or manages under lease a significant portion of the habitat used by publicly owned natural wildlife.<sup>2</sup> Much of the wildlife is mobile and transient and is very hard to monitor (Mussell et al. 2011).



## ***SARA and MBCA highlight the importance of landscape level stewardship and the potential for conservation agreements.***

Federal and provincial governments have addressed the market failure associated with this un-priced social benefit by enacting endangered species legislation. Canada has provincial endangered species acts and one federal act (SARA) (Mussell et al. 2011). Farmers who provide habitat for endangered species are eligible for some cost share programs, under which they can recover some of the additional incurred costs. SARA and MBCA are both excellent examples of the opportunity for farmers and government to recognize the importance of landscape level stewardship and the potential for conservation agreements.

## **Environmental Programs**

There are a number of programs in Canada that provide incentives for the agricultural community to consider EG&S in their production activities. Most of these programs do not wear the “EG&S stamp” but their goal is to benefit the environment. They are financed through federal/provincial programs or NGOs. Table 1 lists a selection of environmental programs currently in place. It constitutes a cross-section of programs, and does not reflect how many are indeed available. The table lists the geographical level of the program reach, the incentive payments/costs of the program, and the funding source of these programs.

**TABLE 1 OVERVIEW OF PROGRAMS ACROSS CANADA THAT PROVIDE INCENTIVES FOR EG&S PRODUCTION**

| Level             | Program                                               | Short Description                                                                                                                                                                                                     | Incentive/Cost Share Payment                                                       | Funding                                                                                                                                                    |
|-------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Federal</b>    | Habitat Stewardship Program (HSP) for species at risk | Contribute to the recovery of endangered, threatened, and other species at risk, and to prevent other species from becoming a conservation concern, through engaging in activities that protect or conserve habitats. | HSP funds activities promoting habitat protection and recovery of species at risk. | Federal (Environment Canada, Fisheries and Oceans Canada, and Parks Canada, Interdepartmental Recovery Fund, and the Aboriginal Fund for Species at Risk.) |
| <b>Federal</b>    | Ecological gifts program                              | Program encourages landowners to protect valuable pieces of nature by donating ecologically sensitive lands.                                                                                                          | Tax credit or deduction to donors and a reduction in the taxable capital gain.     | Federal (Environment Canada), other provincial and municipal governments, and environmental non-government organizations.                                  |
| <b>Provincial</b> | Agriculture Stewardship Program                       | Some components support production of EG&S, examples include: wetland restoration; buffer zone tree and shrub planting.                                                                                               | Example: cost share: 66% tree planting; 75% wetland restoration.                   | Federal (Growing Forward)                                                                                                                                  |
| <b>Provincial</b> | Conservation Land Tax Incentive Program (Ontario)     | Program encourages the protection of Ontario's provincially significant conservation lands by encouraging landowners to carry out specified activities to conserve the natural heritage values of their properties.   | A 100% tax exemption on the eligible portion of the property.                      | Provincial (Ontario Ministry of Natural Resources)                                                                                                         |

| Level              | Program                                                                   | Short Description                                                                                                                                                                                                                                                    | Incentive/Cost Share Payment                                                                                                                                                                                                            | Funding                                                                                                               |
|--------------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Provincial         | Alternative Land Use Services (Prince Edward Island)                      | Provide incentives to agricultural producers to produce EG&S.                                                                                                                                                                                                        | Annual payment: buffer zone tree planting and sensitive land retirement, (\$100-185/ha/yr), land under soil conservation structures (\$250/ha/yr), and maintaining livestock fences adjacent to watercourses or wetlands (\$0.30/m/yr). | Provincial (Government of Prince Edward Island and Fisheries and Oceans Canada)                                       |
| Provincial         | Recreational Access Management Program (RAMP)                             | 3-year (2009-11) private lands hunting and fishing access and habitat stewardship program to encourage "recreational hunting and fishing access opportunities".                                                                                                      | Technical assistance and incentive payments.                                                                                                                                                                                            | Provincial (Alberta Sustainable Resource Development)                                                                 |
| Provincial         | Strategic Transition and Agricultural Revitalization for Tomorrow (START) | Remuneration for EG&S in order to better protect the environment and diversify farmers' sources of income.                                                                                                                                                           | Annual payment: \$124/ha/yr .                                                                                                                                                                                                           | Federal and Provincial Governments                                                                                    |
| Provincial         | Environmental Service Initiative                                          | Project intended to compensate farmers for the loss of cropland under a 1999 regulation increasing the length of riparian strips.                                                                                                                                    | Payments: extension of buffer zones (\$296/ha/yr), high slope land retirement (\$247-296/ha/yr), shelterbelt establishment (\$296/ha/yr).                                                                                               | Waiting for federal funding                                                                                           |
| Provincial         | Water Management Program                                                  | Program provides technical assistance and incentive for the creation of a Long Term Water Management Plan at the farm level.                                                                                                                                         | Program payment: maximum of \$5000. Cost sharing: 50/50 for certain items also available.                                                                                                                                               | Federal (Growing Forward)                                                                                             |
| Provincial         | Nature Conservancy Canada (NCC)                                           | NCC works with landowners to secure ecologically significant land identified as priorities for conservation. Land is protected through purchase of land, donation of land, or agreement in which a landowner agrees to the imposition of restrictions on activities. |                                                                                                                                                                                                                                         | Private (NCC)                                                                                                         |
| Municipal/Regional | Environmental Water Quality Program (Ontario, Waterloo/Wellington County) | Pays farmers in this area for 3 years to plant trees on their property.                                                                                                                                                                                              | \$250/acre for 3 years, \$100/acre for 4 more years                                                                                                                                                                                     | Provincial/Grand River Conservation Authority                                                                         |
| Municipal/Regional | Reverse Auction Program Saskatchewan                                      | Set up of a reverse auction to pay landowners for restoring wetlands in their fields                                                                                                                                                                                 | Determined by reverse auction                                                                                                                                                                                                           | Private (DUC)                                                                                                         |
| Municipal/Regional | Alternative Land Use Services "ALUS" (Alberta)                            | Provide incentives to agricultural producers to produce EG&S.                                                                                                                                                                                                        | Establishment costs shared (50/50), annual payment based on local rental rates, quality of soil, use, etc. (\$2-\$50/acre).                                                                                                             | Municipal/Regional, private organizations (County of Vermilion River, Delta Waterfowl, Wildlife Habitat Canada, etc.) |
| Municipal/Regional | Habitat Conservation (Ducks Unlimited Canada)                             | This program focuses on threatened wetlands including i) wetland rehabilitation and ii) wetland protection through conservation easements, donation, or purchase.                                                                                                    | Direct payment or tax reduction.                                                                                                                                                                                                        | Private (Ducks Unlimited Canada)                                                                                      |



| Level                  | Program                                                 | Short Description                                                                                                                                                                                                                | Incentive/Cost Share Payment                                                                                                                                | Funding                                                                       |
|------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Municipal/<br>Regional | Wetland auctions program (Ducks Unlimited) Saskatchewan | Reverse auction in efforts to conserve, restore, and manage wetlands and associated habitats for North America's waterfowl. Habitat land is sold through an online auction to provide opportunities to conserve an area of land. | Participants provide estimates of restoration costs, payment is provided to the lowest estimate.                                                            | Private (Ducks Unlimited Canada)                                              |
| Municipal/<br>Regional | ALUS Norfolk County Ontario                             | Program aiming to conserve the environment on farmlands in Norfolk County, Ontario.                                                                                                                                              | Establishment costs covered by ALUS with in-kind contributed by producer. Annual payment based on rental rates, soil quality, use, etc. (Up to \$150/acre). | George Cedric Metcalf Charitable Foundation and W. Garfield Weston Foundation |
| Municipal/<br>Regional | Rural Water Quality Program                             | Program designed to improve and protect water quality of the Grand River watershed.                                                                                                                                              | Cost sharing: 30 – 100%.                                                                                                                                    | Municipal, provincial and federal governments.                                |

For example, Ontario's environmental water quality program, which is operated by the Grand River Conservation Authority, pays farmers in its jurisdiction \$250 for 3 years to plant trees on their property (Grand River 2012). One precondition is an environmental farm plan (EFP). The table also shows some of the efforts by NGOs and others (for example, Nature Conservancy of Canada, Delta Waterfowl, Ducks Unlimited Canada) in piloting innovative approaches for providing more EG&S from agriculture.

What distinguishes programs that are supposed to encourage EG&S production from environmental programs? Gagnon (2005) suggests that criteria for EG&S focused programs entail the following: payments are made to producers of well defined EG&S under a contract provision and these payments must be ongoing and exceed the initial incurred costs (hence, providing incentives). According to Fitzgibbon (quoted in Baxter 2011), the production of EG&S is an action that changes farmland permanently or influences farming activity on an ongoing basis.

### ***Production of EG&S changes farmland permanently or influences farming activity on an ongoing basis.***

There are also number of other criteria for programs that aim to increase the production of EG&S, which have been discussed in the literature. These are: additionality, stacking, and bundling. The condition of additionality means that changes to agricultural practices must be made in direct response to a payment (Bennett 2010). For example, if a farmer wants to implement a buffer strip along a river to prevent fertilizer run off, this action would be eligible for an EG&S payment. If the farmer would have planted the buffer strip regardless of the payment, it would not be considered additional. However, if the buffer would be implemented because of the payment, then this is considered additional. Most of the current environmental payments do not require projects to be additional in order for them to be eligible for payments.

EG&S are rarely created in isolation. For example, wetland mitigation creates water quality improvements and biodiversity habitat. This is called bundling, where a farmer may receive one single payment for multiple EG&S created (Cooley and Olander 2011). Programs that pay on an area basis (for example, per acre) effectively pay on the service bundle created. When a landowner receives more than one payment from a program or market on a single parcel or unit, then stacking occurs.<sup>3</sup> Only some of the programs in table 1 conform to the aforementioned provisions of EG&S in that they provide payments for an action that influences farming



activity on an ongoing basis and provides incentives for these changes. There are a number of cost share programs available that pay only part of the burden of implementing the EG&S activity. However, if equity (cash constraints) is an issue for a farmer, a cost sharing program is probably not as likely to be picked up. Another option is reverse auctions. In a reverse auction farmers are competing to sell an EG&S activity to a single buyer. Reverse auction is often used in wetland restoration, as this is very expensive (Boxall et al. 2009). The bidding makes the process competitive and can be based on costs of the project (projects are ranked based on their costs), the benefit (projects are ranked based on their expected environmental benefits), or cost-effectiveness (bids are ranked based on the combination of costs and benefits) (Selman et al. 2008). Reverse auction has been used in a number of pilot and working programs in Canada. For example, Ducks Unlimited used a reverse auction mechanism in Saskatchewan to pay landowners for restoring wetlands in their fields.

There are a number of other economic instruments (EIs) that can be used to provide EG&S and have been used in Canada (tax credits, nutrient credits, and GHG offset credits). Kenny et al. (2011) argue that Canada has made less use of EIs than most other developed countries. They recommended that the use of EIs should be increased in Canada by looking specifically at offset approaches for species at risk, water conservation, migratory birds, and fish habitat.

The next section provides an overview of the ALUS program, as it is the most widespread initiative that promotes the production of EG&S in Canada, and has been promoted as such.

