

Remuneration for ecological goods and services produced by agriculture



Elements for a
Quebec analysis

**REMUNERATION FOR ECOLOGICAL GOODS AND
SERVICES PRODUCED BY AGRICULTURE :
ELEMENTS FOR A QUEBEC ANALYSIS**

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2 Overview

The purpose of this document is to provide a starting point for the discussions that are beginning on the possibility of providing remuneration for ecological goods and services generated by agriculture. It examines this issue from the point of view of related public policies.

This research project responds to the need, among other things, for documenting a new type of agri-environmental approach that is beginning to be studied in some regions of Canada. This approach has been a subject of discussions and presentations during federal-provincial administrative meetings. Referred to as Alternate Land Use Services (ALUS) in some projects, it aims to provide a forward-looking approach to environmental protection in agriculture. It is based on the notion of remuneration for the production of ecological goods and services (EG&S).

This concept is based on the following premise: *agricultural producers produce or can produce positive externalities (positive ecological services) that benefit society as a whole, such as the purification of water or maintenance of biodiversity. Owners of the agricultural land in question should therefore be compensated for producing public goods.*

Another objective of this study is to illustrate the various programs established in Western countries based on the multifunctionality of agriculture, which is closely tied to the notion of EG&S. In addition, it aims to clarify the two concepts in order to understand their interrelatedness and distinguish program structures associated with them. Lastly, certain public policy issues that should be taken into account when considering the implementation of remuneration are discussed.

The document is structured as follows: the concepts of EG&S and multifunctionality are presented first, followed by mechanisms for maximizing EG&S outputs. Next, it suggests some characteristics of remuneration methods. Thirdly, examples of programs in the United States and Europe that compensate producers for providing EG&S are described, followed by potentially similar Canadian programs. Lastly, the programs in question are characterized and compared and the key questions that must be addressed in analyzing the issue are described.

Multifunctionality and ecological goods and services

The debate over ecological goods and services (EG&S) can be seen as part of the debate over multifunctionality. The multifunctional approach recognizes the different economic, environmental and social functions of agriculture and, in the broad sense, multifunctionality attempts to increase the value of the various types of agricultural outputs. In this sense, the idea of compensating producers for the production of EG&S can be considered as a partial application of the concept of multifunctionality. EG&S represent the transformation of natural elements into functions useful to human beings, and can include such things as soil erosion protection, water purification, climate regulation and the maintenance of biodiversity. Some authors consider certain activities that limit or control pollution or harmful practices as ecological services. However, there is a divergence of opinions on this issue and the distinction between these two ways of viewing EG&S is often hazy.

Maximizing EG&S outputs

A number of policy tools are used to maximize the production of EG&S, including the following:

- Regulatory approach;
- Cross-compliance;
- Environmental marketing (certification, eco-labels, etc.);
- Voluntary approach (extension, consultation, etc.);
- Market-based approach (taxes, fiscal tools, tradable rights and offset credits, etc.);
- One-time direct payments;
- Ongoing direct payments.

The first four approaches are well known, and are commonly used in Quebec. The market-based approach, which is rare here, covers a large range of tools ranging from coercion to remuneration and includes taxes on pollution as well as tax credits for beneficial activities. One-time direct payments are widely used to achieve agri-environmental objectives, mainly through the Prime-Vert program. Other types of one-time payments used to provide remuneration for EG&S are uncommon here, however. They include, for example, conservation agreements, which provide the landowner with a lump sum in exchange for maintaining the property in a natural state, or incentive payments made in exchange for the adoption of certain practices. Ongoing direct payments are usually provided under government programs offering recurring support for the production of goods and services other than agricultural commodities, and are not used to any significant degree in Canada. The objectives of these programs may vary, from improving and enhancing the landscape to protecting the environment. *Ongoing direct payment programs associated with multifunctionality provide payments that result in the provision of goods and services other than agricultural commodities as an ongoing source of income for producers.*

Remuneration for EG&S

Remuneration for EG&S is often presented as an alternate way of viewing agri-environmental payments. It is based on the possibility of buying, selling and therefore providing remuneration to the producer for “environmentally responsible production.” The regulatory, cross-compliance and voluntary approaches do not remunerate producers for EG&S. Environmental marketing can generate value added for this type of production, but remuneration is often indirect, since the value added is associated more with the agri-food product than the provision of an ecological service. Programs offering one-time payments as a cost-sharing measure to help producers adopt beneficial practices—although they help significantly in increasing EG&S outputs—do not

constitute remuneration for EG&S. Some one-time direct payment programs, such as those based on the purchase of land development rights, may be akin to remuneration for EG&S.

We propose that, to constitute remuneration, payment programs must meet both of the two following main criteria and at least one of the secondary criteria listed below:

- Main criteria
 - Payments are made to the producer of the ecological good or service;
 - Payments are for the production of a well-defined ecological good or service.
- Secondary criteria
 - Payments are ongoing;
 - Payments are made under a contract resulting in the long-term provision of an ecological good or service;
 - Payments exceed the initial cost incurred and thus provide a form of production incentive;
 - The ecological good or service is the object of a transaction between the producer and another stakeholder for whom the good or service is useful.

The methods commonly used to provide remuneration for the production of EG&S can be divided into the following categories:

1. Direct payments
 - Ongoing payments
 - One-time payments
2. Payments in the form of tax credits
3. Payments as part of a market transaction.

Ongoing direct payments are the most common method used to provide remuneration. To be considered remuneration for EG&S, one-time payments must meet certain of the criteria described above. For example, a lump-sum payment provided in exchange for taking agricultural land out of production and restoring it to its natural state can be considered remuneration for EG&S if the payment exceeds the initial cost incurred, thus providing an incentive to the producer, or is paid in exchange for adherence to a long-term contract resulting in the ongoing provision of an ecological service. Similarly, ongoing tax credits, if targeted in a way to provide remuneration for EG&S, can be considered remuneration. Market transactions include systems allowing EG&S to become objects of exchange through, for example, the sale of emission credits to a firm in exchange for carbon sequestration on agricultural land. Although some private markets for ecological services do exist, EG&S are usually purchased by governments through assistance programs. In general, such markets are absent or rare in Quebec.

In the absence of market-based pricing, remuneration programs use a range of criteria linked to such things as land values and the cost of implementing good farming practices to determine the value of EG&S and the resulting remuneration to be paid to the producer. Pricing methods have been developed based on scientific analyses evaluating an individual's desire to pay for EG&S. Occasionally, the taxation of a resource such as drinking water is used to fund the production of EG&S that have, for example, a beneficial effect on water quality.

Examples of remuneration for EG&S in agriculture

In terms of agri-environmental programs that compensate producers for EG&S (or, more broadly, in the case of Europe, services other than the production of agricultural commodities), most of the major Western countries have developed specific programs using ongoing direct payments. For 20 years, under the Conservation Reserve Program (CRP), the United States has used annual rental payments to encourage the retirement of farmland from

production. The 2002 Farm Bill introduced the concept of annual payments to encourage the adoption of environmentally beneficial farming practices, mainly under the Conservation Security Program. The result has been that the U.S. has de facto adopted the multifunctional approach, despite its official reticence in international forums. In addition, the U.S. is experimenting with systems of tradable rights for pollution emissions. In the past, such programs have yielded excellent results for certain atmospheric emissions and an attempt is being made to adapt this tool to nutrients such as phosphorus and nitrogen. Basically, these programs involve the issuing of permits to point-source polluters such as industries and municipalities, generally in order to respect Total Maximum Daily Load based planning. Some of these tradable rights programs allow polluting entities to acquire credits—a new licence to pollute, so to speak—by financing discharge reductions elsewhere in the watershed, mainly by funding producers' adoption of good practices. Systems based on market transactions, although they may theoretically allow the buying and selling of EG&S, are poorly developed, however. Such mechanisms do not seem to be generating a substantial number of transactions for the moment.

In Europe, under the Common Agricultural Policy (CAP), the production of ecological services above and beyond regulatory requirements can be purchased through agri-environmental programs providing annual rental payments. Such payments are very widespread in Europe for such things as the conservation of natural environments, maintenance of rural landscapes, humane treatment of farm animals, protection of endangered breeds of livestock and the use of beneficial farming practices. Certain programs in the United Kingdom, France, Switzerland and Finland are described below to provide an overview.

In Canada, few programs or mechanisms exist for providing remuneration for EG&S. In this document, we will describe a few examples that resemble a remuneration program, including local Ontario Conservation Authority programs, the federal Greencover Canada program, Manitoba's Riparian Tax Credit Program and Ducks Unlimited Canada's conservation programs. Currently, the Alternate Land Use Services (ALUS) initiative is undoubtedly the best-developed remuneration program in agriculture in Canada. We will examine its characteristics in order to compare it with American and European programs. Under ALUS, annual payments are to be made to producers according to the acreage allocated to beneficial practices, for such things as riparian buffer strips, wetlands, permanent greencover in sensitive areas and natural habitats. In some circumstances, it also has provisions for compensation per hectare for the adoption of good farming practices such as reduced tillage (low till), cover crops and integrated pest management. Depending on the pilot project, the sharing of initial costs may also be included. Currently, ALUS has not yet been implemented but substantial progress has been made in Manitoba, Prince Edward Island and Ontario, where pilot projects may be launched in 2005 provided funding is available. ALUS is currently a private initiative, although it has political support from two provinces (Prince Edward Island and Manitoba) and is garnering growing support from producer associations. In addition, potential mechanisms in Canada for implementing the Kyoto Protocol will be examined, since they will no doubt provide remuneration for EG&S.

In this document, to characterize and compare programs, we will analyze programs in terms of issues addressed, duration of payment and method of remuneration provided. The issues examined comprise the conservation of land in its natural state, conversion of areas under production into natural habitat, good farming practices on arable land, preservation of the rural landscape, animal welfare, farm livestock biodiversity and maintaining land occupancy in rural areas. This comparison reveals that European programs are generally broader ranging than American ones in the issues covered, which are limited mainly to environmental aspects. The ALUS proposal uses a broadly American approach and does not address European concerns over the landscape or animal welfare. Payment methods are varied, but ongoing direct payments appear to be the most common method by far in Europe and the United States for EG&S produced by agriculture. However, remuneration for EG&S can be achieved in different ways and can target a wide range of issues.

A number of different avenues are proposed for an effective examination of EG&S-associated policies. These considerations involve the following concerns:

- Objectives pursued;
- Environmental benefits;
- Selection of eligible EG&S;
- Links with other programs;
- Social acceptance;
- Funding;
- Geographic availability and selection criteria for projects;
- Considerations involving the income and size of firms and assistance limits;
- Contractual framework and progression;
- Role of other sectors;
- Link with sustainable development.

Lastly, we examine the fact that Canada and Quebec have taken a very different approach in the area of EG&S remuneration compared with other Western jurisdictions. In addition, emphasis is put on the gradual introduction of the EG&S based approach so as not to upset our current farm support structures and on its potential contribution in mitigating the income crisis experienced by producers. The potential role of the approach in a future action plan for sustainable development is also examined.

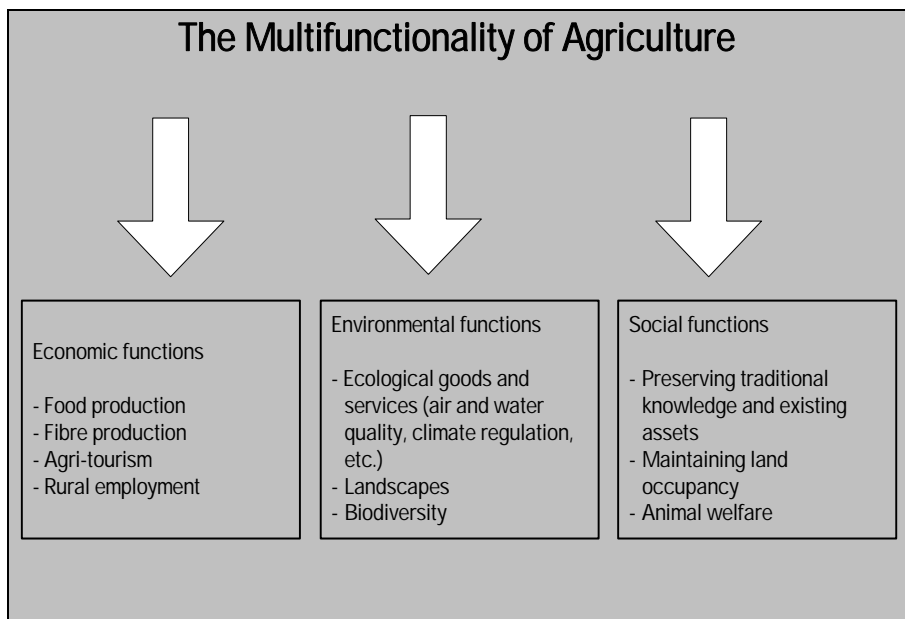
4 Ecological goods and services and the concept of multifunctionality

Since the debate over ecological goods and services (EG&S) intersects to a large degree the debate over the multifunctionality of agriculture, a distinction should be made between the two from the very beginning. We will first look at multifunctionality as a broad concept and then its environmental component.

4.1 The multifunctionality of agriculture

The term “multifunctionality” has only come into official coinage since the United Nations Conference on Environment and Development in 1992. It refers to the fact that a given industry may provide other services besides the primary products it produces and to which value is usually ascribed. Despite the general nature of the term, the concept is used mainly in agriculture and international organizations adopting the concept (OECD, FAO, WTO, etc.) refer to it mainly in the agricultural sector.

The main functions of agriculture are often summarized as falling into three categories: economic, environmental and social.¹ In general, economic functions are given a value by the market, since they generate tradable goods. On the other hand, the absence of supply and demand mechanisms limits the possibilities of obtaining remuneration for the other functions of agriculture. Market failure results in the underproduction of ecological and social goods and services, which are most often non-marketable and non-tradable in nature.



Although the multifunctional nature of agriculture is generally accepted, the debate for many people centres on whether it should be supported. While some believe support is warranted to develop the other functions of agriculture, others are opposed to this. Developing nations are generally against the principle, arguing that it justifies nations granting subsidies to their own producers, which is likely to limit emerging nations' competitiveness. This debate, which has been taking place at the World Trade Organization (WTO) during the

¹ For a complete description of these various functions, see Gouin, Daniel-M and Royer, Annie, La multifonctionnalité de l'agriculture, un fait historique, une base d'intervention des politiques agricoles à discuter, 2004.

renegotiation of the Agreement on Agriculture, is polarizing nations into various groups. The main supporters of the multifunctional approach are the European Union countries, Switzerland, Japan, Korea, Norway and Mauritius, with other countries sometimes joining this core of supporters.

The debate took hold in the WTO in 2000, when 38 member nations expressed their anxiety over “non-trade concerns.”² The issue was over whether domestic support to farmers under other agricultural functions should be considered part of the “green box” and the necessity of capping this support. The green box includes domestic support measures allowed for WTO members, including agri-environmental measures. Although existing multifunctional measures have been associated *de facto* with the “green box” for a number of years, negotiations are currently underway over this issue and some nations may wish to limit the extent of use of these support measures by their competitors. Generally, public support for the multifunctionality of agriculture has favoured the method of ongoing direct payments (annual rental payments) to the farmer in exchange for environmental and social goods and services.

4.1.1 The OECD's approach to adopting multifunctionality

The implementation of the concept of multifunctionality in public policy is recent, but is quickly expanding. Consequently, the Organisation for Economic Co-operation and Development (OECD) addressed the issue in its 2001 document “*Multifunctionality: Towards an Analytical Framework*” and assessed its implications in the 2003 publication “*Multifunctionality: The Policy Implications*.” These documents, the first of their kind to be produced by an international organization, are frequently cited since they provide a useful theoretical basis for the concept, probably the most exhaustive available. A priori, the OECD does not consider multifunctionality a value to be achieved, but proposes to determine on a case-by-case basis whether it is necessary to provide government support when the market fails.

At the risk of repeating most of the studies on the subject in recent years, it is useful to provide a definition of the multifunctionality of agriculture by stating the following characteristics defined by the OECD:

- The existence of multiple outputs, basic and otherwise, that are jointly produced by agriculture;
- The fact that some other products have the characteristics of externalities or public goods, such that markets for these goods do not exist or do not function well.³

Based on this, the existence of environmental, social or economic goods and services linked to agricultural production can be acknowledged. The goal of the OECD is to provide support for government action in this area by providing an analytical framework, which allows the following to be determined:

- If the production of a non-commodity output is linked with the primary output or can be separated from it, and at what cost;
- In the case of a strong degree of jointness (outputs cannot be separated), if there is market failure resulting in the underproduction of this other output;
- Possibilities for encouraging the production of this output by government or private stakeholders.

The hope is that this framework will cover a wide range of non-commodity outputs generated by agricultural activities, from the value of landscapes to the availability of natural habitat and national food security and safety. When outputs may be provided by entities other than farming operations, the OECD will try to encourage nations

² Note on non-trade concerns G/AG/NG/W/36/Rev.1 submitted to WTO 2000.

³ OECD, Multifunctionality: Towards an Analytical Framework, 2001.

to give priority to other private sector stakeholders. However, it recognizes that there may be a strong link between agricultural outputs and a number of positive or negative externalities, such as pollution or water purification, and market failure may call for direct government intervention. When market failure is recognized, the second OECD document recommends that payments targeting farmers and managed by a local authority are the most appropriate method of intervention.⁴ In many cases, EG&S have these characteristics—a strong degree of jointness and difficulty of separating them from agricultural outputs—so that their production can be encouraged by payments to farmers. In these cases, the farmers in question should be recognized as being the most capable of generating the EG&S at the lowest cost.

Nevertheless, a number of countries are already looking at multifunctionality as a real phenomenon to be encouraged and are making direct transfers without necessarily attempting to take advantage of all the mechanisms proposed by the OECD. In addition, the following must be emphasized in the OECD framework: its primary purpose is to determine whether goods or services generated by agriculture are accompanied by market failure that is likely to justify government intervention. It applies to a wide range of goods and services and does not specifically target EG&S. In the case of positive or negative environmental externalities for which the accompanying market failure is a recognized fact, the OECD framework often only confirms that government action is conceivable.