***ALUS incentivizes farmers to establish and maintain services that may lead to EG&S.***

## **Alternative Land Use Services**

Alternative Land Use Services (ALUS) is a community led, farmer delivered program that provides incentives to farmers to establish and maintain services that may lead to the production of EG&S. These services are targeted towards local environmental opportunities and include the restoration, enhancement, and protection of a variety of wetland, riparian, and upland services. The program was conceptualized in Manitoba in partnership between the Keystone Agricultural Producers and Delta Waterfowl, with the first pilot project occurring in the rural municipality (RM) of Blanshard from 2006-2008.

In Ontario, the Norfolk pilot project started in 2007 and has evolved from a pilot project to a countywide program with over 140 farms currently enrolled. Following the lead in Manitoba and Ontario, PEI rolled out a program in 2009 that has been well received by the farm community. Alberta (2010) and Saskatchewan (2011) have started demonstration programs to showcase how ALUS works at a local level. The Alberta ALUS program began in the County of Vermilion River in 2010 and is starting a new demonstration area in Parkland County in 2012. Saskatchewan's demonstration project is using four adjacent rural municipalities in the Wascana Creek and Qu'Appelle River watersheds to help deliver ALUS. While the original Manitoba pilot project was discontinued in 2008, there are plans for its reintroduction in 2012-13. The overarching goal for these demonstration projects is to demonstrate how ALUS works on a community level and with producers helping design and implement environmental improvements says Jim Fisher, Delta Waterfowl's director of conservation policy (pers. comm.).

The various ALUS projects have the same structure in that they are community led and farmer delivered. In general, farmers cost share the costs of establishment and receive an annual fee, based on existing rental rates. The actual expenses to the producer are the opportunity costs of time that is invested in applying for



the program, the establishment of the environmental projects, and any differences in possible additional revenues generated on land that is taken out of traditional production (Jim Fisher, pers. comm.).

### *ALUS projects are community led and farmer delivered.*

The Ontario ALUS pilot program was launched in 2007 with a handful of farms and now there are over 140 farm families enrolled and more than 1000 acres of projects completed. In order to launch in 2007, \$1.3 million was raised from 21 sources for the initial three year pilot project. Funding partners for this ALUS program are a mix of federal, provincial, and municipal sources and a number of producer and environmental organizations, which shows the broad community support for this program. In 2011, the W. Garfield Weston Foundation granted the ALUS project roughly \$1.5 million to continue its operation for another three years. Another grant from the W. Garfield Weston Foundation and an approximately \$400,000 grant from the Ontario Trillium Foundation in 2012 has allowed expansion of the ALUS concept to four new communities in Ontario. The project is governed by a collaborative, community based Partnership Advisory Committee (PAC), comprised of farmers (local Federation of Agriculture) and partners (stewardship council, municipality, conservation authorities, Ontario Ministry of Agriculture, Food & Rural Affairs, Ontario Ministry of Natural Resources) in each community. Project sites are implemented on marginal, inefficient, and fragile land on working farms; projects include riparian buffers, pollinator hedgerows, bird, bat, and bee nesting box establishment, wetland creation and enhancement, tallgrass prairie, and tree plantings. ALUS intends to make the most of marginal spaces on farmland, while leaving the better land on farms for food production (a maximum of 20 percent of a farm's working lands can be enrolled in ALUS). Demonstration farms are used for showcasing the ALUS concept and projects to other farmers, potential funding sources, government officials, and the broader public (Jim Fisher, pers. comm.).

In Alberta, ALUS was initially launched in the County of Vermilion River in 2010. The community has engaged in ALUS with the county and local producers working with conservation interests to drive the process. Delta Waterfowl has helped with fundraising and has worked with the county to raise roughly \$300,000 per year in support of this effort. Six different Alberta ministries have shown their support, as well as a number of farm organization and private industries. ALUS Alberta is actively supported by a number of groups including Cows and Fish, an Alberta NGO (founded by the Alberta Beef Producers and Trout Unlimited Canada), the Alberta Conservation Association, and Wildlife Habitat Canada. Recently Parkland County has embraced ALUS and is working towards a launch in 2012 (Jim Fisher, pers. comm.). Hence, ALUS programs are initiated with grassroots support and include a wide variety of stakeholders.

### *The protection of sensitive land is a key goal of ALUS programs.*

The protection of sensitive land is a key goal of ALUS programs. In most cases, these sensitive areas are not high yielding agricultural lands. Remuneration is based on set cropland leasing rates, which depend on the quality of land. Therefore, ALUS can provide additional income to farmers, when marginal land is converted that could not be used otherwise to achieve maximum return of the land. The difference compared with most beneficial management practice (BMP) programs is that in the case of ALUS the farmer does not incur establishment costs (BMP or environmental stewardship programs usually have a cost share 30-70 percent) and receives on top of that an annual payment.



As mentioned earlier, SARA and MBCA are both excellent examples of the opportunity for farmers and government to recognize the importance of landscape level stewardship and the potential for conservation agreements. Thus, instead of legislating to prevent farmers from damaging habitat, farmers are rewarded for providing habitat. ALUS programs provide remuneration for the provision/enhancement of wildlife/endangered species habitat. In PEI, regulations were designed to offer minimum protection to watercourses and wetlands. The ALUS program supports farmers to go above and beyond minimum standards imposed through regulation. According to Shawn Hill, ALUS Coordinator for the PEI Department of Environment, Energy, and Forestry, the combination of regulations and the ALUS program on PEI is desirable as it demonstrates a shared responsibility for environmental stewardship (pers. comm.). In PEI, the ALUS program was implemented in 2009 with an annual budget of \$750,000. In 2010, the annual budget was raised to \$1,000,000. ALUS clients are eligible for up to six services under the program, including

- reforesting 15 metre buffers around watercourses and wetlands,
- expanding buffer zones beyond 15 metres,
- soil conservation structures (area lost to structures),
- permanent grassed headlands (outside of 200 metre regulated zone),
- retirement of high slope land (9 percent or greater), and
- livestock fencing/watering incentive (watercourses and wetlands).

The PEI ALUS program was developed in partnership with the agricultural community and other major sectors of the PEI community. Watershed groups, academia, construction, aquaculture, and forestry sectors, among others, all helped to develop the program. Ongoing management of the program rests with an implementation committee, consisting mostly of government staff involved in the management of the program, but the original group involved in developing the program continues to meet on an annual basis to receive updates and to provide input. As of spring 2012, there were approximately 400 ALUS clients on PEI and the program is still accepting applications from new clients. Current ALUS agreements with farmers will expire in 2013 at which time the province will enhance and renew the program (Shawn Hill, pers. comm.).

### *ALUS projects reward farmers for providing habitat.*

The ALUS projects pay farmers for measures they implement, and these measures are based on well established stewardship and management practices. However, payments are not based on specifically observed outcomes. Measuring specific outcomes and adapting programming accordingly is a major challenge for EG&S programs, and the need for such research oriented, adaptive management becomes much more important as the scale of the EG&S program extends in space and time, such as to the scale of a national program. The Norfolk ALUS program identified several social, economic, and environmental indicators that could be measured to evaluate project outcomes. An initial pre-pilot benchmark survey of the county's residents was conducted, and workshops to identify the most feasible project indicators were held. The Norfolk ALUS proposal (Bailey and Reid 2004, 44 ff) suggested the following indicators:

- community acceptance, collaboration, and support;
- program uptake by farmers;
- increased farm income;
- greater appreciation of farmers; and
- environmental indicators:
  - evidence of improvement in surface and groundwater quality (reduced phosphorus and nitrate levels),
  - improvement in quality and quantity of wetland types (diversity and abundance of wetland species), and
  - reduction of soil and wind erosion.



While the proposed Norfolk ALUS pilot engaged a broad group of funding and in kind partners to launch the pilot, funding fell far short of the level required to implement the project as designed in Bailey and Reid (2004). Consequently, the pilot was considerably scaled down, and measuring social, economic, and environmental indicators were no longer feasible at that stage of the pilot says Mark MacNeil, the ALUS Norfolk research coordinator (pers. comm.).

### ***ALUS projects monitor ecological and economic outcomes when possible.***

ALUS projects have begun monitoring ecological and economic outcomes of farm projects where feasible by partnering with outside experts. Since 2009, Norfolk ALUS has conducted annual acreage verification of random samples of project sites to ensure projects are implemented and maintained for the contract duration. The sampling and assessment is undertaken by Agrincorp. Since spring 2011, ALUS has worked with outside experts to monitor the outcomes of ALUS farm project sites. For example, Bird Studies Canada is undertaking a three year study, funded by the Ontario Ministry for Agriculture, Food and Rural Affairs (OMAFRA), to investigate grassland bird species responses to different habitat restoration initiatives and ALUS farm projects in Norfolk county. Similarly, Norfolk ALUS has partnered with researchers from the University of Guelph to undertake similar multi-year research into native pollinator response to habitat provision on ALUS farms. At the time of writing this report, ALUS has commissioned a study of the economic values provided by ALUS projects to society in Ontario and Alberta, in addition to welcoming new partnerships to monitor the outcomes of ALUS projects (Mark MacNeil, pers. comm.).

The PEI ALUS program – a provincial scale program – has benefited from a pre-ALUS EG&S pilot that monitored several local environmental, economic, and farm decision-making variables to evaluate the outcomes of specific farm measures implemented and to adapt programming accordingly. The results of this research are summarized in a report by the Souris and Area Branch of the PEI Wildlife Federation (Van Lantz et. al. 2009) and directly informed the design of the subsequent ALUS program in PEI (Van Lantz et. al. 2009, 28). Researchers emphasized the difficulty of measuring outcomes over short time horizons, and have combined local empirical work with calibrated modeling to estimate likely outcomes of continuing practices over a longer time period.

## **CURRENT DEVELOPMENTS**

At the federal level, the current agricultural policy agreement (Growing Forward) will expire in March 2013. Consultations regarding Growing Forward 2 are currently underway and a number of consultation documents have been published. Business risk management is still in the front and centre of the discussion and there appears to be little room for expansion into environmental programs. In the current framework, spending on environmental programs has averaged about 1.9 percent and has remained fairly constant. Income support and stabilization still is the major part of the expenditures. However, the Saint Andrews Statement mentions that environmental challenges should be addressed through more collaborative and result oriented approaches, with a special emphasis on market based solutions (Canada 2011).

Recent election campaigns across the country have demonstrated that the topic of EG&S is top of mind for public policy, at least at the provincial level. Including EG&S as part of the campaign platforms shows an understanding that voters value EG&S. Parties in both Manitoba and Ontario specifically mentioned EG&S, while parties in other provinces mentioned environmental policies that include investment in agriculture stewardship and water protection, which may develop into programs that produce EG&S depending on the specific details of policies that are implemented. For example, expanding existing ALUS pilot programs, and



implementing EG&S programs to protect wetlands and riparian areas were introduced on the campaign trail last fall.

## *Voters value EG&S, as reflected in provincial election campaigns.*

The purpose of the following section is to provide an overview of existing agri-environmental approaches and policies in other countries to draw some lessons learned and to compare them with the current Canadian environment.

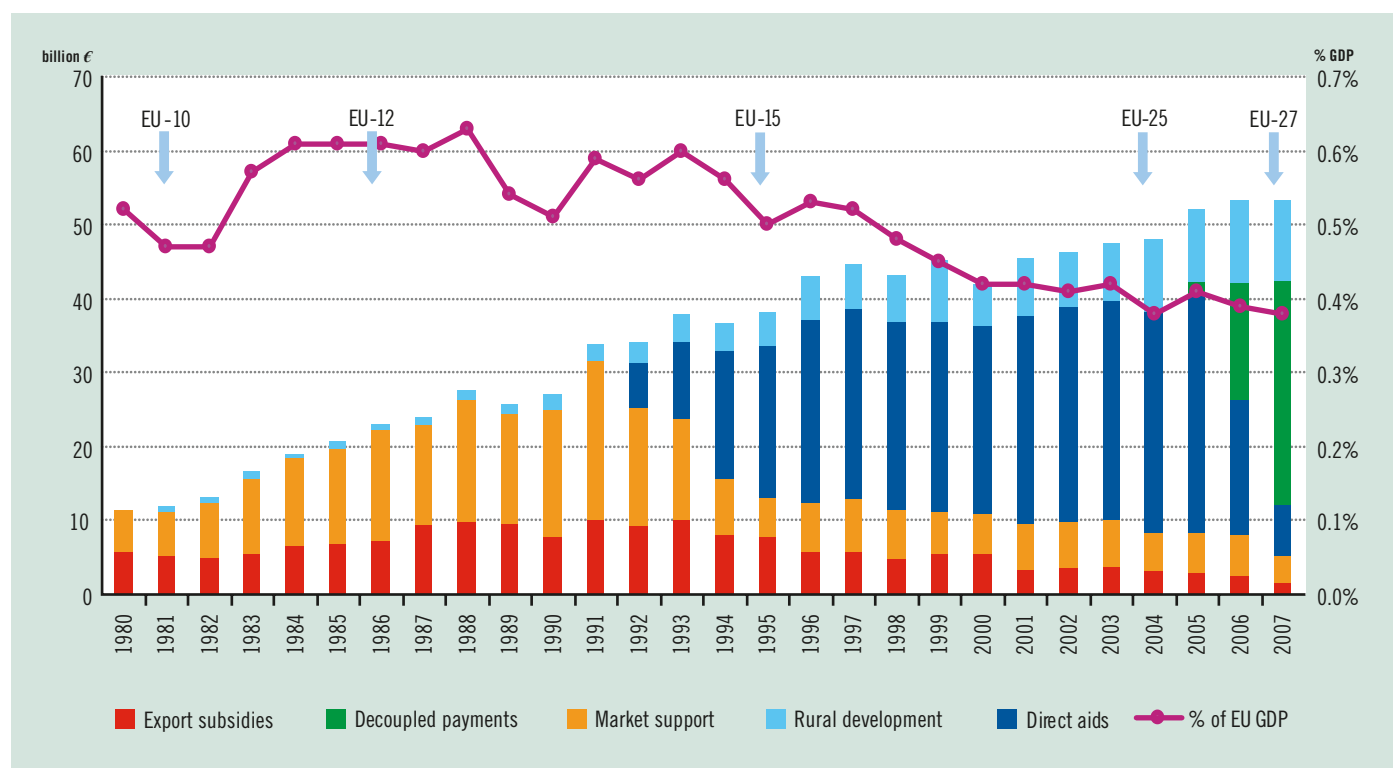
## EU Agri-environmental Policies

The EU's cross-compliance and agri-environmental payments are often mentioned as a way to provide incentives for farmers to produce or increase EG&S production or to use it as a means to provide farm income support, while being in line with international trade agreements (see, for example, Baxter 2011). This section will provide some insights into shifts in the framework of the EU Common Agricultural Policy and the concepts of cross-compliance and agri-environmental payments.

### EU POLICY ENVIRONMENT

The EU Common Agricultural Policy (CAP) has undergone significant changes since its beginnings. The history of the CAP in terms of the budgetary allocation is shown in figure 3.

**FIGURE 3 CAP BUDGETARY ALLOCATION**



Source: Jambor and Harvey, 2010.

The subsidies to the agricultural sector as a percentage of EU GDP have decreased significantly over time. The column to note is decoupled payments (green blocks), which have taken over from coupled market support. Decoupled payments do not influence production patterns and these payments are dependent on cross-compliance (Jambor and Harvey 2010). It also should be noted that budget spending overall has been decreasing over the past 20 years, from almost 75 percent of the total EU budget to about 45 percent. As a result of the addition of new EU member states, the extent of support per head and per hectare has declined substantially (Jambor and Harvey 2010).

***Cross-compliance is meeting minimum requirements and maintaining good practices.***

### **Cross-Compliance**

Cross-compliance refers to producers meeting the minimum statutory management requirements and maintaining good agricultural and environmental conditions. Cross-compliance became mandatory for producers receiving program payments as of 2005, replacing previous voluntary measures. To receive payments such as price supports and whole farm payments, producers must meet these minimum cross-compliance standards. The penalties for failure to comply through negligence are a 5 percent reduction in direct payments, with up to a 15 percent reduction for repeated failure to comply. If compliance failure is deemed intentional then producer payments are deducted anywhere from 15-100 percent (Baylis et al. 2008).

### **Agri-environmental Measures (AEM)**

Agri-environment measures (AEM) are voluntary measures that provide additional payment to producers in remuneration for undertaking actions that satisfy specific requirements in order to “protect and enhance the environment on their farmland” (European Commission 2005). Under AEM payments are provided to farmers who commit themselves for a minimum period of at least five years to adopt environmentally friendly farming techniques that exceed basic environmental standards and good management practices.

***AEM pays farmers who commit to long-term environmentally friendly practices.***

Since 1992, member states are required to include AEM in their respective agricultural framework. In 1999, the Agri-environment Regulation provisions required that AEM be incorporated into the Rural Development Regulation (European Commission 2005). Farmers receive compensation payments for the additional costs and foregone income incurred resulting from the implementation of these measures. Agri-environment measures are co-financed by EU Member States. These expenditures for the period of 2007-2013 amount to nearly 20 billion EUR, which comprises 22 percent of the expenditure for rural development (European Commission 2010). As of 2005, the total area of agricultural land in the original EU-15 covered by AEM is 25 percent (European Commission 2005).

Agri-environment measures can be designed at the national, regional, or local level, providing flexibility to meet local needs based on differing production systems or environmental conditions that may be unique to the region (European Commission 2005). As with other programs that fall under rural development,





member states are solely responsible for implementing AEM programs (EC Council Regulation No 1698/2005, Article 7). These differences have led to an uneven distribution of expenditure for AEM among EU countries (European Commission 2005). Member States and regions set up their own agri-environment programs, subject to European Commission approval, which are made up of a number of AEM (European Commission 2005). Additionally, administration costs of the programs are paid for by the member states (Baylis et al. 2008), so the availability of national funding to administer AEM is a factor in determining how strongly they are adopted in one country versus another.

Agri-environment measures provide payments to producers for providing public goods as well as reducing negative externalities that result from agricultural production. Measures cover six specific areas: landscape, biodiversity, water, soil, nitrates, and pesticides.

**LANDSCAPE MEASURES:** The EU stresses the importance of preserving the aesthetic qualities of farmed landscapes, based on the idea that farming activities that promote “landscape diversity” have become less competitive economically and that additional payments for undertaking landscape preserving activities are needed to maintain public benefits (European Commission 2012). Traditional agricultural landscapes are a part of the cultural and natural heritage of a given region or country and the aesthetic value of landscapes and the “ecological integrity” of a given area makes them more desirable for both commercial and residential development as well as tourism and recreation (European Commission 2012). Landscape measures are designed to address the positive externality created from traditional agricultural production, which is not often included in environmental programs in other jurisdictions (Baylis et al. 2008).

**BIODIVERSITY:** Agricultural practices can contribute to the preservation of natural flora and fauna in the environment. Biodiversity measures in the EU are designed to reverse the negative impacts of specialization and intensification of certain agricultural practices, such as increased chemical and heavy machinery use (European Commission 2012). They also recognize that marginalization and abandonment of traditional land management practices have had a negative impact on biodiversity in certain ecosystems; as such, some programs are designed to encourage continued land management in “less favored areas” (European Commission 2012). This means that in some parts of Europe a large part of AEM expenditure prevents land abandonment of land where farming would otherwise not be economically viable (Baylis et al. 2008).

*Forty four percent of EU water use is for agriculture.*

**WATER:** The water measures in the CAP policy are based on the high rate of water usage in agriculture. In the EU, 44 percent of water use is for agriculture, particularly in Southern European countries (European Commission 2012); as such agriculture is recognized as an area of interest in the protection of water sources. Causes of water quality issues at the forefront of this policy are the presence of pesticide residues, nutrient run-off from fertilizers, and soil erosion. Agri-environmental measures target farming practices aimed at preventing these sources of decreased quality. Water usage for irrigation is also a concern for the EU; however they recognize the value of irrigation for increasing agricultural production as well as contributing to the biodiversity of a region.

**SOIL:** AEMs targeting soil issues centre on preserving the productive capacity of soils in the EU. Factors contributing to soil quality issues include the use of “inappropriate farming practices such as unbalanced fertilization, the excessive use of groundwater for irrigation, improper use of pesticides, use of heavy machinery, or overgrazing” (EU 2012). The EU also points to the increased specialization of farming systems which has led to a decline in traditional crop rotation systems, including incorporation of legume plants in to the soils, as activities which have resulted in decreased productive capacity. Soil measures focus on increasing organic matter in soil, increasing the biodiversity of the soil, and reducing erosion, contamination, and compaction of the soils (EU 2012).

**NITRATES:** Related to water quality, the nitrates directive specifically deals with the reduction of nitrates in water as a result of fertilizer application. The nitrates directive was introduced in 1991 and involves monitoring of water quality as a result of agricultural production and the designation of “Nitrate Vulnerable Zones” as well as action programs for these zones above the codes of good agricultural practice (European Commission 2012).

**PESTICIDES:** Recognizing the potential health dangers of pesticides, the EU is considering a pesticides directive, similar to that for nitrates (European Commission 2012).

Within this program, a farmer commits him/herself for five years to apply environmental measures and receives an annual payment in return. One example is Bavaria’s KULAP program for the years 2011-2015. Under this program, converting agricultural land into grassland would result in a payment to the farmer of 400 euro/ha (CAD 560/ha) (STMELF 2011). Activities undertaken for AEM payments are above those required under normal good farming practices and do not normally result from the adoption of measures required to conform to environmental legislation. An interesting note is that because each Member State is responsible for calculating the costs of the income forgone from undertaking the activity, producers in two EU countries undertaking the same action can have different payment levels.

The Integrated Administration and Control System (IACS), which is designed to ensure that correct payments are made to farmers and that there is traceability of payments (FAO 2006), requires a minimum of 5 percent of all beneficiaries of AEM be inspected (Baylis et al. 2008).

### *The voluntary nature of AEM leads to more cooperation and a positive outlook.*

According to the European Commission (2005), the voluntary nature of AEM leads to more cooperation and a more positive outlook by farmers on their role in environmental stewardship. The flexibility of AEM to suit a variety of agronomic and environmental conditions provides more opportunities to introduce environmentally beneficial activities into agricultural production. AEM conforms to the WTO Green Box requirements, in that they only pay for additional costs or loss of income that result in undertaking the measures, and as such are not considered to be trade distorting subsidies (European Commission 2005).