4.2 Ecological goods and services (EG&S)

The concept of ecological goods and services (EG&S) refers to the transformation of natural capital (soils, water, biota) into products of value to people.⁵ Although we sometimes use certain variants such as “environmental goods and services” or “ecosystem services,” this generally corresponds to EG&S. EG&S may include:

- Ecosystems themselves;
- Provision of good-quality water;
- Climate regulation;
- Maintenance of animal and plant biodiversity;
- Prevention of floods and other natural catastrophes;
- Protection against soil erosion;
- Etc.

Although most EG&S are produced by natural environments, they can also, in many cases, be produced through agricultural practices that favour the maintenance of ecosystems’ natural functions. For example, not leaving the soil bare is a way of promoting the provision of certain EG&S, i.e., erosion protection and water filtration. Occasionally, some authors have included among ecological services activities that limit pollution or harmful practices,⁶ for example, by decreasing the use of pesticides. This notion logically results in the inclusion of coercive practices—for example, taxing negative externalities—as part of the policy tools to increase the provision of ecological services. Unanimity has not been reached over this and generally ecological services are considered to include activities that are basically beneficial and that go beyond the simple fact of not polluting or decreasing pollution. The distinction between these two notions of EG&S is often hazy and makes defining the concept more difficult. This central issue will be dealt with in greater depth in the last section.

It is the ecosystem itself, of course, that generates EG&S. Therefore, farmers adopting beneficial practices do not directly generate EG&S, but rather improve the environment’s ability to provide them. For example, by adopting winter cover crops, farmers allow the ecosystem to provide protection against soil erosion. However, for the sake

⁴ OCDE, Multifunctionality: The Policy Implications, 2003, page 89.

⁵ Whitten, Salzman, Shelton and Proctor, Markets for ecosystem services: Applying the concepts, CSIRO, February 2003.

⁶ See, for example, Zilberman, D., Environmental Services, University of California at Berkeley, 2001.

of conciseness, we will consider EG&S to be farming practices implemented by the farmer, thus avoiding the overly fastidious distinction between cause (agri-environmental practices) and effect (EG&S).

The concept of EG&S can be understood as a component of multifunctionality. It is part of the environmental function of agriculture, which consists in producing positive environmental effects. For example, the conservation of wetlands constitutes both an ecological good (the wetland itself) and a service (water filtration by the wetland).

5 Measures to maximize or provide remuneration for the provision of EG&S

In general, the production of EG&S is not valued by the agri-food market. Producers have more incentives to increase their production of agricultural commodities, while EG&S outputs are quite often lower than desired. There are a few markets that value this type of output, but they are of limited size.

5.1 Approaches available

How can EG&S outputs be maximized if the market does not take care of it? Different approaches can be used in agriculture such as regulatory measures, cross-compliance (sometimes called ecoconditionality), the voluntary approach, environmental marketing and one-time direct payments. Market instruments and ongoing direct payments also number among the available policy tools.

5.1.1 Regulatory approach

The most common solution is government regulations. By requiring adherence to minimum standards to protect resources, this approach recognizes the close link between farming activities and the quality of the environment. In Quebec, the Agricultural Operations Regulation (AOR) is the cornerstone of environmental policy in agriculture. Obviously, the regulations do not require farming enterprises to produce EG&S and do not provide remuneration to farmers for their EG&S outputs. Instead, the goal of the regulatory framework is to ensure that individual and collective activities and practices do not harm society as a whole.

5.1.2 Cross-compliance (ecoconditionality)

Requiring farmers to meet certain environmental requirements in order to have access to government funding forces them to produce a minimum amount of ecological services. Such requirements may be found in existing regulations or new measures. Consequently, there is often a link between the regulatory approach and cross-compliance, although it is not automatic. For example, the new requirement in France that 3% of farmland receiving direct funding be maintained as permanent cover forces farmers to produce an ecological service, despite the fact that this requirement is not a legal obligation. Since cross-compliance often only involves making existing support subject to compliance with standards, it does not constitute remuneration for EG&S. According to Delache (2001), the shortcoming in this approach is that there is no incentive to produce EG&S beyond the level required, which is also true for the regulatory approach.

In 2005, Quebec adopted this approach by introducing cross-compliance mechanisms for some support programs. Here, too, this simply involves an incentive to meet regulatory standards but nothing more.

5.1.3 Voluntary approach

This involves various non-restrictive initiatives that do not provide compensation to participants. The approach may involve extension, training and consulting services. Various sectors are experimenting with, among other things, voluntary agreements between governments and industries to limit pollution emissions without resorting to coercion.

Quebec's Clubs-conseils en agroenvironnement (CCAÉ), or agro-environmental advisory clubs, are an example of the use of the voluntary approach to encourage EG&S outputs. Participants can obtain technical advice from professionals, which allows them to adopt more environmentally friendly practices. Another example is farmers' voluntary use of practices identified in MAPAQ's guide to agri-environmental practices, *Bonnes pratiques agroenvironnementales pour votre entreprise agricole*.

5.1.4 Environmental marketing

This refers to the value added that can be obtained for an agricultural commodity if its mode of production is certified, it has a recognized eco-logo or it is identified as ecologically responsible.⁷ This involves providing benchmarks that allow market stakeholders downstream to know that the producer meets defined criteria for beneficial farming practices. In this voluntary approach, many producers choose organic methods, since they know this is a rapidly expanding market. Specific market niches such as organic products naturally prompt farmers to modify their way of doing things to incorporate environmental considerations. Official certification programs linked to good practices, such as France's *agriculture raisonnée* (rational agriculture) program or the ISO-14001 standard, also exist. Here, too, the approach is voluntary and does not necessarily involve the government. On the other hand, governments can promote these initiatives in various ways. In Quebec, the agri-food designations board, the Conseil des appellations agroalimentaires, promotes environmental marketing through specific environmental designations for products. The Quebec Department of Agriculture, Fisheries and Food (MAPAQ) is also active in the field of environmental certification. *The value added that EG&S obtain through environmental marketing is indirect since it is associated with the agri-food product rather than the provision of the ecological service itself.*

In Quebec, certification has been envisaged, among other things, as a way of enhancing the status of farmers adopting ecologically responsible practices. In MAPAQ's 2001-2004 Strategic plan, in the action area of increasing the value of farmers' efforts, certification is identified as a method to be developed further.⁸ The "*Un environnement à valoriser*" agri-environmental Action plan, formulated by a working group consisting of the main industry stakeholders, has also taken a stand on the subject. In its C target, certification is identified as a way to reward farmers that adopt good farming practices.⁹ Ideally, certified farms should be able to obtain value added for the sale of their products. Accordingly, certification pilot projects have been underway in Quebec since 2002 based on the ISO-14001 and AGRISO standards. This has allowed the feasibility of certifying farming operations to be demonstrated and a framework for doing so to be developed. This project however, does not seem to have generated all the value added expected, which decreases the approach's attractiveness.

5.1.5 Market-based approach

A wide range of fiscal and economic tools such as taxes and tradable rights can be used to promote the production of EG&S or minimize environmentally damaging effects. They send a signal to market stakeholders to modify their behaviour. To promote remuneration for EG&S, tax credits and a system of purchasing offset credits seem to be the most appropriate, while tools involving taxes, charges and tradable rights are more effective in limiting the negative effects of agriculture.

⁷ Term borrowed from the World Wildlife Fund, *Advanced Environmental Farm Planning in Canada: Thoughts on Concepts, Tools, and Implementation*, March 2004, page 36.

⁸ MAPAQ, *Plan stratégique du Ministère et des organismes, 2001-2004*, page 38.

⁹ Plan d'action "*Un environnement à valoriser*", bilan de l'an 5, 2005.

A market-based approach could include mechanisms favouring the production, sale and purchase of EG&S with minimum government intervention. The latter could guide decisions of industry stakeholders at arm's length through:

- The appropriate regulatory framework to create a market in EG&S;
- The creation of a framework for, and allocation of, tradable emission rights;
- The establishment of offset credits that can be purchased from EG&S producers by polluting industries subject to emission quotas;
- The levying of taxes and charges on pollution emissions;
- The use of fiscal tools such as tax credits or green taxation.

The market-based approach is varied and can include measures ranging from simple coercion (taxes) to ongoing remuneration for EG&S by their sale on a market such as the one for offset credits.

5.1.6 One-time direct payments

Direct payment programs are common in the agri-environmental field. They are often used to assist farm producers in complying with standards and, in many cases, involve cost-sharing programs. Often, they result in the increased production of EG&S. However, the one-time-only nature of cost sharing and its direct link with the expenses incurred eliminate the idea of remuneration for EG&S outputs. In Quebec, the Prime-Vert program fills this niche. In the United States, the primary program of this kind is the Environmental Quality Incentives Program (EQIP).

One-time payments may in some ways provide remuneration for EG&S outputs: for example, the purchase of development rights to preserve the land's natural character. A payment can be made to the landowner in exchange for the latter agreeing to retire a piece of arable land from agricultural production and convert it to permanent cover, thus generating an ecological service in exchange for a lump-sum payment. Section 5.2.1 will show that this type of one-time payment may meet some of the criteria for remuneration for EG&S outputs.

5.1.7 Ongoing direct payments

In the broad sense, multifunctionality attempts to enhance the value of the various products of agriculture, whether economic, social or environmental. In practice, however, this usually occurs through government programs providing ongoing support for the production of goods and services other than agricultural commodities. According to our observations, ongoing direct payments are the main vehicle for promoting multifunctionality. *Ongoing direct payments associated with multifunctionality result in the production of goods and services other than agricultural commodities becoming a source of ongoing income for farmers.*

To clarify the concept, in terms of agri-environmental programs specifically, we use the following definition:

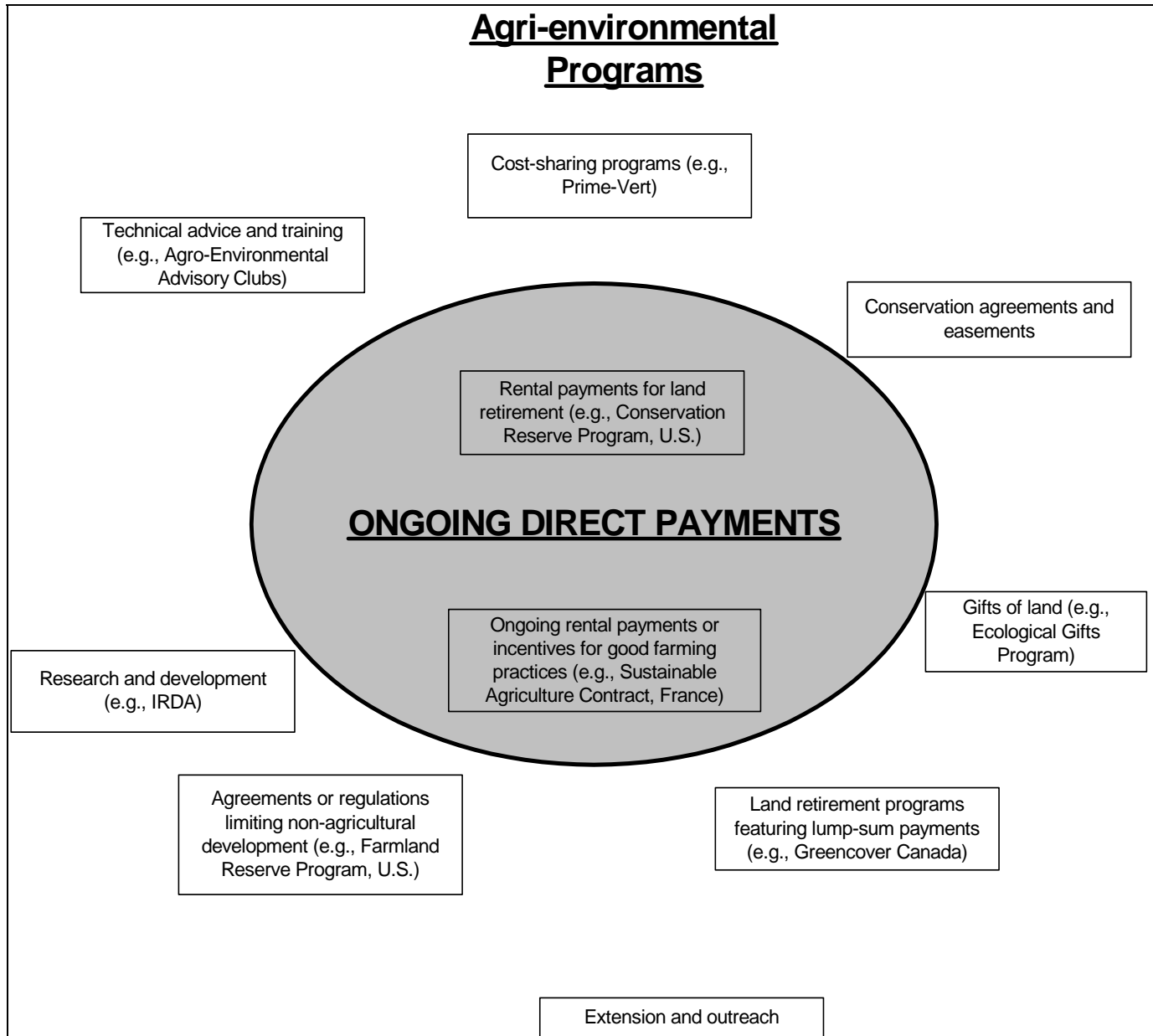
Agri-environmental programs using ongoing direct payments integrate the environmental function as a source of ongoing income for farmers.

Programs using the multifunctional approach usually:

- Are voluntary;
- Provide ongoing support for functions other than agricultural production;
- Target the medium or long term;

- Involve a contract between the farmer and agency;
- Are offered on a geographic basis rather than by specific production chain (UQCN 2002).

The following diagram provides an overview of the differences between agri-environmental programs in general and those providing ongoing direct payments. Of course, programs may provide both ongoing support and support that is more short term, in which case a clear distinction cannot be made.



In the interests of accuracy, it should be noted that all multifunctional programs of this type in agriculture are not necessarily agri-environmental programs. For example, a program can include as a regular source of income for farms such things as the protection of the built rural environment and preservation of regional landscapes. Usually, however, remuneration for these various functions is provided at the same time as for the stewardship of the natural environment under a single, more general program.

5.2 Remuneration for EG&S: a new way of looking at agri-environmental payments

This section deals more specifically with remuneration for EG&S. We have observed that, although many different approaches are used to maximize production of EG&S, they do not all constitute remuneration. The actual advantage in adopting the concept of EG&S is that the sale, purchase and consequently the remuneration of EG&S can be envisaged. The adoption of the concept is supposed to result in increased EG&S outputs owing to the resulting financial support.

5.2.1 Characteristics

According to Pagiola and Platais (2002), payment systems for ecological services must provide *ongoing income*.¹⁰ Many other authors refer to this idea of continuity or duration. According to this definition, the regulatory, cross-compliance, voluntary and one-time direct payment approaches do not constitute remuneration for EG&S. However, we believe that some forms of one-time payments may sometimes constitute remuneration for EG&S, which leads us to assign relative importance to continuity. Criteria must be set to accurately characterize the special features of the payments studied.

We suggest that the following criteria, which are not exhaustive, be used to clarify the specific features of payments associated with this concept.

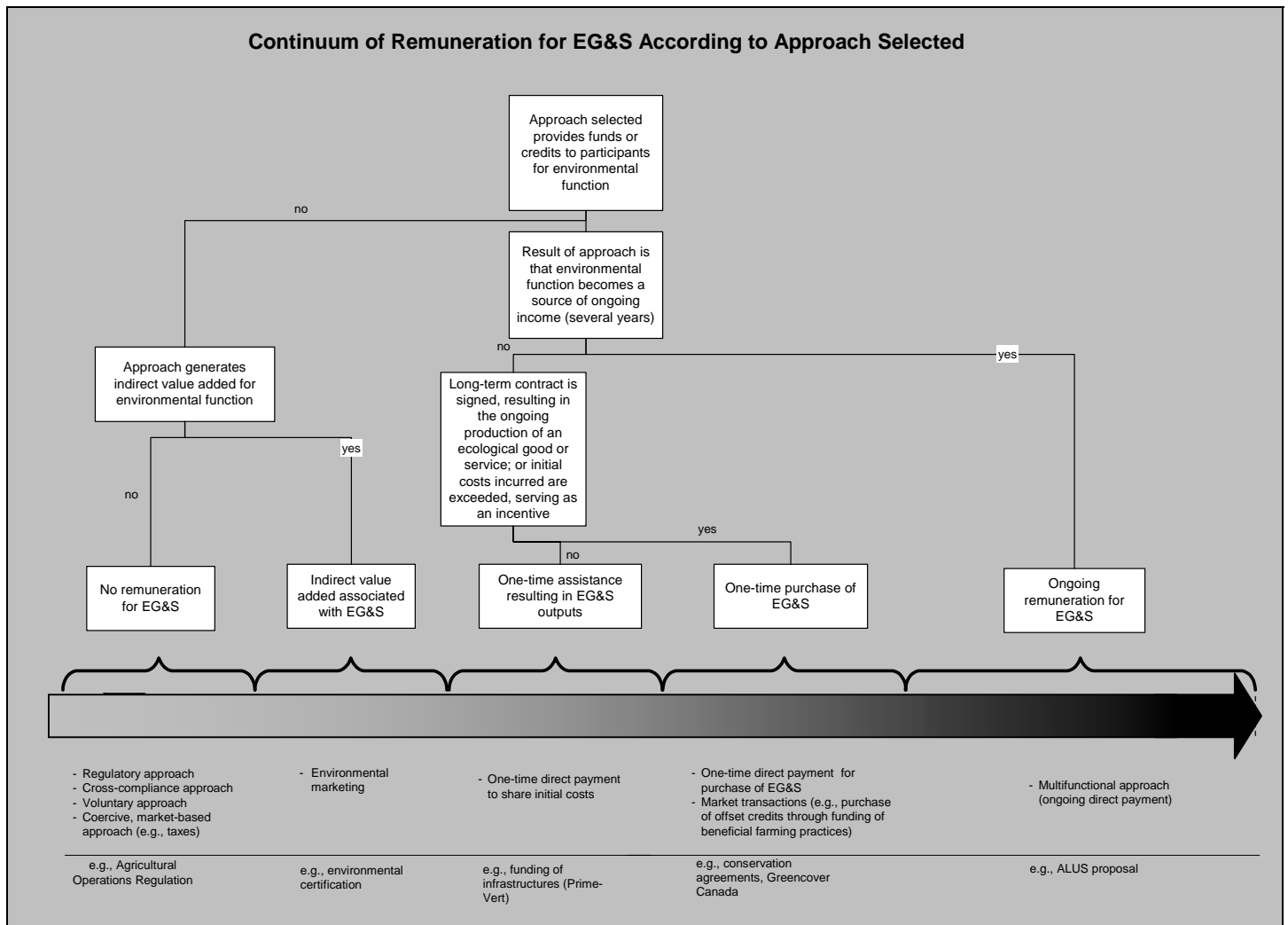
These criteria do not allow a perfect distinction to be made since, in our opinion, there is a grey area between one-time approaches that clearly provide remuneration for the production of EG&S and approaches that do not meet the criteria set.