Due to the variety of implementation measures and the long-term goals of some measures, results are difficult to measure short-term and require longer, disciplined monitoring and evaluation in order to determine the impact of AEM. According to Baylis et al. (2008), AEM do not “explicitly target measurable environmental outputs”. However, European countries conduct their own evaluations on how effective these agri-environmental measures are. The evaluations include farmer take up of the program, increase in biodiversity, and improvements in water and soil quality. In some areas these evaluations are based on actual scientific data, where specific quality parameters are measured during the time of the program. For other criteria, interviews with conservation officers and personnel who approve and enforce agri-environmental measures are used to measure program impact (Dickel et al. 2010).

AEM does have the potential to be production distorting. While the goal is to ensure greater environmental benefits as a result of land use they also must compete with the most profitable use of the land, thus the payment levels must be such that they attract farmers to undertake activities, but not so high as to overcompensate for these activities (European Commission 2005). While flexibility of the measures is beneficial, it also means that the implementation and adoption of AEM is highly dependent on the “wider contextual and institutional issues as well as attitudes” which are prevalent in the country (European Commission 2005).



## US Policies

The US has undertaken programs that aim at environmental goals since the early 1930s. These early programs were focused on prevention of soil erosion and maintaining soil quality (Baylis et al. 2008). Since that time US policy has expanded to take on new agriculture related environmental challenges. Current US environmental programs are a part of the Conservation Titles of the US Farm Bill. Similar to the EU, the US has adopted policies in order to comply with the WTO Green Box (Baylis et al. 2008). The Environmental Protection Agency is responsible for enforcing environmental regulation, while the United States Department of Agriculture (USDA) is responsible for agri-environment programs. In 2008, the office of environmental markets was established in response to the Farm Bill (USDA 2012a). This office supports the creation of environmental markets by building infrastructure, analysis, and education. For example, water quality markets in the Chesapeake Bay are one focus of the office.

*US policy tends to focus on negative externalities.*

US policies focus on the achievement of specific environmental goals, but leave producers largely able to choose their own methods to obtain them. Unlike policies in the EU, American agri-environmental policy tends to focus on the negative externalities created as a result of agricultural activities (Baylis et al. 2008). State level measures tend to address specific local concerns, also regarding negative externalities created by farming. US policies tend to be based on the view that there is a greater environmental value to having land in its natural state than in agricultural production (Baylis et al. 2008). The 2013 USDA budget includes \$6.2 billion for conservation programs (4 percent of its budget), with over 358 million acres of land enrolled in conservation programs. On the other hand, the USDA spends \$15.24 billion (9.8 percent of total budget) on commodity programs, and \$87.74 billion (56 percent) on the Supplemental Nutrition Assistance Program (SNAP, or food stamps).

There are 11 separate mandatory programs that promote the production of EG&S in the US, which are included in the US Farm Bill:

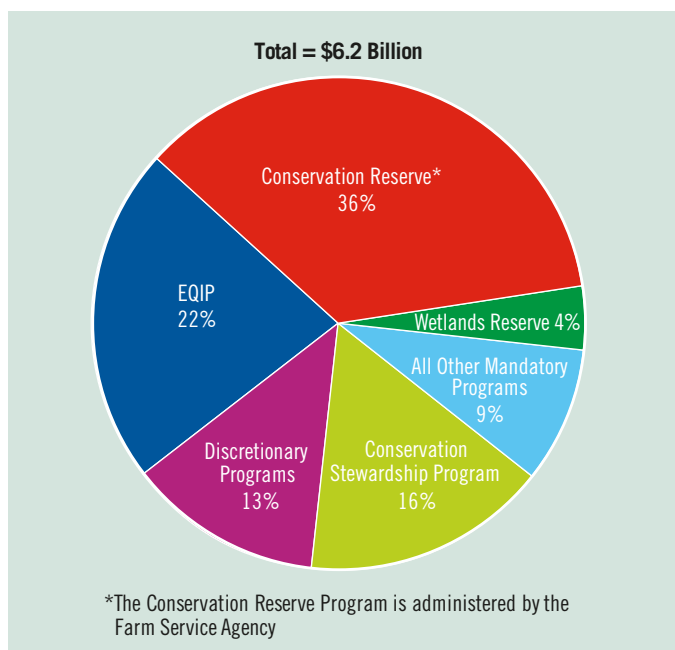
- Conservation Reserve Program and Environmental Quality Incentives Program (both discussed in detail below);
- Wetlands Reserve Program – pays producers to retire cropland which can be restored to protected wetlands;
- Conservation Stewardship Program – Replaced the Conservation Security Program in the 2008 Farm Bill. The program differs from the old program in that it provides incentives for new conservation activities on tribal and private agricultural working lands, whereas the Conservation Security Program funded ongoing conservation activities;
- Agricultural Water Enhancement Program;
- Farm and Ranch Lands Protection Program – Provides matching funds to state, tribal, or local governments and NGOs to keep productive farm and ranch land in agricultural use;
- Wildlife Habitat Incentives Program – provides financial and technical assistance to participants to develop habitats for wildlife. Focus on species of local, state, or national significance;
- Grasslands Reserve Program – Program helps landowners and operators restore and protect grasslands, including pasture land and other eligible land, while maintaining suitable conditions for grazing;
- Chesapeake Bay Watershed – provides assistance in conservation activities for producers within the Chesapeake Bay Watershed area. This program covers activities which improve the conditions of water quality or quantity and enhance and preserve soils, air, and other natural resources; and



- **Agricultural Management Assistance** – Provides financial and technical assistance to agricultural producers to address water quality, management, and erosion control through conservation. Currently available in 16 states.

The USDA also funds the Voluntary Public Access and Habitat Incentive Program, which provides grants to state and tribal governments to encourage producers to voluntarily allow public access to land for the purpose of “wildlife-dependent recreation”, which includes activities such as hunting and fishing (USDA-FSA 2011). Figure 4 shows the allocations for the 2013 USDA budget.

**FIGURE 4** USDA CONSERVATION SPENDING ALLOCATION, 2013



The influence of the farm lobby on the US Congress has limited the ability of government to direct agriculture policy towards greater environmental measures. For example, Baylis et al. (2008) note that motions were defeated in both the House and the Senate that would have shifted funding from commodity programs to conservation programs. The 2002 Farm Bill did achieve the expansion of conservation programs with both increased funding and the creation of two new conservation programs, but there was also an increase in funding for commodity programs.

Source: USDA, Fiscal Year 2013 Budget Summary and Annual Performance Plan.

An evaluation of the EG&S provided by the US agri-environmental programs is hampered by the same issue of measurability as in other countries. However the Conservation Effects Assessment Program introduced in the 2002 Farm Bill attempts to address the issue of quantifying the benefits of the suite of conservation programs.

***The farm lobby limits the ability of the US to enact conservation programs.***

## CONSERVATION RESERVE PROGRAM

The Conservation Reserve Program (CRP) is based on earlier soil conservation programs. CRP pays producers to take land out of production. Currently the cap on US farmland eligible for CRP is 10 percent of cropland. Thirty six percent of the 2013 Conservation Programs Budget is allocated to the Conservation Reserve Program. This covers enrolment of over 29 million acres.

The CRP is a competitive auction based program, which requires farmers to submit bids to include land in the CRP. CRP uses the Environmental Benefits Index (EBI) to determine the value of removing specific lots of farmland from agriculture (Baylis et al. 2008); this allows the government to evaluate the costs and benefits of allowing that parcel of land into the program. The complexity of the EBI calculation creates a large information requirement, which adds to the administration costs associated with the program. The competitive bid process inherently includes the opportunity costs of removing the land from production, while the limit on acreage into the program moderates bids, since higher bids are less likely to be the most cost effective. CRP contracts are between 10 and 15 years long. Enforcement is usually combined with other governmental agencies, such as the Natural Resources Conservation Service (NRCS). Farm agencies also make use of GIS technology; every two years field images are compared and any suspicious fields are subject to further investigation says Bryan Crook, a program specialist at the USDA (pers. comm.).

### ***CRP pays producers to take land out of production via auction.***

Baylis et al. (2008) show that CRP payments are highly correlated with direct government payments to producers. They show that if agri-environmental policies are used as a mechanism to provide subsidies to producers, then the same producers benefit from both CRP and commodity payments. CRP also increased the value of commodities by reducing the volume of domestic production. There is some debate as to whether this increase in commodity prices actually encourages cultivation of land that would have been in active production in the absence of CRP. However, the cost-benefit analysis that is used to determine which land is enrolled in the program keeps the most vulnerable land out of production by placing a much higher value on the environmental benefits of keeping it out of production. On the other hand, higher prices encourage farmers to undertake more intensive production on land that is not enrolled in CRP, potentially causing damage to the soil. Historically, the uptake on CRP declines when commodity prices are high, because the opportunity cost of enrolling the land increases. However, the length of the existing contracts usually exceeds periods in which high prices have prevailed, allowing for continuous conservation efforts.

## **ENVIRONMENTAL QUALITY INCENTIVES PROGRAM (EQIP)**

The EQIP program is designed with the intent of providing assistance to landowners facing “serious natural resource challenges that impact soil, water and related natural resources” (USDA 2012). The program provides financial and technical assistance to plan and implement conservation practices. The program also helps producers meet federal, state, tribal, and local government regulations. National priorities under the program are identified and funds are distributed to State conservationists, who, with advice from the State Technical Committee, identify state concerns and allocate funds to projects addressing these concerns.

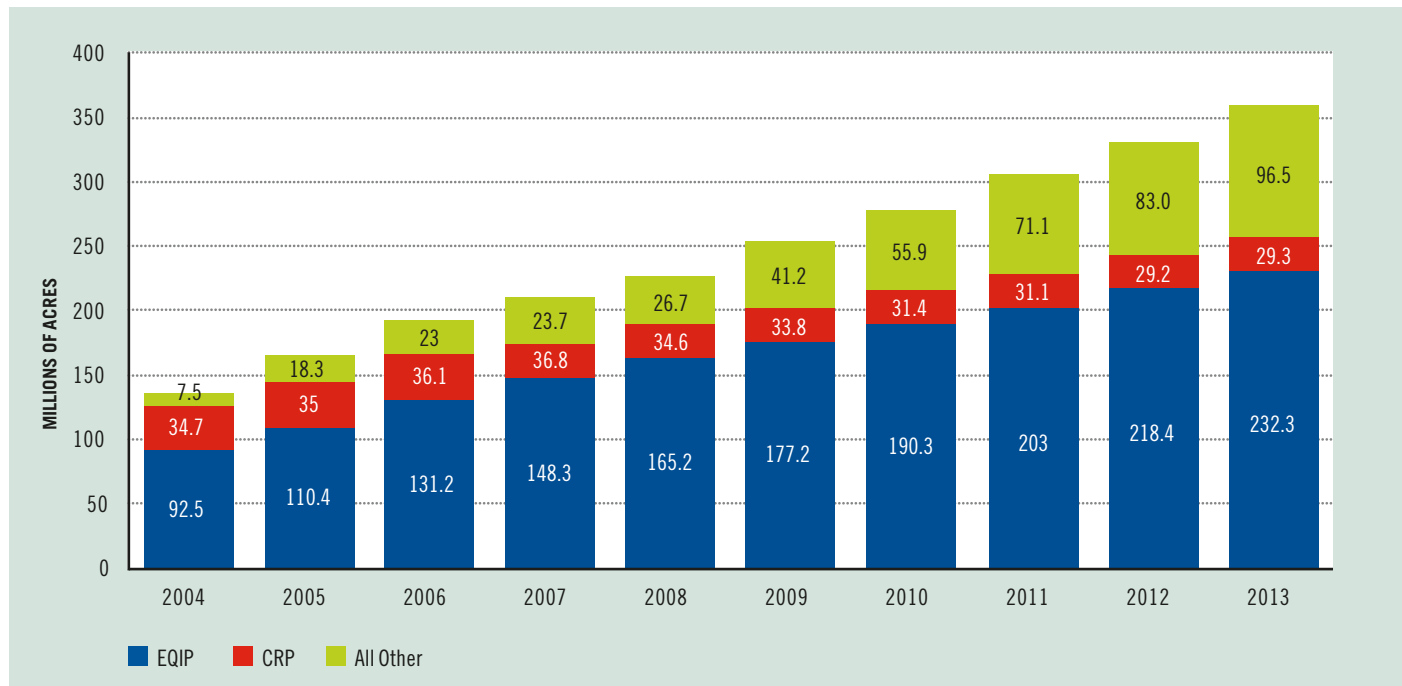
Producers submit a plan of operations, developed with the help of the Natural Resources Conservation Service, outlining conservation practices they intend to undertake. EQIP contracts can be obtained for periods as short as one year, with a maximum of 10 years. Similar to the CRP, an “offer index” is created for EQIP proposals that compares the environmental benefits for the amount of funding requested by the producer (Baylis et al. 2008). Funding is then provided to the proposals with the greatest index value. The USDA notes that the areas with the highest conservation benefits are typically found on small farms (USDA 2012). Payments are limited to \$300,000 for all contracts within a six year period, with some exemptions for socially disadvantaged farmers and ranchers as well as beginning and limited resource farmers and ranchers.

Five percent of EQIP participants who are self-certified as being a “Limited Resources Farmer, Rancher or Beginning Farmer or Rancher” are selected for random annual review. The penalties for lack of compliance

are stiff, including the repayment of any payments previously received and removal from eligibility of certain producer loan programs (Baylis et al. 2008).

EQIP is the largest USDA conservation program; it is also growing rapidly as shown in figure 5. Government expenditure for EQIP is expected to be \$1.4 billion in 2013, according to the USDA Budget, compared to \$2.2 billion for CRP.

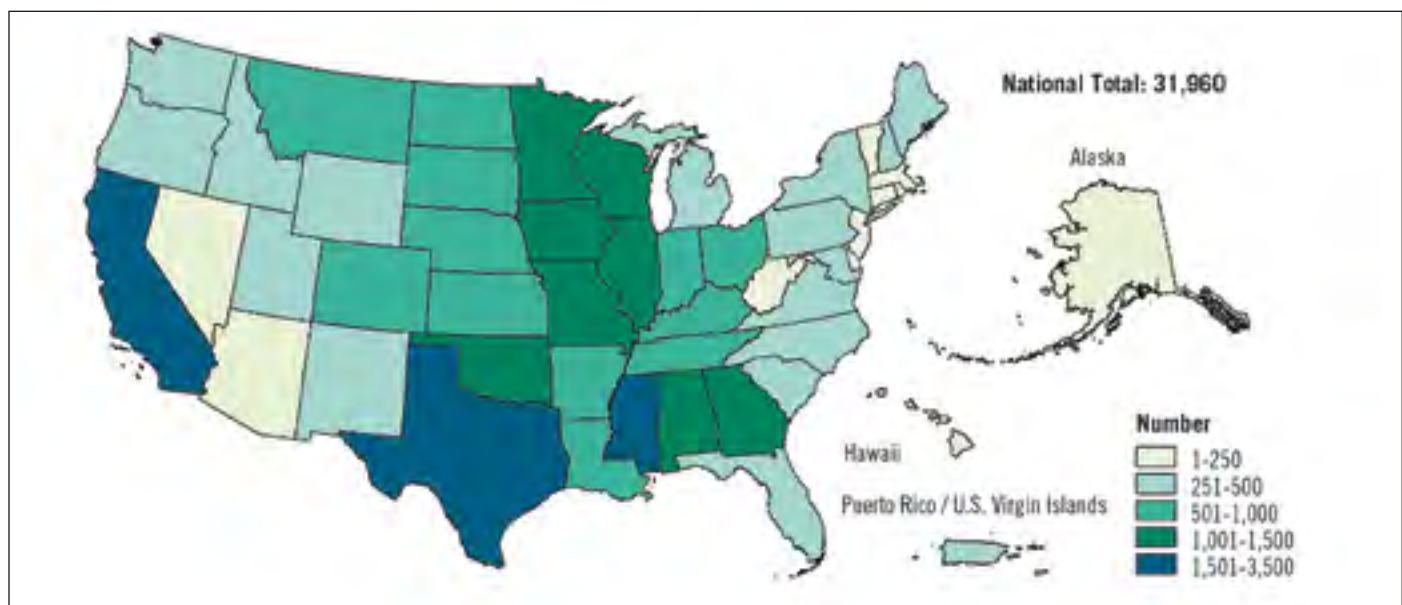
**FIGURE 5** USDA CONSERVATION PROGRAM ENROLMENT BY ACREAGE, 2004-2013



Source: USDA, Fiscal Year 2013 Budget Summary and Annual Performance Plan.

The number of EQIP contracts by state are shown in figure 6.

**FIGURE 6** NUMBER OF EQIP CONTRACTS BY STATE, 2009



Source: USDA, Natural Resources Conservation Service.



A project by Selman et al. (2008) compared the cost-effectiveness of EQIP to a reverse auction to reduce phosphorus in the Conestoga watershed in Pennsylvania. The reverse auction resulted in a sevenfold increase in cost-effectiveness of reduction of phosphorous runoff per dollar spent. With the reverse auction, some farmers that would have not been able to implement a practice under a cost share program were able to receive funding under the EQIP program. Furthermore, under the reverse auction program measures were ranked regarding their effectiveness. Hence, the measures with the highest efficacy were implemented. A virtual budget constraint was created because the total program expenditures under the reverse auction scheme were double those of EQIP. The actual reduction of phosphorous run off was not measured. These were computed with NutrientNet software.

## Australian Policies

Australia uses a number of market based instruments in order to promote the creation of EG&S (Rae 2007). These market based instruments are designed to either provide incentive for the creation of EG&S or to promote preservation of current EG&S (Rae 2007). Australia places significant emphasis on biodiversity conservation, as shown in the Biodiversity Conservation Strategy 2010-2030. Under market based instruments, land owners bid to supply the pre-determined environmental output. These tenders are ranked and the ones with the greatest benefits at the least cost to taxpayers win. Rae (2007) notes that valuing EG&S is difficult. This is explored further later in the paper, but market based approaches do at least allow producers to consider the costs that they themselves are willing to occur in order to receive funding.

### BUSHTENDER

BushTender is an auction program in the state of Victoria, which encourages management and protection of native vegetation. An ecologist determines a baseline by examining the current condition of the land and assesses the ecological value and significance of conservation of the land (Rae 2007). A visual assessment measures the attributes of the land, such as the number of “old” trees and the size and connectivity of the land to other natural areas (Rae 2007). Models are then created to examine the environmental impact of changing land use on hydrology, stream flow, carbon capacity, and biodiversity (Rae 2007). The producer and the ecologist then consider costs of undertaking measures to improve these outcomes. The producer is also provided with the costs of undertaking activities, as well as the cost associated with other tenders (Rae 2007). The BushTender program places high emphasis on transparent information. The producer can then submit a bid to enter the program.

***BushTender participants tend to continue conservation practices beyond the contract.***

Management agreements are for a length of five years. There is also an option for a five year management agreement with permanent protection (DSE 2011). The program also offers single site bids for individual producers or larger joint bids which allow for protection of amenities such as streams which may run through the properties of several owners (DSE 2011). A survey of BushTender participants indicated that many producers who receive funding from the program continue conservation practices beyond the tenure of their contract (Rae 2007). Producers complete an annual report revealing changes, improvements, and the current condition of the contract land. Payments are provided periodically as specified in the management agreement.

The program began in 2001, and 33,000 ha have been registered to the program since its inception (Australian Government 2012a). The 2009-10 trial took an outcome, rather than the traditional input, based approach

to conservation. The final results of this trial will be examined at the conclusion in 2014. The outcomes approach makes this version of the BushTender program more like the US CRP model than the EU model. Table 2 lists the opportunities and issues currently identified in the BushTender program.

**TABLE 2 OPPORTUNITIES AND ISSUES IDENTIFIED IN THE BUSHTENDER PROGRAM**

| Opportunities                                                                                                                | Issues                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Flexible for landowners                                                                                                      | Time consuming to design and implement                                                                                       |
| Easy to adapt to local circumstances                                                                                         | Environmental improvements are difficult to evaluate                                                                         |
| Effective use of public expenditures                                                                                         | More complex than traditional regulatory approaches                                                                          |
| Promising in areas of resource conflict                                                                                      | Market failure potential due to inadequate information                                                                       |
| Promising where there are substantial variations in compliance costs and where there are a relatively high number of bidders | Potential of market dominance by a few players                                                                               |
| Effective when actions and outcomes are homogenous                                                                           | Administrative intensity (contract development, monitoring and assessment of outcomes requirements, and public consultation) |
| More attractive to landowners than regulation                                                                                | Inappropriate design can exacerbate environmental issues                                                                     |
| Provides a means to value for public goods in land use decisions                                                             | Must ensure that the process is transparent and fair; build trust in the process                                             |
| Bidders reveal the true cost of compliance                                                                                   |                                                                                                                              |

Source: Rae (2007), after Stoneham (2002).

## CONSERVATION COVENANTS

Conservation covenants are permanent agreements with current and future landowners that define limitations, conditions, or restrictions on the use of land (Australian Government 2012b). The agreements are made with an authorized body such as a Covenant Scheme Provider, which may be a non-profit organization, government agency, or local body. Covenants are attached to the deed of the land. Under specific programs, producers involved in conservation covenants are eligible for tax concessions. These tax deductions amount to the difference in value of the land before and after entering into the covenant.

## SUMMARY

The summary of the programs in the EU, US, and Australia has shown that each of their environmental and EG&S programs are based on the historical development of their respective agricultural policy and specific environmental problems.

There are some important differences between the programs. While the US and Australian programs are more focused on reducing negative externalities, the EU program promotes positive externalities and the reduction of negative externalities produced by intensive farming. Furthermore, the funding of environmental programs in the US and in Australia is based on specific outcomes, whereas in the EU it is typical for payments to be made to producers adopting technology or processes which are considered to be environmentally friendly, regardless of whether the intended environmental service is actually produced (Baylis et al. 2008).

The US and Australian programs are mainly targeted towards sensitive areas and marginal land and have a more narrow view on conservation, while the EU programs consider consumer and taxpayer perception of agricultural landscapes and production. Baylis et al. (2008) also note that the requirement that land be kept in good agricultural condition may not result in the optimal production of EG&S; for example,



afforestation may actually provide greater benefit in some areas. Another problem with the EU approach is that the countries that create the largest externalities are not necessarily the ones who are receiving the largest share of AEM funding. At the same time, countries receiving the largest overall agricultural subsidies are not the ones with the greatest AEM expenditure (Baylis et al. 2008).