¹⁰ Pagiola, S, and Platais, G, Payment for Environmental Services, World Bank, 2002, cited in Centre international Unisféra, Le paiement pour les services environnementaux : Étude et évaluation des systèmes actuels, 2004.

Characteristics of Remuneration for EG&S

To constitute remuneration for EG&S outputs, payments must meet both of the main criteria and at least one of the secondary criteria.	
Criteria (general characteristics)	Explanation
Payments are made to the producer of the EG&S.	Approaches that do not include monetary payments do not constitute remuneration for EG&S.
Payments target the production of a well-defined EG&S.	This criterion emphasizes that payments must target specific areas or issues rather than being universal. Farmers must know for which specific ecological good or service they are receiving remuneration.
Secondary criteria	Explanation
Payments are ongoing.	Ongoing payments are the most common method of providing remuneration. Although the payment may represent only a fraction of the costs incurred (e.g., tax credit), it nonetheless allows environmental production to be included as a source of ongoing income.
Payments are made under a contract resulting in the long-term provision of an ecological good or service.	Under this type of contract, payments often serve as an incentive for the long-term production of EG&S, even if the payment is one-time only.
Payments exceed the initial cost incurred.	The payment, by exceeding the incurred cost, provides an incentive that may correspond to remuneration. This criterion emphasizes that remuneration for EG&S goes beyond cost sharing, the latter often resulting in the production of EG&S without remuneration.
The ecological good or service is the object of a transaction between the farmer and another stakeholder for whom the good or service is useful.	By becoming the object of a transaction, the ecological good or service is sold by the farmer as a marketable good or service.

It is useful to illustrate the gradations between the absence of remuneration for EG&S and ongoing payments for EG&S on a continuum as illustrated below.



By answering the questions on the type of payments involved in the program or approach, you can situate the latter along the continuum. On the extreme left are approaches that do not compensate farmers for environmental functions. Moving towards the right, some mechanisms provide payments that prompt farmers to generate EG&S outputs, but do not directly compensate the farmer for the good or service in question. Beyond a certain level, EG&S outputs become a source of ongoing income. A good example of a one-time payment that corresponds to the criteria for remuneration is conservation agreements. These agreements take the form of legal easements or contracts limiting the use of a piece of land in order to keep it in a natural state or preserve it for agricultural use. They involve, to a certain degree, a monetary payment intended to compensate the farmer producing EG&S to the detriment of agricultural commodities or the possibility of selling the land for development. Some programs of this type, such as the U.S. Grassland Reserve Program, even offer participants the choice of obtaining remuneration in the form of a single payment or in the form of annual rental payments over several years.

5.2.2 Remuneration methods

At the beginning of section 5, we discussed the policy instruments used to promote EG&S outputs and then determined the characteristics of remuneration for EG&S. Here, we will identify the methods for providing remuneration for EG&S that are the most likely to provide for the purchase of EG&S from farmers.

1. Direct payments
 - Ongoing payments
 - One-time payments that involve the signing of a long-term contract or that exceed incurred costs
2. Payments in the form of a tax credit
3. Payments involving a market transaction (e.g., purchase of offset credits from farmers)

Many remuneration programs or systems include more than one form of remuneration. Initial cost sharing followed by an ongoing rental payment or permanent tax credit is often used.

Programs involving ongoing direct payments or tax credits provide long-term remuneration. Market transactions based on the purchase of offset credits from farmers are still in their infancy, however. Although, theoretically, such transactions would allow farmers to sell their EG&S at any time and thus obtain an income from doing so, the number of actual transactions of this type taking place at this time is extremely small.

5.2.3 Purpose of remuneration: action or result

According to a number of studies, remuneration for EG&S can be provided in two primary ways.¹¹ The first is to provide remuneration for an action, in other words, for the respect of a practice deemed to be standard or desirable, in exchange for which a payment is made regardless of the result. This often involves the use of specifications describing eligible practices such as harvest periods or the use of limited inputs. This is the approach used in most agri-environmental programs based on the multifunctional approach. Result-based approaches, on the other hand, are theoretically the most effective since they take into account the actual effects of an action on the environment. They provide remuneration for a measurable product or service from an identifiable source. Air purification could not be included, for example, because the concept is too intangible and must be achievable by specific practices as part of a program to compensate participants for action. Generally, action-based remuneration is easier to implement. EG&S markets based on the sale of a measurable result are rare. According to the literature, however, result-based remuneration is the most efficient and cost-effective way of designing payments to achieve environmental objectives.

5.2.4 EG&S pricing

In formulating remuneration policies, assigning a monetary value to positive externalities generated by a farming operation in order to compensate the producer poses a significant challenge. There are many questions and existing mechanisms are far from perfect but, as we will see later, such policies do exist and are operational. However, they often abandon the idea of determining a monetary value for goods and services in favour of a system of rates, which are easier to assess. Such rates are often based on the value of the agricultural production that is foregone or on the rate for leasing or purchasing the farmland. Although society values the production of

¹¹ See, for example: Gerowit, Isselstein and Maggraf, Rewards for ecological goods- requirements and perspectives for agricultural land use, University of Göttingen, 2003. Remuneration for ecological goods and services produced by agriculture: elements for a Quebec analysis

EG&S, there is little willingness on the part of individuals to pay to obtain them, which makes it difficult to determine the value of EG&S and limits the introduction of market mechanisms.

In the absence of private demand, governments are often the only potential buyer of these types of goods, which amounts to saying that governments can set such things as prices and quantities to be produced. Governments also have access to a set of factors allowing them to assess the amount required for farmers to provide the service in question. According to an examination of the various programs and Canadian ALUS proposals, the following factors are generally used:

- The market value of the land;
- The value of the agricultural production that is foregone;
- The value of support payments lost from other programs (crop insurance, direct assistance, etc.);
- The taxation rate for the land;
- The cost of implementing the beneficial practice;
- The soil productivity class;
- Regional rate of leasing of farmland;
- The cost of maintaining the land or a particular element in the program.

Usually, when a remuneration program is being set up, a working group, often regional in nature, establishes remuneration levels. The group assembles various factors and selects the most relevant ones or develops a pre-established calculation formula. Ideally, a good system should provide for the possibility of modifying established prices to reflect the characteristics of a given piece of land, in order to encourage participation or prevent overcompensation.

Sometimes, a looser system is used in which remuneration is not uniform and not based on a central standard. This provides more leeway in setting EG&S prices and would be essential in a national program that has to respond to very different regional needs. Consequently, *regional data* must be taken into account in such a program.

There is also an influential school of thought that favours setting prices based on market mechanisms. Analysis methods are used such as contingent evaluation and the hedonic approach.¹² In the former, surveys are used to determine the willingness of individuals to pay for a given ecological good or service. Randall suggests that this method be used with a fairly large sample of respondents, and that each be asked to evaluate the value attributed to various ecological goods by comparing them with commercial goods of a known value.¹³ Various studies of this type have been carried out in the field of rural economics, including researchers in Quebec, particularly at McGill University. However, this method tends to overevaluate individuals' willingness to pay, when in reality they are more reluctant to do so.

In some locations, research and pilot projects have been carried out to test the effectiveness of payment systems for ecological services and to develop a price-setting mechanism using a market-based approach (for example, in Australia under the Ecosystem Services Project).¹⁴ In credit trading systems, prices are set according to such things as the amount of phosphorus or carbon and then the contribution of good farming practices in limiting loads is calculated, although this is no small task. For example, creating a riparian strip can limit phosphorus loads; the quantity of phosphorus prevented from being released into the environment then generates a credit that can be resold to other stakeholders that wish to be able to release more phosphorus. Mathematical formulas have been developed to calculate the impact of such practices on the environment, in terms of the quantity of nutrients

¹² See Mollard, A., Multifonctionnalité de l'agriculture et territoires : des concepts aux politiques publiques, 2003, page 41.

¹³ Alan Randall, Valuing the outputs of multifunctional agriculture, European Review of Agricultural Economics, 2002, page 303.

¹⁴ See <http://www.ecosystemservicesproject.org/>

retained in the soil or carbon sequestered, for example. By attaching a value to the result, the amount to be paid for a given practice can be determined. This way of determining the value of EG&S is obviously based on measurable results in the environment.

5.2.5 Funding remuneration systems

Remuneration programs can be funded in various ways. In most operational programs adopting this type of agri-environmental approach, government subsidies are the main or only source of funding. However, funding can also be obtained from private organizations, taxes, fees, etc. For example, a good or service such as drinking water can be taxed. A watershed-based approach can also be implemented in which a user tax on water is levied and is used to provide remuneration for the adoption of good farming practices so as to improve or maintain water quality. Very successful examples of this type can be found and preparations are being made to implement similar mechanisms in Ontario to fund the protection of water sources. A similar approach is used in the State of New York¹⁵ and is frequently cited as an example. The Watershed Agricultural Program is a voluntary program administered by an agency commissioned and financed by the City of New York to undertake water quality protection projects downstream. The program includes land acquisition, infrastructure funding, conservation agreements and other methods. Two of the program's characteristics are particularly noteworthy:

- It is funded by a city interested in investing less money in water purification in its specific watershed, rather than under a comprehensive government program providing funding in all regions;
- Funding comes from a water consumption tax.

Among other things, this program provides annual rental payments, the main measure used in the multifunctional approach. These are paid mainly with assistance from the U.S. federal government through existing programs such as the Conservation Reserve Program and the Conservation Reserve Enhancement Program.

A number of nature conservation organizations, which are well-organized private stakeholders, negotiate conservation agreements that sometimes correspond to a form of remuneration for ecological services. Many of these organizations are interested in participating in funding remuneration programs for EG&S with a significant effect on the natural environment.

In the case of some programs based on tradable rights and offset credits, funding can come from stakeholders required to have permits. They are not necessarily part of the agricultural community and can be polluting industries, for example. This notion will be discussed in greater depth in the next section.

There are certain limits on funding, however. For example, to comply with WTO regulations on green category programs, funding must come from the public purse and not involve a transfer from consumers. Although government expenditures for remuneration for EG&S (including tax credits) are allowable under the current wording of the Agreement on Agriculture, mechanisms based on funding from sources other than governments must be examined on a case-by-case basis.

¹⁵Watershed Agricultural Council, <http://www.nycwatershed.org/>

6 Examples of remuneration for EG&S in agriculture

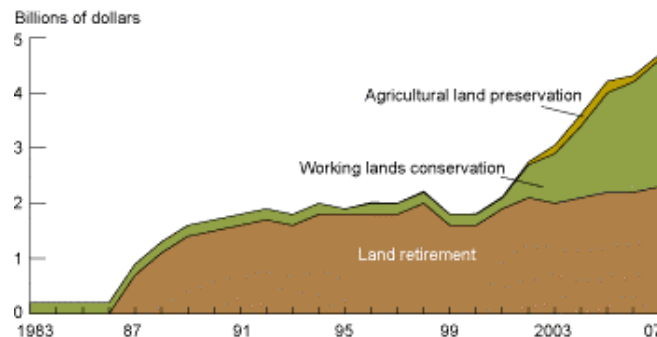
To describe the approaches taken by certain Western countries in providing remuneration for EG&S produced by agriculture, this section analyzes specific programs. The dominant method employed is ongoing direct payments and this method is the most common in jurisdictions wishing to provide remuneration for EG&S. In addition, attempts in the U.S. to develop offset credit systems in agriculture will also be discussed, as well as programs based on the purchase of development rights.

6.1 Direct payments in the United States

The current agricultural system in the United States is governed by the 2002 Farm Bill. The legislation provides for a number of agri-environmental programs, some of which use ongoing direct payments to provide remuneration for EG&S. Many are specific. Some target land retirement and conservation—the Wetlands Reserve Program (WRP) and Conservation Reserve Program (CRP)—while others protect agricultural land use and pastureland—the Farm and Ranch Lands Protection Program (FRPP) and the Grassland Reserve Program (GRP). The Wildlife Habitat Incentive Program (WHIP) supports the creation of viable natural habitats. The main objective of the Agriculture Management Assistance and the Environmental Quality Incentives (EQIP) programs is to encourage the adoption of good farming practices on arable farmland.¹⁶ There are a number of other federal conservation programs.

The 2002 Farm Bill marked a turning point in U.S. agricultural policy. Previously, the emphasis was on land retirement. In 2002, a movement began to emphasize good farming practices on arable land and to encourage farmers to improve their environmental performance. Historically, the great majority ($\cong 90\%$) of federal agri-environmental expenditures has consisted of remuneration for land retirement through the CRP and WRP. In the coming years, the EQIP, CSP and WHIP, which do not fund land retirement, will represent a growing percentage of total funding (roughly 40% by 2010).¹⁷

Evolution of U.S. Agri-environmental Programs before and after the 2002 Farm Bill
(Source: United States Department of Agriculture)



Sources: Office of Budget and Policy Analysis, USDA, and the Congressional Budget Office.

The USDA administers most of these programs through its Natural Resources Conservation Service, with the notable exception of the CRP, which is managed by the Farm Service Agency.

¹⁶ NRCS, 2002 Farm Bill Programs, <http://www.nrcs.usda.gov/programs/farmbill/2002/products.html>

¹⁷ USDA, The 2002 Farm Act, Provisions and Implications for Commodity Markets, 2002, page 10.

6.1.1 Conservation agreement programs

Several U.S. programs operate by means of conservation agreements or the purchase of development rights. The main objectives of these agreements are generally:

- Preventing development of natural environments;
- Restoring habitats followed by long-term protection;
- Protecting agricultural land use from urban sprawl.

The Wetlands Reserve Program, the Grassland Reserve Program and the Farm and Ranch Lands Protection Program are based mainly on this mechanism. Landowners still own their land, but are limited as to how they can use it. For example, the Wetlands Reserve Program forbids the farming of wetlands restored under the program, the Grassland Reserve Program only allows use as pastureland, and the Farmland Protection Program simply preserves the agricultural use of the land in question. As we have seen earlier, this method can be considered a form of remuneration for EG&S, although it does not generally provide an ongoing source of income. Lump-sum payments combined with a long-term contract ensure protection of the land, thus generating an ecological service. In addition, the amount paid corresponds to the provision of the service and the cost to the landowner of giving up the potential uses, and not simply the costs incurred in protecting the land. Some programs such as the Grassland Reserve Program even offer participants the possibility of spreading the remuneration over a number of years, making it very similar to programs providing annual rental payments.

In the United States, this conservation tool has been used for over a quarter of a century and has had significant repercussions in conservation. It not only is used to protect natural habitats but also is a favoured method of protecting agricultural land from urban sprawl. For example, a 2003 study showed that roughly 1.8 million acres (728,745 ha) are covered under conservation agreements targeting the protection of agricultural land use, including local and state programs. The average purchase price for rights under this type of agreement is US\$2,000 per acre (C\$6,138/ha).¹⁸ Occasionally, development rights are sold at below their market value; the difference between the two (a form of donation) can then be claimed as a tax deduction for an ecological gift. In addition, many conservation agreements are signed with no monetary remuneration or in exchange for advice or technical support, and care will be taken here to not confuse them with agreements involving remuneration.

In terms of ongoing direct payment programs in the United States, two programs stand out, the Conservation Reserve Program and the Conservation Security Program.

6.1.2 Conservation Reserve Program

The Conservation Reserve Program (CRP) was established well before the debate on multifunctionality, but we have included it in this category due to the fact that it involves ongoing direct payments. This is a key program in the field and the proponents of the ALUS approach in Canada use it as a basis for comparison. Basically, the goal of the CRP is to withdraw environmentally sensitive land from production and favour the restoration of a permanent vegetative cover. The financial incentives provided consist of annual rental payments, based on land rental costs. Since these rates differ depending on things such as soil characteristics and the presence of irrigation works, the amount of remuneration varies significantly. Annual rental payments can be provided for riparian buffers, grassed waterways, shelterbelts and contour grass strips, as well as for full fields. Therefore, the program compensates producers de facto for the retirement of blocks or strips of land, as long as the land provides ecological services useful to society as a whole. These EG&S are associated with water quality and

¹⁸ American Farmland Trust, A National View of Agricultural Easement Programs: Profiles and Maps- Report 1, September 2003.
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biodiversity, among other things. The CRP also has a cost-share assistance component, covering the initial costs required to implement a project, to a maximum of 50% of the expenses incurred.

By late 2003, over 34.1 million acres (13,810,500 hectares) were covered under the CRP, or an area equal to six times the area of cultivated land in Quebec and roughly 3.6% of cultivated land in the United States. According to the Farm Service Agency, participants have 156 acres (63 hectares) on average enrolled in the program. This large amount of land can also be explained by the fact that close to half of participants are no longer actively farming their land: the program therefore offers in many cases an incentive for the complete shutdown of farm production. As of January 2005, the average CRP payment was US\$48.21 per acre (C\$143/hectare/year), or roughly \$9,000 per farm on average. Payments under the CRP in 2003 represented US\$1.772 billion (C\$2.131 billion).¹⁹

Established in 1985, this is probably the oldest and best-run remuneration program in the world. However, since it is primarily a conservation program, little is done to encourage the maintenance of agricultural use since the land enrolled in the program is taken out of production.

6.1.3 Conservation Security Program

Of more recent vintage than the CRP (it was introduced under the 2002 Farm Bill), this federal program is distinguished from other USDA programs by its multifunctional approach. Its maxim is to “reward the best and motivate the rest” and it aims to compensate agricultural producers who excel in environmental performance. Using a watershed-based approach, it provides latitude to each watershed to define its own practices eligible for payments through the local office of the Natural Resources Conservation Service (NRCS). Funds are limited, however, to watersheds deemed a priority. To date, no watersheds have been selected in the states bordering Quebec but, beginning in 2005, farmers in all New England states can access CSP funding in selected watersheds. The program's multifunctional component provides annual rental payments to compensate for participation and to maintain existing practices. These rental payments constitute remuneration for the provision of EG&S. The program also has a cost-sharing component for the initial costs of implementing new practices, as well as one-time incentive payments.

The CSP does not aim to retire cropland from production, but rather to encourage the implementation of good practices such as crop rotation, watercourse enhancement and nutrient management. Fundamentally, it is a program to purchase surplus EG&S produced by agricultural operations whose environmental situation is already under control. For example, it differs from the EQIP program, which is also a USDA program, in that the latter aims to support producers in complying with agri-environmental regulations through cost sharing (as does Prime-Vert).

CSP is a more complex program than its predecessors. We provide an overall portrait of the program below but, for the sake of brevity, numerous details have been omitted. The program has four forms of payment and three tiers of environmental performance. Selected candidates receive a basic annual payment (Stewardship Payment) for the area enrolled in order to reward sound stewardship of the land. The amount is determined on a percentage basis (from 5% for the first tier to 15% for the third tier) of the rental rates for land in the region. According to Craig Derrickson, program officer at NRCS headquarters, these rates vary widely. For example, in the state of Washington, rates range from US\$4 to US\$400 per acre. The NRCS reduced base level rates considerably when Congress enacted program caps when the program was launched in 2004.²⁰

The CSP also provides payments to support the maintenance of existing practices (Existing Practice Payment). This payment also constitutes an annual rental payment. The third type of payment funds new practices (New Practice Payment) but, instead of ongoing annual payments, provides, under a cost-sharing arrangement, a one-

¹⁹ Farm Service Agency, CRP statistics, <http://www.fsa.usda.gov/dafp/cepd/crp.htm>

²⁰ NRCS, Conservation Security Program; Interim Final Rule and Notice, 2004.

time payment not to exceed 50% of the implementation costs incurred. Lastly, payment is available for exceptional improvements (Enhancement Payment), in the form of a lump-sum payment exceeding cost sharing, and constituting a type of bonus. Adopting new practices may promote progression to one of the higher tiers in the program, which increases the base-level payment.

Payments under the Conservation Security Program

Type of payment	Description
Stewardship Payment	A base-level payment consisting of an annual rental payment compensating participants accepted in the program. It consists of a percentage of local land rental rates, the same indicator used for the CRP. The base-level payment is increased when the participant progresses to a higher tier.
Existing Practice Payment	Annual rental payment to encourage the maintenance of practices deemed beneficial when the participant entered the program.
New Practice Payment	A one-time payment based on a cost-sharing arrangement, covering no more than 50% of the initial costs incurred in adopting a new practice.
Enhancement Payment	A one-time payment to encourage exceptional improvements in practices. Some latitude is provided in setting the amount.

Eligible participants can enrol in the program without changing their practices since the stewardship and existing practice components do not require improvements but rather provide remuneration for maintaining the existing situation. However, the base-level payment increases significantly depending on the tier, which is a major incentive for continued progress. The starting level and progression through the program are determined by the number of actions or practices undertaken by the farming operation, and operations can be admitted directly to a higher tier. Participants undertake to respect CSP criteria on the minimum level of practices to be implemented, which results in the adoption of new practices over the years. A list of eligible activities and practices is provided and varies depending on the type of operation. Some examples include:

- Construction of tailwater pits;
- Grassed riparian buffers;
- Crop rotation;
- Annual soil sample collection;
- Use of resistant crops to limit pesticide use;
- Controlled burns in pasturelands;
- Rotation of pastureland.

The CSP is the large-scale agricultural program in North America with the greatest reliance on the concept of multifunctionality since it encourages the joint production of agricultural commodities and ecological services. It is recent, however, and has not been tried in most states. In addition, Congress put a cap of US\$41.4 million on the program for its launching in 2004, which forced the NRCS to drastically reduce the amount of base-level payments and the regional availability of the program.²¹ In 2004, 2,200 agricultural operations participated in the program. Invitations for proposals in 2005 are underway as this document is being written.

The CSP, although it was part of the 2002 Farm Bill, has not yet been in existence for a full year. However, it can be considered to constitute the sanctioning of the multifunctional approach in the United States and definitive proof that our neighbours to the south are embarking on this road. Although the official position of the U.S. has not changed, according to Debailleul, NRCS representatives candidly admitted to him that multifunctionality was what it was really about.²²

²¹ NRCS, Conservation Security Program; Interim Final Rule and Notice, 2004.

²² UPA, L'agriculture, une profession aux multiples vocations, actes du colloque 2003, page 48.

6.2 Market-based tools in the United States

Various jurisdictions use market-based mechanisms in the environmental area. In general, the purpose of these mechanisms is to limit harmful emissions or loads. Taxes on emissions may provide an incentive to reduce them. Tradable rights put a cap on such loads and allow the purchase and sale of unused rights. Offset credits, which are closely linked to tradable rights, are the most attractive market-based tool for agriculture. They are referred to by various other terms: offset mitigation, compensatory mitigation, etc.

Offset credits allow firms to pay for environmental improvements made by other stakeholders in order to compensate for the environmental damages the former cause in their own activities.

For example, a power plant may fund reforestation projects in order to limit its “net” production of greenhouse gases (GHGs). The implementation of the Kyoto Protocol is a good example of a market-based tool including tradable rights and offset credits that allows farmers to sell emission credits obtained through good practices.

Occasionally, market-based systems offer a form of remuneration for ecological services provided by farmers. The U.S. has experimented with this type of system for several years for nutrients such as phosphorus and nitrogen.

6.2.1 Tradable rights and offset credits for nutrients

First and foremost, tradable rights and offset credit systems for nutrients aim to limit point-source discharges into the environment from sources such as industries and municipalities. However, they sometimes also contribute to limiting nonpoint source emissions such as those from agriculture. Theoretically, they could generate ongoing remuneration for EG&S, although, as we will see, the effectiveness of this mechanism is hindered by a number of problems.

These systems work as follows: in a given area (most often a watershed), stakeholders such as industries or municipalities producing point-source pollution are required to comply with a total maximum daily load. A system of tradable rights for these discharges is established. Polluters that reduce their discharges may sell their unused rights, and those wishing to pollute more (for example, to expand their operations) may purchase them, thus obtaining the right to increase phosphorus discharges, for example. When this system is used alone, there is no way of providing remuneration for EG&S. However, the option of generating additional discharge rights (often called credits) by funding activities that reduce discharges in another location in the watershed may be provided in the system. Theoretically, these offset credits create a market in which practices that reduce nonpoint source pollution may generate credits that can be resold to firms requiring them. This can provide remuneration for ecological goods and services, which become the object of a market transaction.

Such an operation requires that the quantities of nutrients that are retained in the soil through the implementation of beneficial farming practices such as reduced tillage or limiting crop inputs can be assessed. Since this is far from being an exact science, most systems of this type use a trading ratio that forces purchasers of credits to purchase more reductions than they are entitled to. For example, to obtain the right to discharge one extra tonne of phosphorus, an enterprise may be required to fund good farming practices elsewhere that reduce phosphorus discharges to the environment by three or four tonnes. This allows the authorities to minimize the effects of imprecise calculations and ensure a net gain in terms of environmental quality. Note, however, that farmers do not necessarily obtain remuneration for their EG&S; the system can simply be a way of accounting for and balancing discharges. For example, the authorities could calculate the nutrient load retained in the soil through good farming practices implemented voluntarily or under a cost-sharing arrangement, and grant these savings to polluters by selling them credits. In this case, there would be no value added for farmers, but simply a way for authorities to account for and offset pollution discharges.

The U.S. Environmental Protection Agency (EPA) strongly encourages the development of these trading systems to improve water quality, particularly in terms of phosphorus and nitrogen loads. They are usually established to respect Total Maximum Daily Load (TMDL) objectives. The EPA has a policy framework for defining the characteristics of efficient pollution credit trading systems: the Water Quality Trading Policy. Funds are allocated to various watersheds to implement these mechanisms. This market-based tool appears to have a promising future in the United States.

While this idea is very interesting in theory, it has not worked well in practice, according to the results of pilot projects carried out in several locations in the United States. According to King and Kuch, in 37 project pilots of this type, only a few actual transactions took place.²³ Only one reportedly involved the purchase of credits from nonpoint source polluters that adopted beneficial practices. In terms of nutrient inputs, firms–water treatment plants, in particular–seem to prefer simply to reduce their discharges or to exchange rights among themselves. Various obstacles limit the effectiveness of these mechanisms:

- The difficulty of measuring the actual effects of practices to reduce nonpoint source pollution;
- The reluctance of polluters to provide funding to agricultural producers to reduce their discharges since they have to do it at their own expense;
- The significant presence of government transfer programs that already fund the adoption of good farming practices;
- Sometimes high transaction costs caused by such things as the use of trading ratios;
- The possibility of funding practices that would have been implemented anyway;
- Etc.

In Quebec, the Ministère de l'Environnement et de la Faune (Department of the Environment and Wildlife) considered the use of tradable rights for solid and liquid manure inputs a few years ago. Nolet, Gouin and Morisset studied the issue from the point of view of tradable rights more than offset credits.²⁴ This initiative appears to have been a non-starter.

6.2.2 Rights and credits for atmospheric emissions

These tools seem to be most successful in reducing atmospheric emissions. A system of tradable rights allowed the United States to strongly reduce harmful SO² emissions in the 1990s, mainly through the Acid Rain Program. Due to this success, the current administration has pushed the idea forward again: the 2002 Clean Skies Initiative sets ambitious objectives for certain atmospheric emissions. For several years, the U.S. Department of Energy has been developing a market-based system that could allow these objectives to be attained. Although it targets first and foremost power plants and major industries, it will also affect agricultural producers to a certain degree. For example, the USDA has just published, in cooperation with the Department of Energy, technical guidelines for agricultural and forestry firms on assessing GHG sequestration by agricultural activities such as reduced tillage, nutrient management, forest management and the installation of waste digesters. This will likely allow agricultural enterprises to have emission reductions and GHG sequestration achieved since 2002 recognized in a future offset credit trading system.²⁵

²³ King, D., and Kuch, P, Will Nutrient Credit Trading Ever Work? An Assessment of Supply and Demand Problems and Institutional Obstacles, Environmental Law Reporter, 2003.

²⁴ Nolet, Morisset, Gouin, Les permis échangeables pour gérer les surplus de fumier, GREPA, 1997.

²⁵ See the following for more information on this subject: <http://www.usda.gov/oce/gcpc/greenhousegasreporting.htm> - guidelines
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6.2.3 Remuneration for wetlands and riparian areas

This concept can also be applied to remuneration for damage to the physical natural environment during construction and development. Therefore, stream mitigation banking and wetland mitigation banking both appear in the literature on EG&S.²⁶

When issuing development permits for work near watercourses or wetlands, the U.S. Army Corps of Engineers allows developers to achieve compliance with regulations through offsite compensation.²⁷ This practice arose as a result of the Clean Water Act, the cornerstone of water management in the United States, which introduced the policy of no net loss of wetlands for certain permits. Specialized firms began to provide shoreline and wetland replanting and restoration services in areas outside zones to be developed, thus creating a shoreline and wetland “protection” market. In 2002, there were 219 of these stream compensation sites in the United States.²⁸ In 2000, the U.S. Army Corps of Engineers counted 150 wetland compensation sites.²⁹ Some states have developed trading ratios for this market, for example, the requirement that two acres of shoreline be restored for every acre destroyed in a project. However, it should be emphasized that not all of these projects result in EG&S compensation. A firm paying compensation to a farmer to maintain a restored habitat on private land is an example of remuneration for EG&S, as is a firm setting up “banks” of natural habitat for sale. Such firms exist in the United States, although their importance should not be exaggerated. On the other hand, a mitigation project undertaken by the developer on land that the developer owns does not constitute remuneration for EG&S.

Environmental organizations have expressed a number of concerns about this method, such as the difficulty of determining the actual value of the environment created in compensation.

6.3 Direct payments in Europe

For more than a decade, the European Union has been experimenting with agri-environmental programs using multiyear contractual agreements. Such agreements are concluded under assistance programs for organic farming conversion, among other things. The enshrinement of multifunctionality as a basic principle in such programs is more recent, however. In Europe, the central document governing the funding of agri-environmental measures (including multifunctional ones) is European Community Council regulation 1257/1999 (see extract in Appendix). Today, programs based on the multifunctional approach can be found in the United Kingdom, France, Spain, Ireland, Finland, Sweden, Belgium, Germany and other countries and are characterized by the use of ongoing direct payments.

Reforms under the Common Agricultural Policy (CAP) of 1999 and 2003 gave a considerable boost to the multifunctional approach. The approach retained states that “wherever the society desires that farmers deliver an environmental service beyond the baseline level, this service should be purchased through agri-environmental measures.”³⁰ This instituted the principle of remuneration for EG&S in countries throughout the Union.

The 2003 CAP establishes additional guidelines for agri-environmental programs. To obtain remuneration, farmers must undertake a commitment by contract for at least five years and support will be calculated on the “basis of income foregone, additional costs resulting from the commitment given and the need to provide an incentive” to meet agri-environmental commitments.³¹ The CAP also sets maximum ceilings for annual support, to be

²⁶ For example: Gillespie, N. Stream Mitigation Banking.

http://ecosystemmarketplace.net/pages/article.news.php?component_id=699&component_version_id=839&language_id=12

²⁷ U.S. Army Corps of Engineers, Mitigation banking applied to streams, September 2000, <http://www.hq.usace.army.mil/cepa/pubs/sep00/story3.htm>

²⁸ Gillespie, N., op cit.

²⁹ U.S. Army Corp of Engineers, op cit.

³⁰ European Commission, Agriculture and the environment, http://www.europa.eu.int/comm/agriculture/envir/index_en.htm - measures

³¹ European Commission, Summary of regulation (EC) no. 1257/1999, <http://www.europa.eu.int/scadplus/leg/enlvb/l60006.htm>

calculated by hectare of land enrolled in the program. Ceilings are 600 €(euros) (\$959) for annual crops, 900 € (\$1,439) for perennial crops and 450 €(\$719) for other crops. These substantial amounts are used as maximums by member countries in setting the annual remuneration for each practice. In addition, funds allocated to cover initial costs (such as equipment purchases) can be covered in a contract and spread over a period of five years. Not all countries choose to engage in these cost-sharing arrangements, however.

In Europe, multifunctionality is combined with cross-compliance. EC regulation no. 445/2002 states that, by 2005, member countries must fix minimum standards for agri-environmental measures as an eligibility requirement for support programs. This means that even access to voluntary, multifunctional-type programs is conditional on respect of these minimum standards. It should be noted that cross-compliance will gradually be implemented between 2005 and 2007 and that the ten new members of the Union will not be immediately subject to these requirements.

6.3.1 United Kingdom: Environmental Stewardship and Rural Stewardship Scheme

Great Britain's Environmental Stewardship program, which goes into effect in 2005, uses a special form of ongoing direct payments. The Department for Environment, Food and Rural Affairs (DEFRA) wishes to recruit 43,000 participants in the program's first year. The program offers, under its Entry Level Stewardship component, a flat rate payment per hectare for the adoption of agri-environmental measures. Each measure is scored on an eligibility grid and projects with the number of points required are eligible for a payment of £30 per hectare (C\$69/ha). There are over 60 options available and specific requirements are established for each. Options are divided into the following groups:

- Boundary features (hedgerows, stone walls, ditches);
- Trees and woodland;
- Historical and archeological features;
- Buffer strips and field margins;
- Arable land;
- Encouragement of a range of crop types;
- Soil protection;
- Lowland grassland;
- Uplands;
- Nutrient and soil management.

Payment takes the form of an annual rental payment encouraging the adoption of beneficial practices exceeding those required under British or European regulations. Five-year contracts are signed as required in the CAP and participants receive payments every six months. Participants have much leeway in selecting measures to be adopted, which unfortunately has had an unwanted effect, which was measured during pilot projects. Farmers tend to adopt the practices requiring the fewest changes rather than the most demanding ones, which are also the most beneficial. In short, they qualified for funding by making as few changes as possible.³² Readers should note that the program does not in any way defray initial costs and concentrates only on long-term funding for action.

The original approach adopted in the Environmental Stewardship program provides uniform compensation, which participants qualify for by undertaking a minimum number of measures. Eligibility is calculated by totalling the points for each activity, with the minimum generally being 30 points per hectare on average for the entire farm.

³² Central Science Laboratory, Evaluation of the pilot entry level Agri-Environmental Scheme, second interim report, 2003, page 88.
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**Examples of Measures Obtaining Entry Level Funding
under the U.K.'s Environmental Stewardship Program**

Action	Details	Points
Hedgerow management	Maintain hedges, do not cut during bird breeding season, etc.	22 points per 100 m of hedgerow
Sow arable land with pollen and nectar flower mixtures	Create well-distributed strips or small blocks and seed them with a variety of flowers to encourage the presence of insect pollinators, birds, etc. Several options of this type are described, associated with varied cropping systems or specific crop sequences.	450 points per hectare
Buffer strips along the edge of cropland	Maintain a protective buffer strip along sensitive elements such as shorelines and woodlands and do not apply pesticides, fertilizers, etc.	400 points per hectare for a strip of 4 or 6 m wide
Use of a nutrient management plan	Formulate and implement a nutrient management plan, keep a spreading log, etc.	2 points per hectare
Permanent grassland with very low inputs	In grassland, do not fertilize with more than 50 kg inorganic nitrogen per hectare, and no more than 100 kg/ha in total, including organic fertilizers, manure, etc.	85 points per hectare

Source: Entry Level Stewardship Handbook, Rural Development Service, DEFRA, 2005.

The Rural Stewardship Scheme, which is available in Scotland and administered by the Scottish Executive, differs somewhat from the program above but is governed by the same community-based imperatives. It is described here to show that methods retained may differ significantly within the same country. The scheme requires the signature of a five-year contract and provides annual payments. The latter cover infrastructure expenses and provide remuneration for adherence to prescriptions. Scotland has chosen, like France and Switzerland, to put a value on each action undertaken, calculated by unit or surface area. Planting native trees is compensated by the stem, while the extensive use of pastureland to benefit birds is compensated by the hectare. There is therefore a great deal of leeway in compensation amounts depending on the number of actions undertaken. The program is original in that it pays lump sums for the purchase or installation of active elements such as fencing (payable by the linear metre), ornamental trees (paid by the stem) and retention ponds. Payments are spread over the five years of the contract.