All programs have mechanisms for dealing with non-compliance but it appears that most are reluctant to undertake the costs associated with monitoring, measurement, and enforcement. BushTender has very high administrative costs relative to the US or EU programs because there is a large amount of work to be done to assess the current state, prior to a producer even deciding to submit a bid. Reverse auctions may require more administrative costs. However, it is likely that it results in even more efficient spending in terms of results per dollar spent.

The Canadian programs are more dispersed and provide incentives that are publicly and privately funded. The ALUS program appears to be a mix of elements of the EU and US program in that it encourages the implementation of environmental practices, regardless of the degree of service arising, or the true economic value associated with that level of service. However, it does target marginal lands. Payments are based on the implementation and opportunity costs rather than on the actual costs.

## Prospective EG&S Policy Approaches

**T**his section evaluates the prospects for alternative EG&S approaches to be adopted in Canadian agri-food policy.

### Cross-Compliance

As referred to above, the EU's scheme of cross-compliance is sometimes suggested as a way to ensure farmers produce EG&S or to use it as a means to provide farm income support, while being in line with international trade agreements. This section considers the prospects for a similar scheme in Canada.

Cross-compliance conditions require farmers to comply with existing regulations and standards to maintain land in good agricultural and environmental condition (OECD 2010). Producers are required to meet these minimum standards prior to receiving farm payments. Baylis et al. (2008) note that cross-compliance and additional agri-environmental measures have been introduced by government to decrease or prevent farmer discontent with "externally-imposed environmental regulations". That is, producers are more willing to accept the measures if they perceive that they are being compensated for them. According to Fox and Ramlal (2006), compliance with environmental programs above the legislated standards is largely a voluntary process in Canada. One example is the environmental farm plan (EFP). The EFP is a confidential and voluntary process in which individual farmers identify risk and benefits from their farming operation and then develop an action plan to address identified environmental risks. The EFP is often used as a prerequisite to funding programs for BMPs, such as endangered species cost recovery or the National Farm Stewardship Program.

*Compliance above legislated standards is largely voluntary in Canada.*

In order to understand the prospects for cross-compliance mechanisms, one must understand the incentive effects. This, in turn, requires an understanding of the underlying program that makes farm payments. In

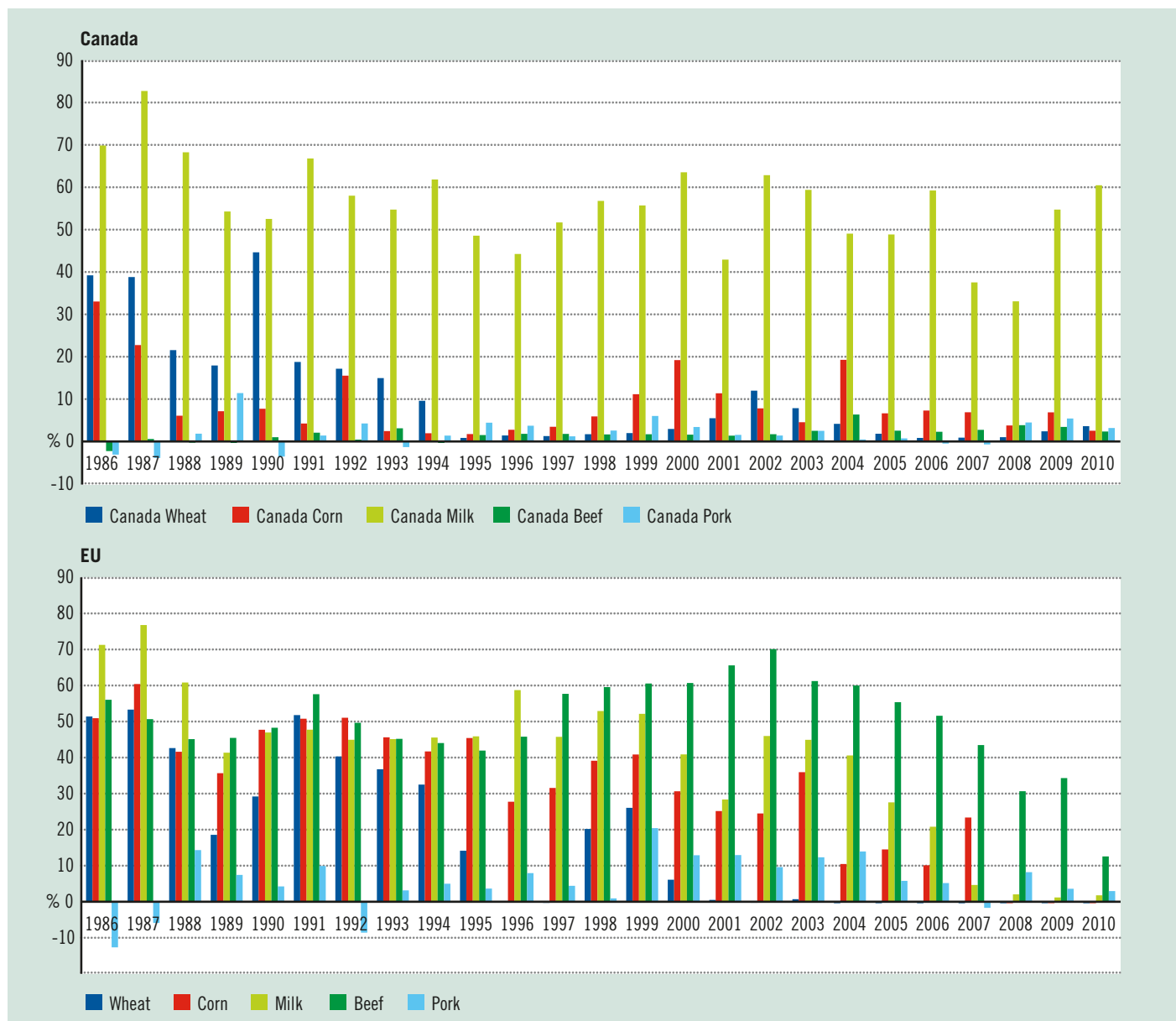


general, the incentive to cross-comply will be stronger the greater the level and certainty of the payment that it is tied to. If the benefit of the underlying farm program is fixed and large, then the effective cost of failing to cross-comply is tangible and farmers will be more inclined to carry out cross-compliance measures. Conversely, if the nature of payments from the underlying farm program is such that the payments are uncertain, and may only be small in size, then the effective benefit of cross-complying may be perceived as small.

In the EU, cross-compliance is linked to the single farm payment. This program is actually an amalgam of past commodity specific programs, which offers material payments to farmers based on past crop specific payments. In Canada, significant crop specific payments are limited to supply managed products (milk, eggs, and poultry) and the principal program that makes payments to farmers (AgriStability) is whole farm in nature.

Figure 7 shows single commodity transfers (SCT) for major commodities in both Canada and the EU, representing the value of agricultural policy to each specific product.

**FIGURE 7 PERCENTAGE PRODUCER SUBSIDY EQUIVALENT – SINGLE COMMODITY TRANSFERS, 1986-2010**

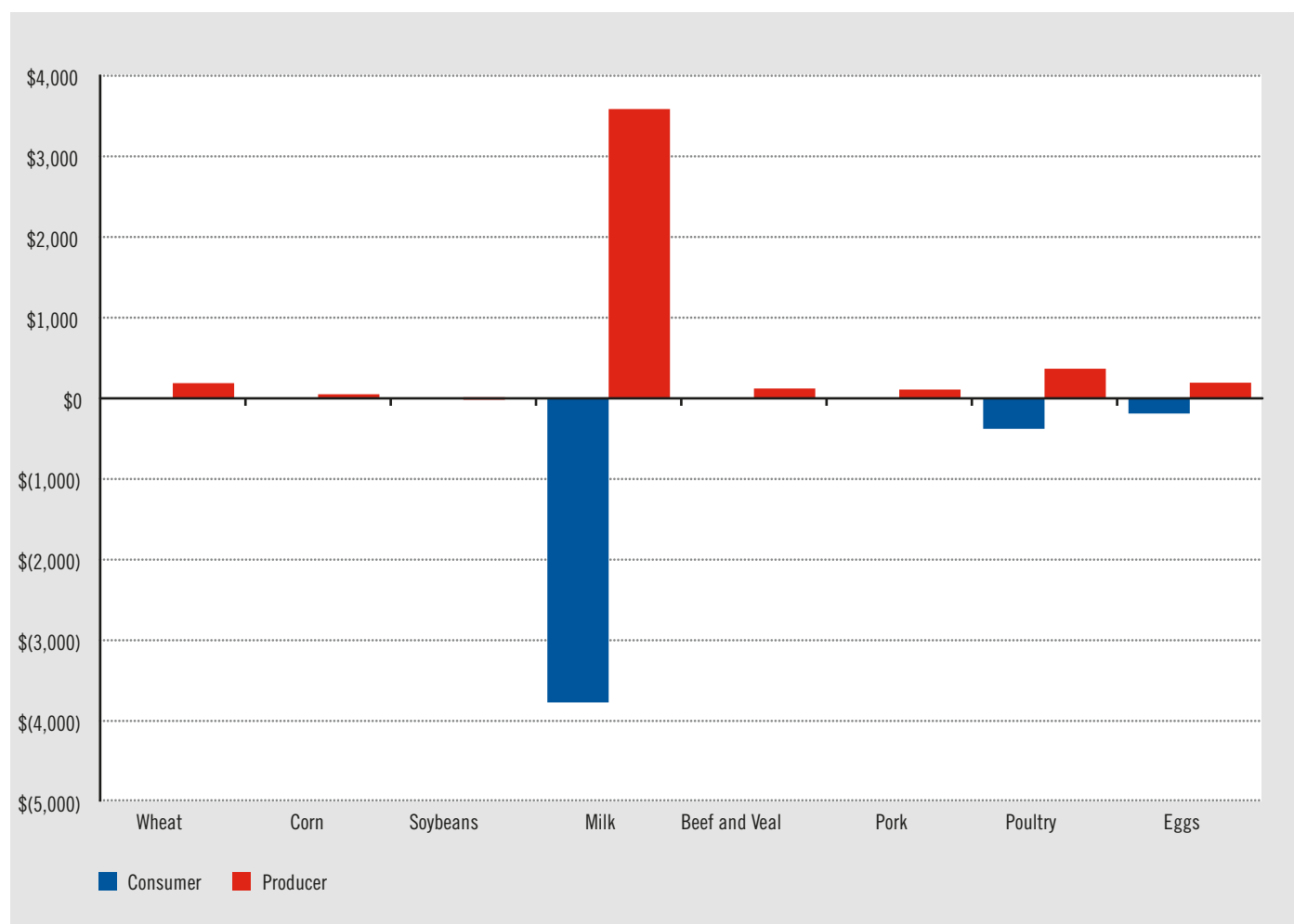


Source: OECD.

The figure shows that up to the mid-late 2000s the SCTs for the EU were at least 10 percent and regularly more than 30 percent of the producer subsidy equivalent (PSE) for almost all commodities. Traditionally, the EU program has been comprised of commodity specific programs. However, this has been declining over the years, as the EU has switched to decoupled farm payments, as shown in the graph above. For Canada, the only commodity that consistently has high SCTs is dairy.