6.3.2 France: Sustainable Agriculture Contract

In 2003, France replaced the expensive Farmland Management Contract (Contrat Territorial d'Exploitation, or CTE) with the Sustainable Agriculture Contract (Contrat d'agriculture durable, or CAD) and refocused its objectives on top priorities. The CTE was the first real multifunctional program in France, and the CAD is similar but simplified. Contracts are managed at the *préfecture* level. Each *département* draws up a standard contract, which applicants use as a basis. Applicants undertake in the contract to respect for at least five years the basic requirements and to implement specific measures, which are described in great depth in the specifications. Remuneration is provided in the form of annual rental payments based on the measures undertaken, for which the amounts are determined in advance by the authorities. French legislation on the CAD specifies that the average amount of a CAD in a given *préfecture* must not exceed 27,000 € (\$43,000) for the duration of the contract.³³ This provides the budgetary control that was absent for the CTE. The average maximum amount for a CAD corresponds to around C\$8,727 per year.

³³ Arrêté du 30 octobre 2003 relatif aux aides accordées aux titulaires de contrats d'agriculture durable, Journal officiel de la République française #258, November 7, 2003.
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The CAD is based on a wide range of specific, verifiable measures. Each measure has an annual value based on the number of hectares or units. They are wide-ranging and are not limited to environmental protection. Farmers keeping an endangered breed of livestock on their farm can receive an annual incentive payment, which helps to protect biodiversity.

For the purposes of this study, we consulted the list of measures eligible for CAD funding in the *Département de Mayenne*. We observed that many options are available only to farmers that have previously signed a CTE, in order to honour the latter. Under CAD, the number of options is more limited. Regional authorities identified three priority measures that must be undertaken in all contracts, which ensures consistency in regional efforts. One is the use of winter cover crops. In addition, nationwide actions have been defined for all *départements* such as support for organic farming conversion and for endangered species of livestock. Funding available in 2005 should support 10,000 new contracts in France.

Examples of Measures Funded under a CAD, *Département de Mayenne*

Measure	Details	Remuneration
Reconversion of arable land into a temporary grassland	Converting cropland next to a watercourse into a grassland (width of 10–35 m) and limiting treatments there, without prohibiting mowing or pasturing	259.16 €/ha/year (\$419/ha/year)
Hedgerow management	Undertaking to maintain existing hedgerows in a field and keep them up and trim them (except during the nesting season for birds), etc.	0.37 €/linear metre/year (\$0.59/linear metre/year)
Endangered local breeds of cattle, sheep and goats	Owning and caring for a certain number of livestock units of endangered breeds.	46 €/LU/year (\$74/LU/year)

Source: Arrêté n° 2004-A-355 portant création du contrat type départemental de la Mayenne pris en application du décret n° 2003-675 du 22 juillet 2003 relatif aux contrats d'agriculture durable (CT-DEP), Préfecture de la Mayenne.

CAD also has a provision for the sharing of initial costs up to a maximum amount. Although the CAD is a major agri-environmental measure, there are some other programs in France, such as the Agricultural Pollution Control Program (Programme de maîtrise des pollutions d'origine agricole), which is comparable to Quebec's Prime-Vert program and which focuses on minimizing nonpoint source pollution by funding infrastructures and consulting services.

6.3.3 Switzerland: direct payments

Switzerland is a pioneer in the multifunctionality of agriculture and its neighbour, the European Union, seems to be moving towards the Swiss way of doing things. The overall European agri-environmental framework described earlier is similar to that of the Swiss Confederation. To receive direct payments, farmers must provide certain required ecological services (*prestations écologiques requises* or PERs), which constitute a reference level for good farming practices. The European Union and its members have a similar cross-compliance mechanism, which will come into force in 2005. On the other hand, the Swiss program has support measures not available in most European countries and which make Switzerland unique in this area.

Direct payments are structured as follows:

1. General direct payments
 - Payments based on farm size in hectares
 - Payments for farming livestock fed on roughage
 - Payments for farming livestock under difficult conditions
 - Payments for farming on steep slopes
 - Payments for vineyards on steep slopes
2. Ecological direct payments
 - Payments for ecological set-aside areas
 - Extensive meadows, areas used to grow livestock bedding, hedgerows, groves and wooded shorelines
 - Low-intensity meadows
 - Floral fallow (fallow strips)
 - Rotating fallow (fallow fields)
 - Extensive crop strips
 - Tall fruit trees
 - Extensive farming
 - Organic farming
3. Payments for humane animal husbandry
 - Stabling systems that are particularly respectful of livestock
 - Regular outdoor exercise for productive livestock

General direct payments provide remuneration to farmers for services rendered based on the farm size in hectares, the objective being to ensure the use and maintenance of the entire agricultural area concerned.³⁴ Switzerland assigns a monetary value to the value to society of land occupancy in rural areas and farmers' contribution to the country's food security and safety, which is an extremely multifunctional approach. Other general payments are provided for maintaining livestock under difficult conditions, maintaining livestock that consume roughage and farming on steep slopes. Payments for the latter are based on the degree of the slope, which encourages farmers to farm even the most mountainous plots. The biggest payments are for farm size; in 2003, 57,397 farming operations received on average 22,962 € (C\$23,955) for this category.

Ecological direct payments are provided for ecological services that go beyond certain required services (*prestations écologiques requises* or PERs) (the Swiss version of cross-compliance). They take the form of annual payments per hectare linked to a particular type of land use. There are three categories: organic farming, extensive farming and payments for ecological set-aside areas. Each type of land use is associated with certain conditions, such as the prohibition of herbicide use or manure spreading. In 2003, in the subcategory of payments for set-aside areas, 54,564 enterprises received on average 2,289 € (C\$2,388) for ecological services provided.

In 2003, Switzerland made the equivalent of C\$2.566 billion in direct payments of this type.

³⁴ Swiss Federal Office for Agriculture, <http://www.blw.admin.ch/rubriken/00310/index.html?lang=fr> (not available in English)
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Examples of Measures Eligible for General and Ecological Direct Payments, Switzerland

Measure	Details	Remuneration (2004)
Payments based on farm size in hectares (general direct payments)	Base-level contribution to compensate for the protection and maintenance of the rural landscapes, ensuring a safe and sufficient food supply and preserving natural heritage ³⁵	\$1,273/ha/year (SF1,200)
Extensive meadows, areas used to grow livestock bedding materials, hedges, groves and wooded shorelines (ecological direct payments)	An integrated measure to support the management of these lands. Funding depends on the region.	\$468 to \$1,560/ ha/year (SF450-1,500)
Regular outdoor exercise for productive livestock (payments for humane animal husbandry)	Provide a minimum number of outings (generally once a day)	\$156-282/LU/year (SF155-280)
Tall fruit trees (ecological direct payments)	Conserve nut or fruit trees (not part of an orchard), at least 20 per farm	\$15.50/tree/year (SF15)

Amounts are reduced gradually as farm size increases. Consequently, a farm of 90 ha or with over 135 livestock units is not eligible for funding. Farms eligible for 100% of the amounts listed in the table have fewer than 30 ha or fewer than 45 livestock units. Funding is also refused to farmers with over a certain amount of taxable income.³⁶ The average Quebec farm (106 ha) would therefore not have access to this assistance.

Program administration is decentralized and cantons have some latitude in modifying certain parameters. Farmers must apply to authorities in their canton.

To sum up, Switzerland offers a direct payment program that:

- Is very generous;
- Recognizes all the functions of agriculture;
- Promotes the survival of small operations;
- Promotes land occupancy in rural areas.

Switzerland represents without a doubt the most advanced example of multifunctionality in agriculture.

6.3.4 The progressive and degressive approaches: Finland and Scotland

In some European countries, an approach is used to promote the gradual adoption of beneficial farming practices. Two examples are provided here, Finland's Agri-environmental Support Program and Scotland's Organic Aid Scheme.

The Finnish program³⁷ provides participants with an initial amount per hectare (93 €/ha/year or C\$152), a little like the U.K.'s new Environmental Stewardship program. For farmers to receive funding, a predefined set of specific measures must be undertaken, involving environmental planning, minimum fertilization of arable crops, pest control, buffer strips, and biodiversity- and landscape-based management. In the following year, farmers are required to implement an additional measure and of course may undertake to do more. Each additional measure

³⁵ Ibid, <http://www.blw.admin.ch/rubriken/00332/index.html?lang=fr>

³⁶ Swiss Federal Office for Agriculture, Résumé des paiements directs versés à l'agriculture en 2004, Berne, February 2004.

³⁷ <http://www.mmm.fi/english/agriculture/environment/>

increases the payment per hectare, and can involve such things as more appropriate fertilization, winter cover crops, reduced tillage and animal welfare.

The opposite approach can also be taken. The Scottish Organic Aid Scheme, which aims to encourage conversion to organic agriculture, provides participants with degressive support.³⁸ Participants receive a significant initial payment (for example, £220 or C\$521 for arable land in the first year) and this amount decreases gradually over five years. Afterwards, an annual maintenance payment of £30 (C\$71) is paid until the tenth year. Several European countries have degressive systems to support conversion to organic farming and have had them for fifteen years or so.

³⁸ <http://www.scotland.gov.uk/Topics/Agriculture/Agricultural-Policy/15869/3753>

7 Situation of remuneration for EG&S in Canada

Agri-environmental programs in Canada do not provide significant compensation for the provision of EG&S per se. Efforts are focused instead on encouraging farms to implement agri-environmental management plans, adopt environmentally beneficial practices and acquire the appropriate facilities and infrastructures. This section presents a sample of Canadian programs that provide something akin to remuneration for EG&S.

7.1 Direct payments

Although direct payments linked to agri-environmental concerns are very common in Canada, ongoing direct payments based on the multifunctional approach are rare. Here, we provide an overview of certain programs with certain similarities to the multifunctional approach, whether fully operational or in the planning stage.

7.1.1 Alternate Land Use Services (ALUS) Project: history and concept

This program was initiated by a joint working group made up of representatives of the Keystone Agricultural Producers (KAP), the main farm producers association in Manitoba, and Delta Waterfowl, an organization dedicated to waterfowl conservation. After determining the conceptual basis of the approach, the two organizations worked to convince the authorities of the merits of testing such an approach. In addition, local partners were recruited to implement pilot projects (the former will be dealt with in the subsections on each project). At the political level, ALUS has the support of the governments of Prince Edward Island (the former Minister of Agriculture attended the Ontario ALUS workshop) and Manitoba. Since 2004, there has been an informal committee, chaired by the deputy ministers of Manitoba and Prince Edward Island, which is trying to convince the other provinces of the advantages of this approach. Some local Members of Parliament are also encouraging implementation of the project and refer to it occasionally in their speeches in the House. The idea is also gaining ground among several farmers' organizations and has been endorsed by the Canadian Federation of Agriculture.

The ALUS approach is distinct in that it aims to provide financial compensation to farmers for their EG&S outputs, and thus promote the greater production of such goods and services. An extensive range of EG&S is targeted in the program, including such things as water filtration, biodiversity and carbon sequestration.

According to the ALUS approach, since ecological goods and services are often purely public goods or at least goods held in common, it is unfair that farmers alone should bear the costs of producing, restoring or conserving them. ALUS aims to introduce the concept of ongoing payments for these public goods, thus distinguishing itself from approaches based on the one-time funding of specific projects. The objectives of ALUS fall into three broad categories:

- Conservation and environmental enhancement (soil, water, carbon sequestration, fauna and flora);
- Promotion of sustainable rural communities;
- Agricultural income enhancement and adaptation.³⁹

³⁹ Keystone Agricultural Producers, <http://www.kap.mb.ca/alus.htm>

Aside from the third item, these objectives are very common in the agri-environmental field and what makes the project special is its aim of changing remuneration methods for farmers. This latter is based on the following fundamental principles:

1. Voluntary program
2. Cap on land eligible for program to 20% of landowner's holdings
3. Integrated with existing delivery systems, such as crop insurance programs
4. Targeted to environmentally sensitive sites
5. Flexible, based on a nine-year contract, modifiable every three years
6. Does not cause market distortion

According to Dr. Robert Bailey, vice president of Delta Waterfowl and cofounder of the approach, the basic difference between ALUS and traditional conservation programs is that traditional approaches do not involve the farmer in the process. Bailey believes that land acquisition and retirement programs, which are common in the Prairies, have not achieved tangible environmental results and have not recognized the active role that farm producers can play in environmental protection. Proponents of this approach believe that it is the most likely to encourage farmers to produce a wider range of positive externalities. In addition, Bailey believes that the local program administration advocated by ALUS differentiates it from programs administered centrally or by major NGOs.

One of the main characteristics of the implementation of the project is that program delivery will be entrusted to agencies managing crop-insurance programs. The ALUS proposal defines qualifying practices as follows:

1. Annual practices
 - Grazing management using rotation
 - Green manure crops (biennial or short-term perennial legume crops) to improve the soil
 - Crop residue management
2. Multi-year practices
 - Conversion of land to conservation cover (forage pasture, wooded cover, etc.) for longer than one year
 - Creation of forage reserves
 - Deferred harvesting of forage areas to accommodate nesting
3. Permanent practices
 - Riparian area management
 - Wildlife management zones
 - Carbon sinks
 - Conservation or creation of water storage areas or wetlands

As readers can see, ALUS aims to provide compensation for several activities already encouraged in Quebec through MAPAQ's guide to agri-environmental practices, *Bonnes pratiques agroenvironnementales pour votre entreprise agricole*, among others.

7.1.2 ALUS project in Blanshard, Manitoba

After several years of planning and a funding search, this made-in-Manitoba proposal was launched in the summer of 2004. The main institutional partner is the Manitoba Rural Adaptation Council (MRAC), a non-profit organization that administers regional funding for Agriculture and Agri-food Canada's Agricultural Environmental Stewardship Initiative. In Quebec, it is the equivalent of the Conseil pour le développement de l'agriculture du

Québec (CDAQ). On November 25, 2004, the MRAC announced that it would be providing \$200,000 to fund the launching of the pilot project over two years. The organizers hope to obtain the remaining funding required to get the project underway in the spring of 2005. A number of private partners have already come on board.

A detailed proposal has been prepared for the project, *A Proposal for the Development of an Alternate Land Use Services Pilot Project in the Rural Municipality of Blanshard*, which contains all the details required for a full understanding of the project. The project is the subject of an agreement between KAP, Delta Waterfowl, the Rural Municipality of Blanshard and the Little Saskatchewan River Conservation District (LSRCD). The LSRCD will manage the program locally within the municipality of Blanshard. The program's aims include testing the method's feasibility and costs, determining the most efficient administrative structure for program delivery, establishing a fair-market-based method of pricing ecological service delivery and quantifying the effects of the approach on farm incomes.

Various information sources were used to set proposed payment levels for each alternative land use. They include the leasing costs for adjacent land, municipal taxes, estimates of the costs and benefits produced by agriculture, provincial data on land productivity and compensation provided under conservation agreements signed in Manitoba. The amounts retained are to be provided in the form of annual rental payments that should encourage farmers to assign portions of their land to the production of EG&S.

Payments Under the ALUS Blanshard Pilot Project

Type of environment	Practices included	Expected annual remuneration
Wetlands	Maintenance with no enhancement	\$12/ha (\$5/acre)
	Maintenance with protection of edges (margins, livestock, etc.)	\$25/ha (\$10/acre)
	Restoration (e.g., filling in drains)	\$37/ha (\$15/acre)
Riparian areas	Maintenance of existing riparian zones	\$12/ha (\$5/acre)
	Maintenance/enhancement of riparian zones allowing limited agricultural use	\$37/ha (\$15/acre)
	Maintenance/enhancement of riparian zones with no agricultural use	\$37/ha (\$15/acre)
Fragile lands	Maintenance of permanent cover with no limitations on use	\$37/ha (\$15/acre)
	Maintenance of permanent cover with limited use (managed grazing or one-cut haying)	\$62/ha (\$25/acre)
	Maintenance of permanent cover with no agricultural use	\$62/ha (\$25/acre)
Natural areas	Maintenance of natural areas with no limitations on use	\$9/ha (\$3.50/acre)
	Maintenance of natural areas with limited agricultural use	\$12/ha (\$5/acre)
	Maintenance of natural areas with no agricultural use	\$37/ha (\$15/acre)

Data taken from *Proposal for the Development of an Alternate Land Use Services Pilot Project in the Rural Municipality of Blanshard*

The Manitoba proposal does not include measures for sharing the initial costs of implementing the measures.

7.1.3 ALUS project in Norfolk County, Ontario

The project in Norfolk County has been amply documented and seems to be ready for implementation, but remains stalled at the funding search stage. A detailed proposal was published in January 2004.⁴⁰ Exploratory work has been done with farmers to identify potential participants. The project is the result of cooperation between the Norfolk Land Stewardship Council, a small organization involved in local rural environmental protection projects, and the Norfolk Federation of Agriculture, as well as Delta Waterfowl. The document prepared to promote the project describes the activities to be funded, with the total cost of the pilot project estimated at \$7.65 million over nine years.

⁴⁰ A Proposal To Test An ALUS Concept in Norfolk County, Ontario, 2004, 69 p.

Payments Under the ALUS Norfolk County Pilot Project

Type of environment	Practices included	Initial cost sharing	Expected annual remuneration
Wetlands	Restoration (e.g., filling in drains) with agreement of landowners affected	66% ALUS, 33% Ministry of Agriculture	None
Riparian areas	Maintenance/enhancement or creation of margins with light agricultural use	50-75%	\$250/ha (\$100/acre)
	Maintenance/enhancement or creation of margins with no agricultural use, option of fencing or reforestation of wetlands	75%	\$375/ha (\$150/acre)
	Creation of margins along municipal ditches	75%	\$375/ha (\$150/acre)
Fragile lands	Creation of permanent cover such as field margins or grass waterways with light agricultural use	50%	\$125/ha (\$50/acre)
	Reforestation without agricultural use (including windbreaks)	75%	\$125/ha (\$50/acre)
	Alternative cultivation methods (IPM, cover crops, reduced tillage)	0%	\$75/ha (\$30/acre)
Wildlife habitat	Maintenance/enhancement of natural lands with no limitations on use	50%	\$25/ha (\$10/acre)
	Maintenance/enhancement of natural lands with limitations on use	50%	\$75/ha (\$30/acre)
	Maintenance/enhancement of natural lands with no agricultural use	75%	\$250/ha (\$100/acre)

Data taken from *A Proposal to Test an Alternative Land Use Services (ALUS) Concept in Norfolk County, Ontario, 2004*.

As readers will note, this project provides for the sharing of the initial costs of implementing these practices, unlike the Manitoba project. A partnership is also planned with the University of Guelph to ensure environmental monitoring and assessment since the project objectives also include determining its environmental effectiveness and the ideal structure for program delivery.

7.1.4 ALUS-linked project in Saskatchewan

Initiated by the Agricultural Producers Association of Saskatchewan Inc. (APAS), the Strategic Transition and Agricultural Revitalization for Tomorrow (START) project is a proposal to change the way farmers are compensated.⁴¹ Very similar to ALUS, the START project has joined forces with ALUS under the latter's banner, but the program has several original elements that merit special attention. START is based on the idea of remuneration for EG&S in order to better protect the environment, but it also aims to diversify farmers' sources of income. The main goal is to remove fragile or less productive land from production and convert it into permanent cover. APAS has set a financial incentive of \$50 per acre annually (\$124/ha/year), but the full amount would not be paid immediately to the farmer. Undertakings to pay would be used to diversify farmers' sources of income or create value-added activities such as investing in livestock buildings, a livestock leather tanning operation or a farm machinery repair shop. Undertakings will be called Agriculture Diversification Bonds, to be funded by the provincial and federal governments, and will be used as security by lending institutions. This mechanism is designed to prevent the loss of economic activities in rural communities that could result from a massive farmland retirement program.

⁴¹ APAS, 2002, <http://www.apas.ca/index.php>

START will provide not only compensation for land retirement but also annual environmental rental payments for the maintenance of natural land such as marshes and forests, or for reforested land or land already retired from production. This incentive will prevent the conversion of natural lands into cropland. The START proponents recently joined the ALUS network and a national workshop was held in Saskatoon in March 2005.

7.1.5 ALUS-linked project on Prince Edward Island

The P.E.I. Federation of Agriculture developed a pilot project originally intended to compensate farmers for the loss of cropland under a 1999 regulation increasing the width of riparian strips to ten metres. The Environmental Services Initiative aims to provide lump-sum compensation for farmers complying with the regulation, which is the strictest in Canada. More recently, the initiative has been expanded by adding an ALUS-linked proposal to provide remuneration for EG&S. The goods and services included are:

- Extension of buffer zones to exceed regulatory requirements (payments of \$296/ha/year);
- High slope land retirement (payments of \$247-296/ha/year);
- Shelterbelt establishment (payments of \$296/ha/year).⁴²

The documents available indicate that, although the initial phase appears to have been approved, the project is awaiting funding from the federal government. Like their Manitoba counterparts, authorities in P.E.I. are strongly in favour of developing compensation for EG&S and ALUS.

7.1.6 Greencover Canada program

As readers are no doubt aware, this is one of the primary agricultural conservation programs which has been administered by the federal government since 2003. Previous versions of the program were implemented beginning in the early 1990s. One of its main objectives is to remove environmentally sensitive land from production and it is implemented mainly in the Prairies. The program is not a perfect example of remuneration for EG&S but it comes close by virtue of some of its characteristics. GreenCover, like most conservation-agreement-based programs, delays compensation through a long-term conservation clause. Remuneration, ranging from \$111/ha to \$247/ha depending on whether native species are planted, is divided into two payments. The first payment covers the costs of converting to permanent cover, while the second serves as an incentive for the participant to comply with the ten-year conservation contract. Agriculture and Agri-Food Canada (AAFC) may adjust the amount of the second payment if the first one covers more than the cost of seeds. The incentive value of the second payment and the long-term conservation agreement make it somewhat similar to the purchase of an ecological service from the farmer.

The GreenCover program can be considered as a rudimentary attempt at remuneration for EG&S since it:

- Is implemented in the form of a long-term contract;
- Compensates the farmer for land use other than crop production;
- May sometimes exceed the initial costs incurred.

The program also has components for managing agricultural land near water (riparian strips), shelterbelts and the evaluation of beneficial management practices in specified watersheds.

⁴² PEI Environmental Services Initiative, PowerPoint Presentation, <http://www.apas.ca/modules.php?name=News&file=article&sid=327>
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7.1.7 Conservation agreements

One of the main players in Canada in the area of conservation agreements is Nature Conservancy Canada (NCC). Other groups like Ducks Unlimited Canada (DUC) and local organizations are also involved. The North American Waterfowl Management Plan (NAWMP) is a major conservation undertaking signed in 1986 between the U.S. and Canada, with Mexico joining in 1994. Partners include dozens of conservation organizations, public agencies and others, which have joined together to protect the natural habitats critical to waterfowl. Regional plans have been developed to unify the efforts of the various organizations involved and Quebec is part of the Eastern Habitat Joint Venture. Representatives of the Quebec government (Société des établissements de plein air du Québec (SEPAQ) and MDDEP) sit on certain NAWMP committees. The plan functions mainly through land acquisition and conservation easements and agreements, and is very large in scale. Although land acquisition in itself does not constitute payment for EG&S, the signing of conservation agreements limiting development rights in exchange for compensation is an approach that falls just within the limits of what we are studying here. The Plan comprises a multitude of activities undertaken by the different partners and is therefore likely to include measures to compensate landowners for ecological services rendered. In western Canada, the Plan has created an impression among farmers and producers' organizations that farmers are to have their land taken away from them in the interests of conservation. Consequently, ALUS and START have emphasized that they want to include farmers in the conservation process.

Ducks Unlimited Canada, a private organization that is actively involved in protecting natural habitats, is familiar with using long-term payment methods. It participates in NAWMP. One of its methods is arranging conservation easements to protect wetlands. Another example of an activity resembling remuneration for EG&S is the Hay Conservation Program available in the Saskatoon region, in which DUC compensates farmers for converting cropland to permanent cover.⁴³ The contract includes a certain number of conditions, such as not draining wetlands or not using converted land as pastureland. Remuneration, provided in the form of a lump-sum payment, is conditional on adherence to a ten- or 21-year contract. It is set at \$15-25/acre for ten years and \$40-70/acre for 21 years, or \$37-62 and \$99-173 per hectare respectively.

Similar to the way Delta Waterfowl is involved in ALUS, Ducks Unlimited Canada is active in a national cover crop program resembling the CRP in the United States. In 2001, DUC carried out an economic study to calculate the potential gains per hectare associated with adopting a large-scale program to retire marginal land and establish riparian strips. In the meantime, the federal government launched its GreenCover program, but Ducks Unlimited's proposal was more ambitious and centred more on ongoing direct payments.

The conservation agreement approach has been most developed in the Prairies, where there is more available land and more experience with land retirement. In a number of cases, however, such agreements do not include the direct remuneration of landowners but rather the development of wildlife management infrastructures and the provision of technical and scientific advice and services. According to Me Pierre Renaud, Quebec regional director of Nature Conservancy Canada, the use of conservation agreements and easements is very recent in Quebec. In Quebec, the NCC proceeds through land acquisition, donation and easements but only four or five conservation easements have been obtained, the oldest dating back only two years. Therefore, Quebec does not yet have a real market for ecological services in the area of conservation agreements.

Some easements involve preserving agricultural land use, while prohibiting agricultural use from encroaching on adjoining woodlands and swamps. As we have seen previously in the case of the United States, rights can be sold for less than their actual value, with the difference eligible for federal and provincial tax credits. The Ministère du Développement durable, de l'Environnement et des Parcs (MDDEP) (Quebec Department of Sustainable Development, the Environment and Parks) administers a program providing funding to conservation organizations

⁴³ Saskatchewan Watershed Authority, Saskatchewan conservation programs, 2003

to acquire development rights for private land. Quebec's Programme national pour le développement d'un réseau privé d'aires protégées (National program for the development of a private network of protected areas) offers financial assistance for projects involving the purchase of development rights on privately owned land with a significant ecological value.⁴⁴

7.1.8 Ontario Conservation Authority support programs

Ontario has a very well-developed system of local conservation authorities to assist in water management and protection. These local agencies, funded by different levels of government, are actively involved in conservation activities to protect water quality.

The Grand River Conservation Authority (GRCA) did not wait for the current debate to emerge before implementing ongoing direct payment mechanisms at a local scale. Comparable to the City of New York's initiative, the GRCA's program aims, among other things, to protect the quality of drinking water, thus reducing the need for intensive filtration and treatment. Although, in general, the Rural Water Quality Program has cost-sharing measures similar to that provided in the Prime-Vert program, annual rental payments are provided to support certain practices in some parts of the watershed.

This program was initiated in 1998 by Ontario's regional municipality of Waterloo, with assistance from the Grand River Conservation Authority. It provides several types of funding. In a measure to provide remuneration for EG&S, the program compensates farmers for land set aside for stream buffer strips, cover crops, shelterbelts, environmentally friendly cropping practices or simply the retirement of fragile agricultural land. For strips, shelterbelts and retired land, the incentive is \$617/ha/year (\$250/acre), while for other land use, the amount is \$49/ha/year (\$20/acre). Annual rental payments ("performance incentives") are available for three years only.⁴⁵ The project is relatively modest in size, only paying out \$2 million since 1998, including cost-sharing measures. However, it is one of the most comprehensive multifunctional agri-environmental programs in Canada. It is also available in Wellington County and Guelph, where \$1.6 million has been invested since 1999.

A program very similar to the preceding one, the Clean Water Program is managed on a watershed scale, involving the South Nation River watershed between Ottawa and Cornwall. Municipalities in the watershed, the provincial government, private firms and conservation organizations fund the South Nation Conservation Authority. It offers primarily a cost-sharing program for the adoption of good farming practices, similar to that offered in most jurisdictions including Quebec. However, there are added performance incentives for establishing buffer strips along waterways, available for up to three years. Participants can receive compensation for up to 50% of the cost of establishing the buffer, to a maximum of \$5,000, and also receive an incentive of \$371/ha (\$150/acre), for up to ten hectares over three years.⁴⁶ Although remuneration is provided for producing an ecological service, it is very rudimentary due to the limited eligible area and duration of remuneration. Despite the availability of the incentive, since 1993, only one project has been funded under the Clean Water Program, for less than \$1,000.⁴⁷ What makes the South Nation program special is that it experiments with a market-based tool that was discussed for the United States in Section 6.2.1: tradable rights and offset credits for nutrients. The Ontario Ministry of the Environment is trying out this concept in the watershed. New polluting firms or municipalities that must comply with a total maximum daily load can buy discharge credits from the South Nation Conservation Authority, which will provide an increase in the allowable phosphorus load certified by the Ministry of the Environment. The organization is mandated to fund good farming practices in order to reduce the phosphorus load elsewhere in the watershed (based on a 4 to 1 ratio). Practices funded are the same as under the Prime-Vert

⁴⁴ For details, see Développement durable, Environnement et Parcs, Québec, <http://www.menv.gouv.qc.ca/biodiversite/prive/programme.htm>

⁴⁵ Grand River Conservation Authority, <http://www.grandriver.ca/index/document.cfm?Sec=25&Sub1=104&Sub2=0>

⁴⁶ South Nation Conservation, Clean Water Program, <http://www.nation.on.ca/English/clean.htm>

⁴⁷ South Nation Conservation Clean Water Program, 2003 Annual Report.

program. Launched in 2000, by 2003, the project resulted in the signing of agreements with two firms and six municipalities for roughly \$800,000 over seven years. The sale of these credits does not provide an ongoing source of income for farmers since they only receive one-time payments for implementing good agri-environmental practices. In addition, the South Nation Conservation Authority systematically measures phosphorus reductions related to projects it funds, whether or not they are part of the discharge credit trading project. Most of the total phosphorus reductions achieved by the authority result from the construction of manure storage structures and milkhouse wastewater treatment facilities.

The City of Ottawa, through its Rural Clean Water Program, is also engaged in providing remuneration for ecological services.⁴⁸ Annual rental payments are provided for a maximum of three years to encourage the adoption of practices such as land retirement for field windbreaks, buffer strips and permanent cover. In this case, the remuneration is \$371/ha (\$150/acre). Residue management and strip cropping are also funded at \$49/ha/year (\$20/acre).

As we have observed, annual rental payments for the provision of EG&S are used in Ontario on a local basis and there seems to be a movement to standardize prices. The limited duration of payments, however, means that these initiatives fall somewhat short of the multifunctional approach. However, the presence of provincial and federal funding for program delivery leads us to believe that some projects similar to ALUS are already being funded in Canada on a small scale.

7.1.9 Incentive program by the Financière agricole du Québec

Very recently (April 1, 2005), the Financière agricole du Québec, an agricultural financing agency, launched a new program that is certainly the first concrete payment program for EG&S in Quebec in agriculture.⁴⁹ The *Programme de mesures incitatives en agroenvironnement et aménagement d'habitats fauniques en milieu agricole* (agricultural incentive program for agri-environmental measures and the development of wildlife habitats) is a simple, targeted program. Its objective is to provide support to groups of farmers interested in participating in the program to enhance biodiversity in watercourses in an agricultural environment (*Programme de mise en valeur de la biodiversité des cours d'eau en milieu agricole*) developed by the UPA and the Fédération de la Faune du Québec. The purpose of the program is to create wildlife habitat on agricultural lands. Since, to carry out this work, participating landowners will experience a decrease in income because of land taken out of production, the Financière took the initiative of offering compensation for the land in question: \$600/ha/year, for up to \$2,000 annually over a maximum of five years. This can be considered as remuneration for EG&S.

7.2 Fiscal tools

The following initiatives come under what has been called "green taxation," a measure sometimes used to provide remuneration for the production of EG&S.

7.2.1 Manitoba Riparian Tax Credit Program

As part of its strategy to fight phosphorus and nitrogen pollution in Lake Winnipeg, in 2003, the Manitoba government adopted a unique incentive measure for protecting riparian strips. Aiming to encourage landowners to restrict their livestock's access to watercourses and preserve substantial riparian strips, the Riparian Tax

⁴⁸ City of Ottawa, Rural Water Quality Program, http://ottawa.ca/city_services/waterwaste/27_2_6_2_en.shtml

⁴⁹ FADO, Programme de mesures incitatives en agroenvironnement et aménagement d'habitats fauniques en milieu agricole, http://www.financiereagricole.qc.ca/fr/fina/prog_mesu_inci.pdf

Credit Program provides a tax credit for the management of healthy riparian zones located near major rivers and lakes. It is managed by the Manitoba Department of Finance. To receive the tax credit, participants must undertake to maintain a 30-m wide strip for five years. Compensation is \$10/acre/year (\$25/ha/year) for one-cut haying of a former field or pasture or \$14/acre/year (\$32/ha/year) for a former pasture that will no longer be used. Participants receive an annual cheque for participating. The Manitoba government is promoting this program as the first of its kind in Canada. It is an innovative economic tool that compensates farmers for wise land use practices. In addition, the use of a recessive credit constitutes a form of payment for the provision of an ecological service. There is also a measure to ensure equity for landowners who have already established similar riparian strips, who are also eligible for funding, so that those who have already displayed an ecological approach will not be penalized. It remains to be seen whether the amounts offered provide a sufficient incentive to farmers. The Manitoba Tax Assistance Office provided us with official data on participation, as well as some comments on the program. As of February 15, 2005, 43 participants had been compensated for protecting 667 acres (270 ha) of riparian zones, or the equivalent of 90 km of shoreline. Mr. Campbell emphasized that this number is lower than expected, but the large number of applications turned down show that many farmers are already protecting riparian zones themselves without receiving financial support. Reasons for rejecting applications were mainly that existing strips were not wide enough or that the watercourse was not included in the program because it was of secondary importance. The program continues to make progress.⁵⁰

7.2.2 Prince Edward Island Environmental Property Tax Credit Program

In 2004, P.E.I. launched a tax credit program to compensate farmers for their environmental efforts. The credit applies to buffer zones that are 10-m wide or more, as required under the 1999 regulations, as well as high-sloped land (over 9% slope) where row crops cannot be grown. In addition, environmental building tax credits can also be obtained for farm structures such as manure, pesticide and petroleum storage facilities and deadstock composting facilities. These credits are subject to cross-compliance measures: farmers must have an environmental farm plan and comply with current regulations, particularly those pertaining to crop rotation.⁵¹

7.2.3 Ducks Unlimited Canada Municipal Tax Credit Project

In a similar vein, a pilot project was initiated in Manitoba by Ducks Unlimited Canada, the Prairie Farm Rehabilitation Administration and the Northwest Soil Management Association to experiment with property tax credits as a way of providing remuneration for ecological services.⁵² Submitted in 2001 to the National Round Table on the Environment and the Economy, it is part of the organization's work on ecological fiscal reform. A tax credit of \$1 per acre is offered for land that meets the established criteria (wetlands, riparian buffer zones, cropland with reduced tillage and native grasslands). On average, participants received \$261 a year in compensation for the production of ecological services. Although this amount seems small, the project seems to have resulted in significant levels of satisfaction among participants. The same initiative was launched in 2003 in Saskatchewan, in the rural municipalities of Emerald and Morse.⁵³

7.3 Market-based tools: implementation of the Kyoto Protocol

The implementation of the Kyoto Protocol in Canada is closely linked to the EG&S issue. Greenhouse gas sequestration, which contributes to climate regulation, is a key ecological service. The Government of Canada's

⁵⁰ Manitoba, Riparian Tax Credit: Information for Taxpayers, and personal communication.

⁵¹ Agriculture, Fisheries and Aquaculture, press release, Prince Edward Island, <http://www.gov.pe.ca/af/agweb/index.php3?number=1005168>

⁵² NRTEE, Toward a Canadian Agenda for Fiscal Ecological Reform: First Steps, 2002, http://www.nrtee-trnee.ca/Publications/PDF/Report_EFR-First-Steps_E.pdf

⁵³ Ducks Unlimited Canada, press release, February 17, 2003, <http://www.ducks.ca/aboutduc/news/archives/prov2003/030217.html>

April 13 launching of the first instalment of Project Green confirms its commitment to get the agricultural sector involved in helping to meet Canada's commitments under the Kyoto Protocol.⁵⁴ For several years, the federal government has been working to develop strategies to generate offset credits for GHGs through the adoption of beneficial agricultural practices.