The monetary PSE and CSE (consumer support estimate) are, respectively, an OECD indicator of the support to producers due to protective policies, and the value of gross transfers to consumers of agricultural commodities due to agricultural policies. Figure 8 shows that consumers are paying for the increased prices of supply managed commodities.

**FIGURE 8 CONSUMER AND PRODUCER SINGLE COMMODITY TRANSFERS, 2010 (CDN MILLION)**



Source: OECD.

The EU single farm payment scheme facilitates the implementation of cross-compliance because, by nature, the program is an entitlement program. Under entitlement programs, payments are known in advance and made on a non-contingent basis; thus, the incentive effect of a cross-compliance requirement is powerful as the cost of non-compliance is clear (and in the case of the EU Single Farm Payment, material). Farm programs in Canada, for the most part, are not entitlement programs; they are stabilization or risk-sharing programs.

## ***Canadian farm programs are mostly stabilization or risk-sharing programs.***

In Canada the AgriStability program is the principal stabilization program, along with crop insurance. AgriStability is a whole farm contingent program with commodity exclusions for supply-managed products. Crop insurance programs exclude livestock. Under either AgriStability or crop insurance, payments vary by year according to individual conditions. Hence, with AgriStability, even though average payments per farm are fairly high and rising, farmers do not know what their payments will be in advance and cannot plan for the payments. Therefore, the incentive effect of cross-compliance in a contingency based program must be less than under an entitlement program. The cost of non-compliance in a contingent program is being excluded from future payouts if they occur; the cost of non-compliance under an entitlement program is much more tangible.

The cross-compliance measures in Canada would be a better fit with entitlement programs, such as AgriInvest. Under AgriInvest, farmers can contribute to a fund up to a certain proportion of eligible sales, and receive a matching contribution from government. Thus, producers know precisely the value of benefit from the program, and thus the cost of non-compliance.

## **Securing Natural Capital**

Olewiler (2008) argues that by attaching a price on natural capital, this can be secured by a number of different market-based instruments. Because there is no monetary value attached to EG&S, it is degraded on an ongoing basis. Olewiler (2008) named five factors that contribute to the degradation of Canada's natural capital:

- Markets fail to appreciate the true value of natural capital.
  - There is a lack of information on how human activity impacts EG&S flows.
  - Policies promote inefficient use of natural capital (non-renewable resources).
  - Financial constraints on local governments make them unable to support conservation efforts.
  - Public decision makers lack long-term planning ability to ensure that there is investment for the future.
- Olewiler presents a national conservation plan as a necessary condition for securing natural capital throughout the future.

## ***Olewiler proposes a conservation plan and taxes to secure natural capital.***

Olewiler proposes a conservation plan for Canada to assess the currently existing natural capital and the depletion rate. It is suggested that the federal government begin collecting data in order to produce natural capital indicators and to standardize approaches for estimating target levels for security of natural capital. Several governments, conservation groups, and research institutes are involved in such data collection; unfortunately a lack of coordination and comprehensive models reduces the value of their efforts. Pilot programs implemented in selected regions are recommended to analyse the success rate of alternate policies on the sustainability of ecological goods and services.





Along with a conservation plan, Olewiler proposes that the federal government reward activities promoting the preservation of the value of natural capital by increasing taxes for activities that degrade natural capital. A new carbon and air pollutants (CAP) tax is strongly preferred, although a portion of the GST could be rebranded as a “conservation tax”. Nonetheless, Olewiler believes that with adequate communication, Canadians could come to support these types of environmental policies.

Lastly, provincial incentive-based policies are proposed in order to increase security of natural capital throughout cities and towns. Provincial and territorial governments would require municipalities to introduce tradable development rights (TDR) or development impact fees. A major benefit of the proposed policies is that they would be self-financing, thus minimizing pressures on the government to provide such funds.

## **MANITOBA CATTLEMEN ENVIRONMENTAL AND RURAL STEWARDSHIP REMUNERATION FOR AGRICULTURE IN MANITOBA PROPOSAL**

A 2008 proposal developed by The Manitoba Cattlemen (now called Manitoba Cattle Producers Association) focuses on the problem that current market signals are promoting transition from wetlands and perennial green cover to land in agricultural production and argue that remuneration for EG&S activities must be available to offset these signals. Therefore, they argue that it must be recognized that some agricultural activities create EG&S and that any remuneration program must recognize this on the basis of different land uses, adoption of beneficial management practices, and other agri-environmental measures. Programs to encourage EG&S must be flexible to allow producers to make farm level adjustments for changing circumstances. Programs must also recognize existing EG&S activities that are undertaken and not simply reward new beneficial practices or enhancements. The Manitoba Cattle Producers Association proposed in 2008 an Environmental and Rural Stewardship Incentive Program (ERSP) to provide remuneration to producers who undertake activities which create EG&S.

*Current market signals encourage agricultural production over preservation.*

Core principles of the proposed ERSP:

- Must provide financial incentives to provide maximum multi-functional (commodity, EG&S, and social goods and services) production.
- Participation must be voluntary and flexible in allowing producer to choose on-farm mix of production methods and outputs.
- Provincial government will be purchaser of ecological and social goods and services.
- A third party will provide assessment, certification, compliance reporting, and other on-farm monitoring.
- Remuneration must account for both new and existing farm activity.
- Payments must be tied to scientifically demonstrated outputs that provide ongoing benefits to the public.
- Must be flexible enough to adapt to changing scientific development and research.
- Some coverage should be available to producers leasing agricultural Crown lands, to reflect the labour component of environmental and rural stewardship.

Under the proposal, payments would be made based on a non-use index. The MCPA proposes using values from an Olewiler (2004) study which estimated the benefits of natural capital on a per hectare per year basis,

to estimate the on-farm agricultural impact based on various activities. Once activities have been evaluated, the farm operation would be assigned a tier and remuneration would be paid based on the tier in which the whole farm activities fall.

## Critique of the Natural Capital Approach

One ongoing debate in the payment for EG&S is the distinction between “polluter pays” and “beneficiary pays” systems. There has been a shift from seeing farmers and other land users as polluters to seeing them as service providers of EG&S as part of their production (Van Hecken and Bastiaensen 2010). This shift is evident in government policies in other jurisdictions discussed in this paper, which provide payment to agricultural producers for the EG&S they provide.

Kosay and Corbera (2010) note that attempts to value ecological activities “simplify the complexity of natural ecosystems”. They argue that assigning value to a particular environmental attribute or function does not account for the complex natural interactions which occur within the environment. This argument holds that the value of the same ecological good in one location differs from that of the same good in another location on the basis of the interactions between it and the rest of the surrounding environment. Applying values to EG&S results in a trade-off between scientifically measurable outcomes and simplification to allow for valuation. The interaction of ecosystem elements also complicates the valuation of EG&S in that a change in a single function may not produce the desired environmental effects (Kosoy and Corbera 2010). Bundling of ecosystem services may help to alleviate this somewhat, however the rival nature of some elements in the ecosystem will still result in prioritizing specific EG&S over others.

***Applying values to EG&S results in a trade-off between measurable outcomes and simplification.***

Spangenberg and Settele (2010) argue that the two prevailing concepts for valuation of environmental services, biophysical accounting, and economic valuation based on consumer preferences both leave out important considerations. Biophysical accounting fails to account for human willingness to pay, while economic valuation often fails to account for the biophysical elements.

Parallel markets created to deal with the non-market benefits of EG&S in market based approaches are described as “potentially more ecologically effective and efficient per unit of funding than other non-market alternatives such as government regulation, voluntary community-based approaches, or educational approaches” (Van Hecken and Bastiaensen 2010). This description reveals a number of questions which remain at the heart of the debate surrounding EG&S.

Using market based approaches to counteract a market failure may still not capture the full range of environmental concerns due to additional market failure. Many market based approaches rely on governments or semi-public agencies (NGOs, conservation organizations, development agencies) to organize demand for EG&S (Van Hecken and Bastiaensen 2010). This often results in these agencies actually setting prices. This price setting masks the individual willingness to pay for EG&S. Some authors argue that the externality framework, which provides for the PES approach, is flawed. There is a feeling among some authors that using payments to providers of EG&S as a solution to environmental problems is only one part of the issue and that a broader approach is necessary to truly deal with environmental issues (Van Hecken and Bastiaensen 2010).



## Observations

The two approaches to new EG&S programming in Canada considered in this section contain significant challenges. Implementing a cross-compliance scheme using the current set up would be difficult in Canada. With a margin-based safety net program like AgriStability, the incentive effect of cross-compliance is mitigated, because the forgone program benefit from non-compliance would be contingent upon margin outcomes extending out into the future, which cannot be known in advance. The prospects would be improved under an entitlement program like AgriInvest. More broadly, a cross-compliance initiative tied to Canada's BRM programs would be distortionary because of the exemptions for supply management and the focus of insurance programs on crops (rather than livestock). This differs from the EU history of comprehensive commodity-based payments that form the basis for entitlements in which cross-compliance can have powerful incentive effects. In addition, it would spur developing livestock performance insurance.

*Implementing cross-compliance would be difficult in Canada.*

Several governments, conservation groups, and research institutes are involved in data collection to assess the value of natural capital in Canada. For example, there is some effort to collect data and produce natural capital indicators at Statistics Canada (2012). In addition, Environment Canada also hosts the "Environmental Valuation Reference Inventory" which is a searchable database of over 2200 EG&S valuation studies (see [www.evri.ca](http://www.evri.ca)).

However, the lack of coordination and comprehensive models reduces the value of their efforts (Olewiler 2008). Currently there is no national approach in collecting data to produce natural capital indicators and to standardize approaches for estimating target levels for security of natural capital. A number of EG&S values have been estimated, which vary considerably between regions (Hotte et al. 2009; Wilson 2008; Anielski and Wilson 2009). This is partly due to the fact that different regions contain different types of land cover in different ratios.

Perhaps the biggest limitation of the natural capital approach is that these values cannot be readily generalized. The value of a particular form of natural capital in a given region where it is scarce or embodies a certain cultural heritage will not be the same as it would be elsewhere where it is more plentiful or is not culturally important. Preferences are not linear in nature.

## Conclusion

The summary of current efforts and programs shows that there is increasing interest in acknowledging the agricultural sector's role in producing EG&S. The concept of policies to enhance the production of EG&S has started to gain more prominence in the past decade in Canada. Election campaigns in the fall of 2011 across the country have demonstrated that the topic of EG&S is top of mind for public policy, at least at the provincial level. Parties in Manitoba and Ontario specifically mentioned EG&S, while parties in other provinces mentioned environmental policies, including investment in agriculture stewardship and water protection, which may develop into programs that produce EG&S, depending on the specific details of policies that are implemented. Examples mentioned on the campaign trail last fall were the expansion of existing ALUS (Alternative Land Use Services) pilot programs, and implementing EG&S programs to protect wetlands and riparian areas.

*There is increasing interest in agriculture's role in producing EG&S.*

## **Incentives for Environmental Protection**

The first objective of this paper was to review the incentives for rural environmental protection in Canada and to compare them with those in the US, EU, and Australia. The Canadian programs are more dispersed and provide incentives that are publicly and privately funded. The ALUS program appears to be a mix of elements of the EU and US programs in that it encourages the implementation of environmental practices, regardless of the degree of service arising or the true economic value associated with that level of service. However, it does target marginal lands. Payments are based on implementation and opportunity costs rather than on the actual costs. There is a range of environmental programs in Canada that are seldom discussed within the EG&S context that do support best management practices.