Project Green confirms that agriculture will be called upon to play a crucial role in GHG sequestration. The sector's current contribution to GHG sequestration is assessed at 10 megatonnes, but the Government of Canada believes that between 15 and 20 megatonnes of additional offset credits can be generated through the adoption of beneficial farming practices such as low-till or no-till (reduced tillage) and liquid hog manure management. Farmers will sell these credits to the Climate Fund, a central agency that will manage emissions trading and will purchase offset credits. These mechanisms will give a tremendous boost to the practice of remunerating farmers for EG&S outputs. The emphasis to be placed on GHG sequestration and the substantial budgets available for funding such work in coming years will make remuneration for agricultural EG&S outputs an important agri-environmental policy tool in the future.

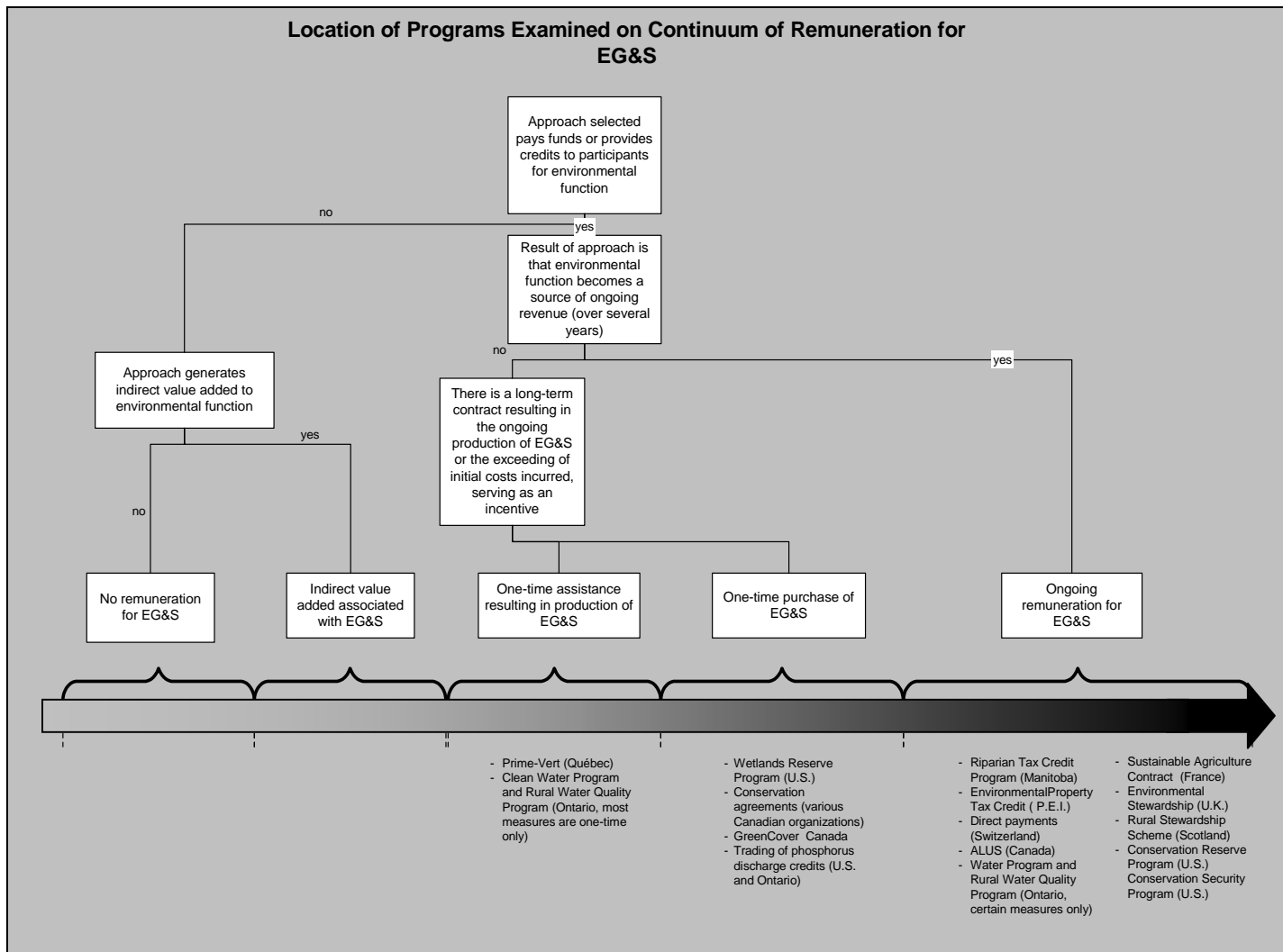
⁵⁴ Government of Canada, Project Green: Moving Forward on Climate Change, 2005, http://climatechange.gc.ca/kyoto_commitments/report_e.pdf
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8 Comparison of programs examined

The aim of this section is to suggest characteristics that will allow policy analysts to accurately compare programs and draw appropriate conclusions. Although these characteristics are far from exhaustive, they are significant to the observer and allow the programs examined earlier to be compared in diagram form.

8.1 Continuity of payment

The various programs examined make payments to participants, but continuity of payment varies. In general, the largest programs use ongoing direct payments in the form of annual rental payments. Some conservation-agreement-based programs, widespread in the United States and growing in Canada, meet the conditions for one-time direct payments to be considered as remuneration for EG&S. Based on the continuum used earlier, we can situate the programs as follows:



8.2 Issues

The programs target various issues, environmental ones naturally being key among them. However, several programs address other issues, such as animal welfare, livestock breed biodiversity and the preservation of rural landscapes. We have selected six main issues covering most of the concerns of the programs examined, which will allow us to quickly gauge the range of issues for which support is provided.

The fundamental issue is the introduction of good farming practices while maintaining land under production. In this category should be included such things as the creation of shelterbelts and riparian buffer strips, the adoption of integrated pest management practices and the practice of organic farming. This objective is the basis for all agri-environmental action.

The conversion/restoration of the environment is also a widespread issue. This concern is targeted by a variety of government and private programs and was the source of the first attempts at remuneration. Many programs deal exclusively with this objective, such as GreenCover, the Wetlands Reserve Program and similar endeavours. Some programs use ongoing direct payments for this purpose: the CRP was a pioneer in this area. Programs aiming mainly to restore the environment by retiring land from, or limiting, agricultural production (for example, through the creation of permanent cover with limited agricultural use) should be included in this category.

Sometimes, measures aim to conserve land in its natural state. Farmers may be offered rental payments to keep wetlands or woodlands intact.

Preserving the rural landscape plays an important role in European programs, particularly to support the important industry of farm tourism, or agri-tourism.

Lastly, some programs promote the welfare and biodiversity of domestic livestock breeds by directly assisting owners in providing humane living conditions or supporting the maintenance of endangered breeds of livestock.

Support measures directly promoting the maintenance of land occupancy in rural areas can be envisaged to compensate farmers simply for cultivating arable land, but they are very rare. In this category, we include programs providing remuneration to protect agricultural land use, since this type of land use generates more ecological goods and services than does urban development.

A brief evaluation of the programs studied provides the following table:

Range of issues covered by programs						
	Conservation of the natural environment	Conversion or restoration of land under production to its natural state	Good farming on land under production	Preservation of natural landscapes	Animal welfare, biodiversity of domestic livestock	Maintaining land occupancy in rural areas and agricultural land use
Canada	Nature reserves on private land (Quebec Department of the Environment/ MDDEP)		Prime-Vert (Québec)			Property tax reimbursement program (Quebec)
		Greencover Canada (Canada)				
		ALUS (project) (Canada)				
		Tax credits (Manitoba)	Environmental Property Tax Credit (P.E.I.)			
United States	Conservation agreements (various organizations)		Conservation authorities (Ontario, various programs)			
		Conservation Reserve Program				
			Conservation Security Program			
Europe	Wetlands Reserve Program		Nutrient credit programs (of various types and of varying scope)			Farmland Reserve Program
			Environmental Stewardship (U.K.)			
			Rural Stewardship Scheme (U.K., Scotland)			
			Sustainable Agriculture Contract (France)			
			Direct payments and ecological direct payments (Switzerland)			

Shaded programs are considered to be mainly multifunctional in approach.

As we can see, the range of issues addressed by programs is quite variable. It is important to remember, however, that a given country may address a wide range of issues through several different programs.

8.3 Remuneration method

As we have seen, remuneration programs for EG&S use a number of different mechanisms. However, variations can be found within the same category. For example, in ongoing direct payment programs, most of which provide annual rental payments, there is a striking difference between action-based programs and those based primarily on land value. In addition, some programs provide a single or fixed amount allowing little or no adjustment.

Along with such payments, some programs use traditional cost-sharing mechanisms for the initial costs of adopting measures or financing facilities or infrastructures. The following table shows the various payment methods employed; lowercase x's indicate secondary payment methods.

Characteristics of Payments under Various Programs

Program		Direct payments					Market-based transactions	Tax credits
		One-time		Ongoing				
		Cost-sharing	Long-term maintenance of ecological service	Linked to land value	Linked to value of action	Fixed or base-level payment		
Canada	Prime-Vert	X						
	GreenCover	x	X					
	ALUS	x		X	x			
	Conservation authorities (Ontario)	X		x	x		x	
	Various conservation agreements		X					
	Tax credits (Manitoba)						X	
	Environmental Property Tax Credit (P.E.I.)						X	
United States	Conservation Reserve Program	x		X				
	Conservation Security Program	x		X	x			
	Wetlands Reserve Program	x	X					
	Credit trading systems (EPA)						X	
Europe	Environmental Stewardship (U.K.)					X		
	Rural Stewardship Scheme (U.K.-Scotland)	x		x	X			
	Sustainable agriculture contract (France)	x		x	X			
	Direct payments (Switzerland)			X	X	X		
	Finnish program				x	X		

The following examples will help readers interpret the table. Practices may include maintaining a hedgerow, paid by the linear metre, adopting a less intensive cultivation method, paid by the area of land, or maintaining an endangered breed of livestock, paid by the livestock unit. Often, compensation is provided for work resulting from the adoption of a practice. Initiatives focusing on land values include land retirement and the maintenance of permanent cover, compensated for by the hectare, and the maintenance of riparian buffer strips, compensated for according to land rental costs. Most often remuneration is provided according to the area of land lost to production and the amount is sometimes determined based on land rental costs or the value of the outputs lost.

9 Developing a framework for analyzing policies linked to EG&S: questions to be addressed

Many questions must be considered in developing a framework for analyzing EG&S-related policies.

9.1 Important questions to be addressed in developing an analytical framework

Questions leading to the development of an analytical framework can be structured according to a hierarchy. The highest level should contain general questions. Below a certain level, considerations would be linked more to regional characteristics and local administrative mechanisms, which could certainly be examined later in the process, once political authorities have taken a position on whether EG&S outputs should be supported.

The European Union has a regulatory framework for determining the rules for financing agri-environmental measures (see Appendix). It is very simple, allowing member states all the latitude they need in selecting measures to be funded. However, the general framework ensures that the same objectives are pursued and that similar payment methods are used throughout the European Union.

Examples of Important Questions to Be Asked Concerning Public Policies

Question level	Questions
Issue definition	<p>What approach is used in providing remuneration for EG&S?</p> <ul style="list-style-type: none"> ○ Ongoing support targeting EG&S outputs ○ Voluntary approach ○ Provide remuneration for services that exceed applicable regulatory requirements <p>What are the priority issues and subissues of the policies targeted by the analytical framework?</p> <ul style="list-style-type: none"> ○ Improve quality of the environment <ul style="list-style-type: none"> ➤ introduction of good farming practices ➤ preservation of habitats in a natural state ➤ land retirement/restoration ➤ biodiversity ○ Improve farmers' income ○ Develop other agricultural functions <ul style="list-style-type: none"> ➤ Value of landscapes ➤ Animal welfare ➤ etc.
Policy tools targeted	<p>Which policy tools for EG&S are targeted in the framework?</p> <ul style="list-style-type: none"> ○ Government programs providing ongoing support for EG&S outputs ○ Taxation-based tools (tax credits and abatements) ○ Regulations promoting emergence of market-based systems encouraging the buying and selling of EG&S (tradable rights, credits, etc.)
Payment for EG&S	<p>What will payments for EG&S be based on?</p> <ul style="list-style-type: none"> ○ Actions undertaken by farmers ○ Actual results measured in the environment <p>How will prices for EG&S be set?</p> <p>What payment mechanisms are envisaged?</p> <ul style="list-style-type: none"> ○ Annual rental payment per unit of land ○ Annual rental payment per other unit (e.g., livestock unit, rent set for use of a fertilization plan, etc.) ○ Income tax credits ○ Property tax credits ○ Emission permits ○ Offset credits (offset mitigation)
Eligible activities	<p>Which activities are eligible for remuneration?</p> <ul style="list-style-type: none"> ○ Farming practices (reduced tillage, limited fertilizer use, crop rotation, etc.) ○ Land use (permanent cover, creation of riparian buffer strips, hedgerows, etc.) ○ Use of management plan or method (fertilization plan, integrated pest management)
Reference levels	<p>Is the maintenance of existing practices or natural environments eligible for remuneration or will remuneration be limited to new activities?</p> <p>What is the threshold for payment?</p> <ul style="list-style-type: none"> ○ Not complying with regulations ○ Compliance with regulations ○ Exceeding regulations
Administrative machinery	<p>What is the geographic availability of program?</p> <p>How is eligibility for program to be determined?</p> <p>What administrative machinery will be used to deliver program?</p> <p>What level of government will be best able to manage program?</p> <p>Etc.</p>

9.2 Objectives pursued

The introduction of measures to provide remuneration for EG&S may have three main objectives:

- Improving the quality of the environment;
- Increasing farmers' income;
- Promoting alternative functions of agriculture (optional).

Focusing first on deciding which objectives are to be pursued is useful. What is the priority? The production of EG&S or other agricultural functions? Concentrating on EG&S leads to basically agri-environmental policies, but of a new kind. Including other agricultural functions as well allows farmers' participation in preserving and maintaining the landscape, land occupancy, the collective heritage and other things to be taken into account. This goes beyond the area of agri-environmental actions. Improving farmers' income goes hand in hand with most programs providing remuneration for EG&S. However, policies to maximize EG&S outputs through more coercive measures can also be envisaged, such as the use of tradable rights for pollution loads. When used alone, however, they do not provide remuneration for EG&S. Improving farmers' income is therefore not a primary objective, although most applications of the EG&S concept include it.

The policy tools and issues to be targeted in the analytical framework must also be defined. We examined a wide range of policy tools: support programs, tax credits and market-based mechanisms. They are very different from one another, but can work together toward the achievement of the same objective. In developing an analytical framework, it is useful to determine whether all these tools will be considered.

The selected tool should be able to provide tangible results in terms of achieving the first two objectives, if both are chosen. One of the main dangers of such a dual approach is that actions providing measurable results in both areas must be chosen. If the objective is to improve the quality of the environment, choosing too many practices to be eligible for funding may result in a piecemeal approach, rendering the environmental improvements that are achieved insignificant. This approach has real disadvantages:

- The possibility of participants undertaking only the least demanding actions;
- The lack of uniform results among farmers, resulting in limited effects on the environment (piecemeal effect);
- Too complicated administratively and compliance is more difficult to verify;
- Subsidies provided for activities that may prove futile.

Solutions may include:

- Definition of high-priority actions that are compulsory under the program;
- Limitation of potential activities under the program;
- Limitation of number of activities allowed under a given contract.

In terms of farm income, setting the payments too low will result in no real impact on farm incomes, and thus reduced participation and similarly poor environmental results. Tax credits do not always provide a sufficient incentive compared with direct payments.

9.3 Environmental benefits

Although environmental benefits can be calculated, this is a difficult and imprecise exercise in many cases. Belchers, Edwards and Gray, in a study submitted to the National Round Table on the Environment and the

Economy on behalf of Ducks Unlimited Canada, quantified the potential environmental benefits from a conservation cover program in Canada.⁵⁵ The net result was positive even under the pessimistic hypothesis proposed. In the study, values were attributed to activities such as fishing, hunting, hiking, carbon sequestration and lowered GHG emissions. The study methodology is interesting in several respects. Ducks Unlimited Canada, in a presentation following the study, evaluated the net benefit per hectare of this type of program at \$115/ha in Quebec (including the presumed value of positive environmental effects), based on a payment of \$80/ha in compensation for land retirement.⁵⁶ This level of remuneration seems rather low to us, however, compared with current Ontario programs and the usual remuneration provided for this type of measure in the countries studied. In addition, a program based solely on the protection or restoration of the natural environment does not seem to respond to the needs of Quebec agriculture, where the main issue lies more in introducing practices likely to reduce nonpoint source pollution.

A similar study was conducted in relation to the Conservation Reserve Program in 1999, to examine the possibility of replacing eligibility criteria based on the fragility of the environment with criteria based on the potential beneficial effects of land retirement. Beneficial effects were calculated, mainly in terms of the value added generated for recreation, which was divided into three categories: water quality, hunting and nature observation. The study concluded that the annual benefits from the program in 1992 were US\$464 million, \$348 million of which could be attributed to potential nature observation activities.⁵⁷ However, this very sophisticated type of evaluation is not used to any degree in determining assistance.

Implementing a similar project in Quebec would require an economic study on potential environmental benefits. The study should be based on data documenting the potential effects on the environment of each action envisaged. Quebec's agri-environmental research and development institute, the Institut de recherche et de développement en agroenvironnement (IRDA), is putting forth remarkable efforts in this area, which will help analysts to assess potential environmental benefits.

9.4 Selection of eligible EG&S

Once the principle has been adopted, selecting the EG&S eligible for remuneration raises a number of questions, some of which are discussed here. It should be kept in mind that a wide range of EG&S can be selected, and that a given jurisdiction may choose to define a few priority actions only or a wide variety of activities.

9.4.1 Positive EG&S versus EG&S that reduce negative impacts

In selecting the EG&S to be favoured, a central issue quickly emerges: should remuneration be provided for only positive services provided by the farmer or should the reduction of negative impacts also be encouraged? For example, should farmers be compensated to encourage them to decrease pesticide use? By their very nature, some EG&S are immediately positive for the environment. For example, keeping land in its natural state or creating a natural environment by retiring land from production is fundamentally positive. Providing remuneration for EG&S of this type can be envisaged without hesitation and does not appear to pose any moral problems: the only thing that has to be done is to determine which activities are to be included, depending on the objectives to be met. The second category consists of practices that limit negative environmental impacts; including them among EG&S requires a great deal of reflection. For example, decreasing pesticide use has a positive effect on the environment, but mainly involves reducing a negative activity. Therefore, should farmers who limit their

⁵⁵ Belchers, Edwards and Gray, Analysis of Economics Instruments: Conservation Cover Incentive Program 2001.

⁵⁶ Ducks Unlimited, A Conservation Cover Incentive Program for Canada, PowerPoint presentation, October 2001.

⁵⁷ Peter Feather, Daniel Hellerstein and LeRoy Hansen, Economic Valuation of Environmental Benefits and the Targeting of Conservation Programs: The Case of the CRP, 1999.

pesticide use be compensated or rather should this be considered as a good farming practice that farmers should defray themselves? To provide an incentive, some European programs broaden compensation to cover such things as the reduction of inputs. The U.S. Conservation Reserve Program (CRP) provides support for the adoption of measures limiting offsite damage to natural resources, in other words, nonpoint source pollution. For example, annual compensation to limit fertilizer applications could, in watersheds with excessive nutrient input, contribute to significantly reducing phosphorus and nitrogen loads.

9.4.2 New and existing EG&S

In choosing EG&S that will be eligible for remuneration, there is a challenge in ensuring fairness or equity. Limiting remuneration to participants who adopt a new agri-environmental practice penalizes those who have already implemented beneficial practices at their own expense. Several of the programs examined have integrated this concern into the allocation of assistance. In the United States, the CSP provides annual rental payments for maintaining existing practices, which can be added to other payments. This program is intended mainly for producers already in control of the environmental situation on their operation. There are a number of pitfalls in ensuring equity, however. For example, it may lead to the overvaluing of existing practices, which does not encourage participants who have already made an effort to do more. This problem was discussed in the section on environmental stewardship, in the analysis of pilot projects that allowed participants to qualify by making as few changes as possible.

9.4.3 Reference levels

What is the threshold above which ongoing support should be provided for EG&S? Although this often depends on the program, the European Union is very clear on this issue: "whenever the society desires that farmers deliver an environmental service beyond the baseline level, this service should be purchased through agri-environmental measures."⁵⁸ How can the ongoing purchase of EG&S from farmers who do not respect existing regulatory requirements be justified? According to the European Union, this is more a matter of individual responsibility and a problem to be addressed by standards programs, which are widespread. Such programs maximize the actual effects of regulations. Theoretically, remuneration cannot be provided for other functions of agriculture unless farmers achieve "a level of environmental performance beyond the reference level," a level which may be construed to correspond to existing legislation.⁵⁹ However, programs may provide remuneration to landowners for such things as the loss of land resulting from their compliance with regulations requiring the conversion of land to riparian buffer zones. In Ontario, the proposed ALUS program is in favour of providing remuneration in some cases when riparian buffers are required by the regulations, for example, when buffers exceed minimum requirements. In addition, zones where no agricultural uses are allowed (pastureland, farm machinery traffic, etc.) may be eligible for remuneration, even when required under the *Nutrient Management Act*.⁶⁰ The original proposal for the Environmental Stewardship Initiative put forward by the P.E.I. Federation of Agriculture has similar provisions; the proposal recommends that remuneration be provided for riparian buffer strips required by law.

Theoretical frameworks have been developed for making decisions on whether remuneration should be provided and on thresholds for compensation. In Quebec, Jean Nolet developed an analytical framework in cooperation with Guy Debailleul, in which reference levels are defined according to one of two criteria, whichever is the most stringent: the current market or the standard recognized by competitors.⁶¹ According to Nolet, a jurisdiction

⁵⁸ European Commission, http://europa.eu.int/comm/agriculture/envir/index_en.htm

⁵⁹ OECD, *Improving the environmental performance of agriculture: policy options and market approaches*, page 41.

⁶⁰ A Proposal To Test An ALUS Concept in Norfolk County, Ontario, 2004, page 21.

⁶¹ NOLET, Jean, DEBAILLEUL, Guy, *Coûts environnementaux et compensation en agriculture : développement d'une grille d'analyse*, 2005. Remuneration for ecological goods and services produced by agriculture: elements for a Quebec analysis

wishing to strengthen its agri-environmental regulations to a level equal to those of its direct competitors does not have to compensate producers for the resulting costs. However, should current regulations be already equal to or more stringent than those of the competition, jurisdictions wishing to strengthen regulations should compensate producers for the resulting costs. The analytical framework developed by Nolet and Debailleul also includes the notions of predictability and reasonableness as decision-making criteria. There is also the question of whether remuneration should be provided when a farmer adopts a measure that generates a net benefit above and beyond what the community derives from it. This applies to reduced tillage, for example. Should remuneration be provided for the adoption of this practice if it already results in cost savings for the farmer? Regarding the question of whether a producer's voluntarily exceeding standards generates an environmental cost that can be compensated, Nolet prefers not to commit himself. In fact, this is a political decision, and one that is far from being trivial.

Take, for example, the creation of a ten-metre-wide riparian strip in a jurisdiction where regulations require three metres. From this viewpoint, the area eligible for remuneration can be calculated as having a width of seven metres. This principle is not always applied, however. According to the UQCN, some measures receiving compensation under former farmland management contracts (CTE) in France were already required under regulations. Indeed, there can be a grey area in terms of the reference level beyond which compensation is acceptable.⁶²

One interesting possibility is to set a uniform reference level for all farmers in the form of a cross-compliance standard. Once this standard has been met, remuneration can be provided for additional practices. Readers should note, however, that using such a reference level, which would have to be a reasonable one, would open the door for a very wide variety of payments. A reference level should probably be defined for each practice for which compensation is provided, in order to encourage farmers to make an effort to obtain remuneration.

Lastly, these concepts do not apply only to direct payments. In the case of offset credits for nutrients, in order to avoid making payments that fund compliance with legislation, governments may decide that only practices that exceed the reference level are to be included as transactions between stakeholders.

9.5 Funding

As we have seen, most programs providing remuneration for EG&S are funded by public money. However, in certain programs, often managed at a local level, funding is derived from fees for a service or from the taxation of a negative externality. The City of New York's program is one example. In addition, some programs are partially or completely funded by conservation organizations. In the case of a program financed with green taxes (eco-taxes) or fees for a service, caution is required. Canada does not have extensive experience with consumption-based pricing for services like drinking water. In a country like France, which has for decades applied a user-pays' principle for this resource, such measures obviously garner greater social acceptance. The experience in Ontario, which began in 2005, must be followed closely in order to measure the reaction of Canadian firms to the imposition of a form of green taxes. Already, the Ontario authorities have strongly limited the liability of farming operations to the province's water tax system and those operations that remain liable will have their application for a permit processed free of charge. In systems based on offset credits, funding can come from stakeholders required to obtain pollution or emission rights. By purchasing offset services, these stakeholders assume the role played by the government in direct payment systems. Such markets are still poorly developed, however.

In Quebec, some organizations are interested in investing in conservation programs, either financially or by providing professional services. The recent project to develop wildlife habitat near watercourses sponsored by

⁶² UQCN, La contribution du concept de multifonctionnalité à la poursuite d'objectifs de protection de l'environnement, 2002, page 8.

the Fondation de la faune du Québec and the UPA eloquently demonstrates this. The willingness of these types of groups to participate in projects to provide remuneration for EG&S should be assessed.

9.6 Geographic availability and selection criteria for projects

This is an essential component in any government program. Where will the program be available? How will participants be selected? Availability is often nationwide, but can also be limited to specific regions, as in the case of the CSP in the United States. Funding can be made available on this basis. In Quebec, a remuneration program could be implemented on a limited basis in watersheds considered by the MDDEP to be a priority because of their poorer water quality.

Project selection can be carried out in a number of different ways. The call for proposals procedure can identify projects most likely to generate beneficial environmental effects. A point system can be established, as in the case of Great Britain and the United States (the latter in its EQIP and CSP programs). In the United States, scientific analyses are used in selecting candidates for the CRP and the CSP. Access to the CSP is denied to operations with inadequate soil and water quality. Soil quality is measured using the Soil Condition Index, which requires samples and analyses, and water quality must conform to the criteria set in the Field Office Technical Guide. In addition, grids for determining the environmental benefits generated by a project are commonly used. In the United States, the Environmental Benefits Index was developed for this purpose; it is a comprehensive tool for identifying the most cost-effective and beneficial projects. Canada's GreenCover program is based on a similar mechanism: land meeting certain criteria for environmental sensitivity is prioritized in funding. In Europe, most programs are accessible to as many farmers as possible, and the inverse phenomenon is sometimes found. Authorities sometimes have problems recruiting enough participants to meet their targets.

If a program does not intend to make funding available to all agricultural operations, the following question naturally arises: should firms with an enviable environmental situation be compensated or should it be the firms that need support to improve environmental quality that receive funding?

9.7 Considerations involving the income and size of firms and assistance limits

A number of programs set a limit for assistance, refusing funding above a certain threshold in income, livestock units or acreage. In Switzerland, small businesses are favoured. Conversely, the lack of such provisions may result in the awarding of assistance to firms that are larger than average, as was the case with farmland management contracts (CTE) in France.⁶³ Since, in most cases, payments are a function of the acreage enrolled in the program, this results in the largest farms monopolizing the available funding.

For this type of program, it is almost essential to set a ceiling for assistance amounts. Most of the time, a ceiling is set for each enterprise, to ensure that operations do not derive a large percentage of their income from the annual rental payments provided by the program. In the United States, the CSP sets the following limits for participants: US\$20,000 for tier 1, US\$35,000 for tier 2 and US\$45,000 for tier 3. Occasionally, an average ceiling is set, as in the case of France's Sustainable Agriculture Contract (CAD), which stipulates that average funding in each region must not exceed 27,000 € over five years. Although some contracts will exceed this amount, the average must be kept below this ceiling. Similar ceilings are already a reality in the agri-environmental arena here: Prime-Vert and the APF both stipulate an annual maximum for the amount of funding available to each farming operation.

⁶³ MAAPAF, L'évaluation du CTE, January 2004.

9.8 The contractual framework and progression

Generally, the remuneration programs described here provide assistance in exchange for adherence to the clauses in the contract. Contract duration varies and may range from three to ten years, although some programs involving conservation agreements exceed this duration. Most contracts contain clauses stipulating that funds paid out must be reimbursed in the event of non-compliance. In addition, as we have seen, contractual commitments are used for both direct payment programs and some programs using fiscal tools. Participants in the Riparian Tax Credit Program undertake to respect the integrity of the riparian strip for five years.

Some programs allow participants to progress to higher levels or tiers, although this is rare. This serves as an incentive to make additional efforts. Although this feature sometimes results in significantly more complex program delivery, it does have the advantage of compensating farmers who wish to continue making improvements. The Conservation Security Program and the Environmental Stewardship Initiative use this approach. In addition, most programs offer several possible levels of commitment, through the term of the contract or through specific options (organic farming, for example). In Finland, farmers are given the option of adding activities without progressing to a more advanced level.

In a recent study, the World Wildlife Fund came out in favour of tiered systems for agri-environmental planning on a farm-by-farm basis. The first tier would consist of assisting the farm in achieving compliance, the second would involve dealing with a number of environmental problems and the third would provide financial rewards for environmental certification and marketing.⁶⁴

9.9 The role of other sectors

The services of stakeholders from sectors outside agriculture could also be called on in a remuneration system for EG&S. Primarily, this would involve public agencies responsible for the environment; the fact that they have jurisdiction over all sectors of activities may mean that action would be required on their part and, in some cases, they may even be the initiator of the process. In the United States, the EPA has initiated nutrient credit trading systems, which are not intended exclusively for agriculture. The USDA oversees direct payments intended specifically for farmers. The use of market-based approaches that create connections between polluting industries and farmers requires partnerships in particular between the departments of agriculture, the environment, natural resources and economic development.

Agencies involved in managing natural resources are sometimes affected by remuneration schemes, particularly those that provide payments for maintaining natural environments such as woodlands.

9.10 The link with sustainable development

By promoting and funding the synergy between agricultural production and environmental protection, remuneration for EG&S responds to both development and sustainability imperatives. Indeed, in some jurisdictions, a link has been established between EG&S outputs and sustainable development in agriculture. For example, under Great Britain's Sustainable Development Strategy, the U.K.'s Department for Environment, Food and Rural Affairs acts in two main areas. The first is the elimination of environmentally harmful farm subsidies and the second is direct involvement through the England Rural Development Programme, a strategy integrating various British agri-environmental programs, several of which are based on ongoing direct payments, such as the

⁶⁴ World Wildlife Fund, *Advanced Environmental Farm Planning in Canada: Thoughts on Concepts, Tools, and Implementation*, March 2004, page 4.

Environmental Stewardship program.⁶⁵ The use of policy tools to provide remuneration for EG&S therefore fits easily into a framework of promoting sustainable development and also facilitates the monitoring of indicators by providing precise data on the number of participants and the acreage allocated to each practice retained.

⁶⁵ The UK Government Sustainable Development Strategy, 2005, http://www.sustainable-development.gov.uk/documents/publications/strategy/SecFut_complete.pdf
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10 Conclusion

To conclude, one question on the role of agriculture in improving the quality of the environment is of paramount importance: what is the minimum level of EG&S that farmers must produce? This issue affects both the regulatory framework and cross-compliance. A second question arises: should farmers be remunerated for producing some of these goods and services? If we choose to do so, we are now in the area of providing remuneration for ecological goods and services.

Many policy tools are available for providing such remuneration. Ongoing direct payments in particular have recently taken on increasing importance in industrialized countries. However, other mechanisms such as fiscal tools and market-based systems of tradable rights must also be considered. Market-based tools are still in their infancy and their use on a large scale has not yet been perfected since they seem better adapted to limiting pollution than to providing remuneration for beneficial practices. Nevertheless, such tools seem destined to become much more common, particularly in carbon sequestration, where the implementation of the Kyoto Protocol will be key.

In Quebec, environmental problems, particularly nonpoint source pollution, have become a major concern in society. The solutions proposed to remedy this situation involve mainly regulations and support to enable farmers to comply with them. However, a number of Western countries have established incentives involving compensation to farmers for EG&S. These tools have the advantage of encouraging society to consider agriculture's contributions to the environment as a separate type of production in its own right, just as the production of food is. This recognition has highlighted the special relationship between the farmer and surrounding ecosystem and has encouraged farm producers to offer more environmental services. In Canada, pressure is being exerted by some groups and governments in Ontario, Prince Edward Island, Manitoba and Saskatchewan to establish remuneration measures for EG&S.

Lastly, citizens' concerns over agri-food development show that, beyond a shared interest in the production of healthy, safe, sufficient and affordable food, there is also a shared concern over preserving public goods such as healthy ecosystems and biodiversity. Furthermore, in a context where farmers clearly need additional financial support to survive what appears to be a persistent farm income crisis, remuneration for ecological goods and services would represent a way of providing assistance for farmers while ensuring benefits to society as a whole in the form of significant environmental benefits.

11 Appendix: extracts from European Union regulation 1257/1999 concerning agri-environmental support programs

AGRI-ENVIRONMENT

Article 22

Support for agricultural production methods designed to protect the environment and to maintain the countryside (agri-environment) shall contribute to achieving the Community's policy objectives regarding agriculture and the environment.

Such support shall promote:

- ways of using agricultural land which are compatible with the protection and improvement of the environment, the landscape and its features, natural resources, the soil and genetic diversity;
- an environmentally-favourable extensification of farming and management of low-intensity pasture systems;
- the conservation of high nature-value farmed environments which are under threat;
- the upkeep of the landscape and historical features on agricultural land;
- the use of environmental planning in farming practice.

Article 23

1. Support shall be granted to farmers who give agri-environmental commitments for at least five years. Where necessary, a longer period shall be determined for particular types of commitments in view of their environmental effects.
2. Agri-environmental commitments shall involve more than the application of usual good farming practice. They shall provide for services which are not provided for by other support measures, such as market support or compensatory allowances.

Article 24

1. Support in respect of an agri-environmental commitment shall be granted annually and be calculated on the basis of:
 - income foregone;
 - additional costs resulting from the commitment given;
 - the need to provide an incentive.

The cost of any non-remunerative capital works necessary for the fulfilment of the commitments may also be taken into account in calculating the level of annual support.

2. Maximum amounts per year eligible for Community support are laid down in the Annex. These amounts shall be based on that area of the holding to which agri-environmental commitments apply.

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13 Acronyms

AAFC	Agriculture and Agri-Food Canada
AEC	Agri-environmental Club
ALUS	Alternate Land Use Services
AOR	Agricultural Operations Regulation
APAS	Agricultural Producers Association of Saskatchewan Inc.
CAD	Contrat d'agriculture durable
CAIS	Canadian Agricultural Income Stabilization Program
CDAQ	Conseil pour le développement de l'agriculture du Québec
CRP	Conservation Reserve Program
CSP	Conservation Security Program
CTE	Contrat Territorial d'Exploitation
DEFRA	Department for Environment, Food and Rural Affairs
EG&S	Environmental Goods and Services
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
FADQ	La Financière agricole du Québec
FRPP	Farm and Ranch Lands Protection Program
GHG	Greenhouse gas
GRP	Grassland Reserve Program
IRDA	Institut de recherche et de développement en agroenvironnement
KAP	Keystone Agricultural Producers
LSCD	Little Saskatchewan Conservation District
MAPAQ	Quebec Department of Agriculture, Fisheries and Food
MDDEP	Ministère du Développement durable, de l'Environnement et des Parcs
MRAC	Manitoba Rural Adaptation Council
NGO	Non-governmental Organization
NRCS	Natural Resources Conservation Service
OECD	Organisation for Economic Co-operation and Development
PAC	Politique agricole commune
RSS	Rural Stewardship Scheme
SEPAQ	Société des établissements de plein air du Québec
START	Strategic Transition and Agricultural Revitalization for Tomorrow
TMDL	Total Maximum Daily Load
UPA	Union des producteurs agricoles
UQCN	Union québécoise pour la conservation de la nature
USDA	United States Department of Agriculture
WHIP	Wildlife Habitat Incentive Program
WRP	Wetlands Reserve Program
WTO	World Trade Organization