While ALUS appears to be a successful grassroots approach to encourage the production of EG&S, it should not be viewed in isolation. ALUS can be and is combined with a number of existing programs. So far, remuneration for EG&S has only been dealt with in pilot programs, exposing it to only a small fraction of farmers. In PEI, ALUS has been implemented as a province-wide program.

*Measurability of the effects of EG&S programs is imperfect.*

One of the common themes that appear across programs that aim at the increase of EG&S production is that measurability of effects is imperfect. Programs generally measure uptake, which amounts to whether the program funding was spent. There appeared to be little evidence of programs that attempted to measure the actual levels of desired EG&S outputs before and after initiation of programs, although in some cases proxy measures were referenced. The difficulties and broad lack of effort in measuring EG&S is important in understanding how programs can and should be designed.

## **Assessment of Canadian EG&S**

The second objective of the paper was to provide an assessment of Canadian EG&S proposals and prospects. Two common recurring themes, the adoption of a European environmental scheme and the natural capital approach, were discussed in more detail, since a number of publications have already analysed EI approaches to enhance EG&S production. The discussion showed that Canada has a multitude of programs in place that do not even remotely compare to the setup of single farm payment schemes in the EU. The AgriStability program is margin based and its payments vary by year. AgriInvest, an entitlement program, is a better candidate for cross-compliance. However, more generally, a cross-compliance initiative tied to Canada's BRM programs would be distortionary because of the exemptions for supply management and the focus of insurance programs on crops rather than livestock. The incentive effect of cross-compliance in a contingency based program like AgriStability is likely to be much weaker than in a broad entitlement program such as the EU Single Farm Payment and the enforcement of a cross-compliance scheme would be fairly difficult.





## ***Future research may significantly change the value provided by EG&S.***

The valuation of natural capital as one way to remunerate farmers for the provision of EG&S has a number of limitations that need to be addressed with further research. The equivocal descriptions in environmental science journals shows that there is an ongoing debate within the scientific community about the value of different approaches in promoting and conserving natural capital. The difficulties in determining an appropriate value for EG&S also translate into even greater issues in providing appropriate cost-benefit analyses for public expenditure on environmental programs (Spangenburg and Settele 2010). As further research is conducted, the values of future costs and benefits provided by EG&S may change significantly.

## **Recommendations**

The third objective of the paper was to provide recommendations to encourage the production of EG&S in Canada. The following steps are fundamental to this goal:

### **THOROUGHLY EVALUATE PAST PILOT PROJECTS**

Assessments on the actual benefits of past programs are very limited. There are a number of issues that have not been evaluated sufficiently with the current pilot programs, such as the potential for capitalization of program payments into land values and the potential for spillover effects, such as intensified land use for cropping on non-enrolled land.

A fulsome evaluation of existing pilot projects is needed in order to move forward. This evaluation should identify any potential gaps, so that future pilot programs could be targeted at filling these gaps. In addition, evidence of negative side effects should be considered and future programming designed to mitigate these. In doing so, the inherent trade-offs should be considered. For example, it might be the case that tolerating leakages and spillovers due to EG&S programming may be better or less costly than incorporating mitigation instruments than not having any programs promoting EG&S production.

## ***Assessments on the actual benefits of past programs are very limited.***

More research is needed to develop approaches to quantify the environmental performance of measures implemented by farmers. Although this is not an easy task, it is a critical one, because any type of EG&S program must be cost-effective. In order to determine cost-effectiveness, more research is needed to evaluate the efficacy of these programs in terms of measurable environmental benefits.

### **INCREASE THE USE OF PILOT PROGRAMS TO APPLY LESSONS LEARNED**

Pilot programs can provide valuable research input for the development and refinement of practices and programs that increase the production of EG&S. They allow for experimentation and learning from alternative approaches, which is important given the complex nature of the subject matter.

Given the context, it is likely that measurement of EG&S program results will be challenging, so it is important that programming be flexible to foster learning by doing. This suggests a decentralized approach in which a critical element is the observation of effects. For example, a more “national” approach could occur using a range of pilot programs across the country, in which observations can be compared so that learning over time can occur. This is broadly inconsistent with an omnibus natural capital approach.

## **GROWING FORWARD 2 AS AN OPPORTUNITY**

Growing Forward 2 provides a framework that offers the opportunity to experiment at provincial levels with variations in EG&S programming. A bottom-up decentralized initiative should be developed to allow for different targeted measures to enhance EG&S production at the provincial level.

Canada’s agri-food policy lacks a broad entitlement nature, such as that in the EU, from which incentives for cross-compliance could be leveraged. This need not limit EG&S policy development in Canada; rather, decentralized pilot initiatives with a focus on follow up measurement can establish over time what types of programming work best. This approach presents the prospect of laying out a process in Canadian EG&S policy that can evolve and improve with experience.

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The George Morris Centre (GMC) is an economic agri-food research institute based in Guelph, Ontario. The centre specializes in providing independent economic research to the agriculture and food industry. Research at the GMC focuses on five central research areas: Market Analysis, Economic Policy, Agribusiness Management, Economics of Food, Health and Sustainability, and Value Chain Management. The Centre’s clients and members include industry associations and individual farms and corporations as well as government agencies.

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# Appendix

Federal/provincial/territorial combined expenditure in agri-food, \$ thousand

|                                | 2004-05   | 2005-06   | 2006-07   | 2007-08   | 2008-09   | 2009-10<br>Preliminary | 2010-11*  |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|------------------------|-----------|
| Operating Expenditures         | 1,948,224 | 2,045,172 | 2,184,094 | 2,322,433 | 2,309,383 | 2,437,956              | 2,395,460 |
| Capital Expenditures           | 118,279   | 157,342   | 163,804   | 137,203   | 166,958   | 183,088                | 187,324   |
| Program Expenditures           | 5,203,338 | 5,758,853 | 5,455,127 | 5,291,753 | 4,911,232 | 4,719,913              | 4,737,388 |
| Income Support & Stabilization | 1,995,475 | 2,353,756 | 3,255,982 | 2,343,033 | 2,046,974 | 1,704,719              | 1,732,998 |
| Ad hoc and Cost Reduction      | 1,210,663 | 1,017,256 | 151,770   | 545,535   | 400,642   | 78,988                 | 339,917   |
| Production Insurance           | 568,518   | 590,945   | 589,191   | 614,692   | 858,915   | 813,263                | 774,333   |
| Financing Assistance           | 81,934    | 82,823    | 108,413   | 135,400   | 98,148    | 346,754                | 269,251   |
| Storage and Freight            | 20,775    | 16,922    | 7,342     | 2,189     | 8,070     | 2,502                  | 1,445     |
| Social and Labour              | 16,088    | 17,386    | 20,857    | 21,098    | 29,499    | 30,414                 | 28,071    |
| Research                       | 87,599    | 135,267   | 158,514   | 247,440   | 130,974   | 164,826                | 182,736   |
| Food Inspection                | 130,290   | 76,437    | 71,444    | 166,857   | 110,157   | 104,174                | 134,644   |
| Food Aid                       | 420,332   | 434,825   | 471,352   | 432,435   | 618,528   | 939,379                | 667,143   |
| Marketing and Trade            | 210,682   | 584,153   | 115,611   | 120,811   | 80,223    | 116,088                | 99,017    |
| Rural and Regional Development | 229,590   | 155,535   | 167,852   | 157,082   | 151,811   | 123,732                | 188,823   |
| Environment                    | 96,377    | 125,133   | 151,236   | 252,793   | 160,638   | 92,849                 | 121,649   |
| Education                      | 104,799   | 126,704   | 121,136   | 144,403   | 137,047   | 134,597                | 133,849   |
| Extension                      | 30,216    | 41,712    | 64,427    | 107,986   | 79,607    | 67,628                 | 63,510    |
| Tax Expenditures               | 403,203   | 465,001   | 489,827   | 387,284   | 379,393   | 394,050                | 405,064   |
| Sub-Total Gross Expenditures   | 7,673,044 | 8,426,369 | 8,292,852 | 8,138,672 | 7,766,966 | 7,735,007              | 7,725,235 |
| Recoveries                     | -343,279  | -349,611  | -379,405  | -467,643  | -484,729  | -444,191               | -456,284  |
| Total Net Expenditures         | 7,329,764 | 8,076,758 | 7,913,447 | 7,671,030 | 7,282,237 | 7,290,817              | 7,268,952 |

\*estimates

Source: AAFC, Farm Income, Conditions and Government Assistance Databook, 2010.

## Endnotes

- 1 The term ecological goods and services is often used interchangeably with environmental goods and services. Environmental goods and services has been used by the OECD (2005) and Statistics Canada (2008) to refer to man-made products, processes, and technologies that improve the environment. This paper will refer to ecological goods and services.
- 2 Wildlife is held in trust for the people by government (mostly provincial government).
- 3 Stacking can be either  
Horizontal – when one management practice affects non-spatially overlapping areas, i.e., a farmer receives nutrient credits and carbon credits for planting trees on his property, where some of the trees are located along a stream.  
Vertical – when one management practice affects spatially overlapping areas, i.e., a farmer plants a forested buffer strip and receives both carbon and nutrient credits (for the same area).  
Temporal – this occurs when a landowner first receives funding to implement a buffer strip for nutrient credits and then, later on when a carbon market develops, receives carbon credits. Horizontal stacking is probably the least and temporal stacking the most controversial (Cooley and Olander 2011).



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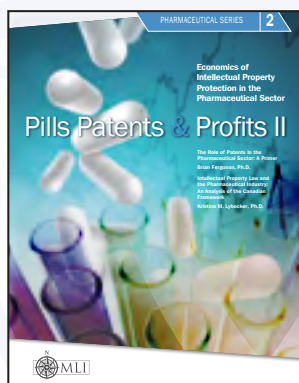
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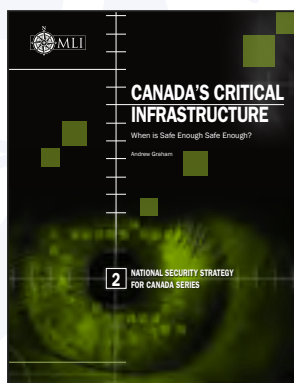
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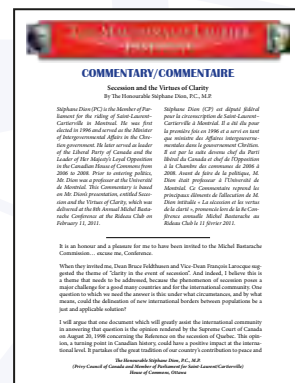
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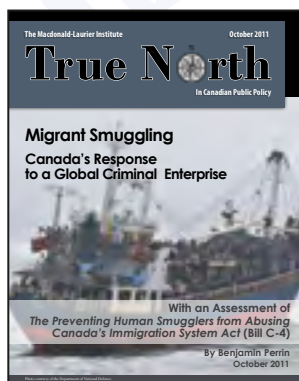
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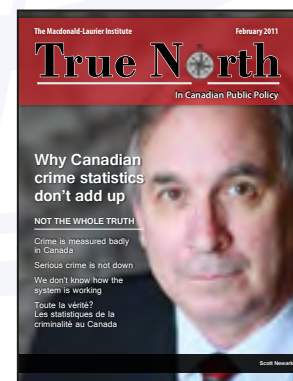
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