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Potential Contribution of Payments for Ecological Goods and Services to Farm Income

Canada

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by

Annie Royer
Daniel-Mercier Gouin

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Research and Analysis Directorate
Strategic Policy Branch
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PROJECT TEAM
Project Manager: Daniel-Mercier Gouin
Authors: Annie Royer, Daniel-Mercier Gouin
Editor: Annie Brochu

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Foreword

Agri-environmental payments are part of a re-instrumentation of farm support in some developed countries. In general, they are meant to contribute to the cost of meeting regulations, compensate for income lost by adopting certain practices, and reward farmers for providing environmental services. In this context, agri-environmental payments are seen as a vehicle which could potentially contribute to meet the double objectives of providing environmental benefits to society while supporting farm income.

Such agri-environmental payments are gaining importance in the policy portfolio of certain countries in response to higher social expectations with respect to the environmental performance of the agricultural sector as well as in response to international agreements constraining the use of trade-distorting support measures. Although these measures have become increasingly significant in budgetary terms, agri-environmental payments still account for only a small share of total agricultural policy expenditure across OECD member countries.

This study is part of a larger research effort undertaken at the request of Federal, Provincial and Territorial Ministers of Agriculture following their 2005 annual meeting in Kananaskis to explore the potential to integrate the concept of ecological goods and services (EG&S) to further develop agri-environmental policy in a post Agricultural Policy Framework era.

The present study sheds some light on limited international experience by assessing the contribution that payments for ecological goods and services make to farm income in Switzerland, France and the Walloon region of Belgium.

Research and Analysis Directorate
Strategic Policy Branch

Executive Summary

In recent years, some countries have adjusted their agricultural policies to better reflect the multiple functions that their agriculture sectors perform. For many years, agriculture-support policies focused solely on encouraging production, without taking the social and environmental functions of agriculture into account. The failure of the market to reward these functions, and the problems that resulted, have now led these countries to redirect some assistance so that farmers who perform such functions receive compensation—most often through targeted direct payment programs. Payments for producing ecological goods and services are one such program and are the subject of the present study.

The primary goal of this study was to assess the contribution that payments for ecological goods and services make to farm income in certain countries. To achieve this goal, the authors examined the multifunctional and ecological agriculture programs now in place in Switzerland, France and the French-speaking Walloon Region of Belgium, focusing chiefly on those programs that provide payments for ecological goods and services. This report presents the results of our analysis. For each of these three countries, we present a brief description of the program, followed by an assessment of the economic importance of the payments made under it.

Our analysis indicates that how successfully the programs achieve their environmental objectives depends chiefly on how many hectares of farmland are involved and how widely scattered these hectares are throughout the country. Typically, the higher the percentage of farmers who formally commit to the ecological programs' requirements, the higher the success rate, at least in the countries we studied.

The contribution of payments for ecological goods and services to farm incomes differs among the countries we studied. Switzerland is the country where ecological direct payments account for the highest proportion of farm income: 14% in 2003. In France, agri-environmental measures (AEMs), including payments for ecological goods and services, accounted for 4% of family farm income in 2002, and those farms that had signed formal farmland management contracts (FMCs) with the government, which include an environmental component, obtained more. For the Walloon Region of Belgium, we could not determine the exact percentage of farm income that comes from payments for ecological goods and services. The most we can say is that these payments are included in payments for the Second Pillar of the European Union's Common

Agricultural Policy (CAP), which accounts for only 5.7% of labour income per unit of work in this region. For Belgium as a whole, the contribution of AEMs to family farm income was only 1.2% in 2003.

CHAPTER 1

Introduction

The agriculture sectors of Canada and of developed countries in general have undergone considerable changes over the past 50 years. The agriculture modernization policies introduced in these countries in the early 1960s have radically altered agricultural production structures, as well as the agricultural landscape and the natural environment. A sector that once consisted mainly of small mixed farms whose primary goal was self-sufficiency has now been transformed into one of specialized, intensive farms to provide the quality and quantities of agricultural products that society demands.

But this intensive, production-oriented model of agriculture now seems to have become the victim of its own success. Output is growing faster than demand and faster than markets can afford to absorb it. The effects of the intensification of agriculture on the environment and on water quality, both in Canada and elsewhere, are increasingly disturbing. Agriculture is now even accused of turning the countryside into a desert and destroying the structure of rural communities. In addition, the costs of agriculture policy are now being questioned not only in terms of their impact on the precarious budgets of individual countries, but also in various international bodies. According to many authors, the productivist model of agriculture is now in crisis (Velasco Arranz 2002, pp. 34-37; Barthélemy and Nieddu 2002, p. 385), and agricultural policy stands accused of being the source of all these evils.

It was against this background that agriculture first became a significant target for multilateral trade negotiations in the Uruguay Round, and it occupies a central position in the current round of trade negotiations as well. The colour-coded support categories that came out of the Uruguay Round (amber, blue, and green) have raised new questions about the traditional mechanisms for state intervention in the agriculture sector. Agriculture policy reforms have been introduced in several countries at a steady pace. In the European Union, for instance, reforms to the Common Agricultural Policy (CAP) were implemented in 1992, 2000, and 2003. In the United States, the FAIR Act for 1996-2001 imparted a new direction to that country's agriculture policy, one that the Farm Bill for 2002-07 has reversed. In Canada, subsidies for the transportation of agricultural products have been eliminated and farm income security programs have been modified several times in recent years. In short, agriculture policy in many countries seems to be attempting to redefine itself.

Many analysts believe that the ultimate result of multilateral negotiations will be the gradual dismantling of the tools of agriculture policy—price supports, income supports, and protection of national markets. Thus agriculture policy would "redefine itself" by disappearing. The Organisation for Economic Co-operation and Development (OECD) analyses generally support this scenario. But other analysts, though still in the minority, see another way to address the imbalances caused by the productivist model that has dominated agriculture since the 1960s, in which the production of raw agricultural output has been the only function considered. These analysts argue for policies that take the multiple functions of agriculture into account (Hudault 1999, p. 710). This concept of multifunctionality, though far from a new idea in agriculture, is often cited as a possible compromise that would let the industrialized countries reorient their agricultural policies and emerge from the crisis now shaking their agricultural economies.

Though the term "multifunctionality of agriculture" was coined relatively recently, the concept and the fact are not themselves new. For centuries, agriculture has been performing social and environmental functions as well as economic ones. The multifunctionality of agriculture refers to all its functions, both market and non-market. Hervieu defines the multifunctionality of agriculture as "the many functions performed by agriculture besides that of producing raw material" (Hervieu 2002, p. 2). The OECD, for its part, proposes two approaches to defining this concept: a positive approach and a normative one (OECD 2001, p. 14). The positive approach defines multifunctionality as a characteristic of agriculture, while the normative approach defines it as an objective that society asks agriculture to fulfil.

Whichever approach is adopted, if agriculture supports are to be redesigned so as to be based on criteria other than production volume alone, the question remains as to what these criteria should be. One possible criterion could be the contribution of agriculture to the production of ecological goods and services (EG&S). Some countries have taken innovative steps in this direction. Adopting the broader concept of the multifunctionality of agriculture, they have attempted, through targeted direct payment programs, to encourage farmers to perform other functions besides producing raw output. France and Switzerland have implemented specific programs of this kind. Belgium's Walloon Region has also recently begun some programs based on the multifunctionality of agriculture.

In this study, we have examined the programs in these countries that encourage the production of EG&S in particular. It is these kinds of programs that are the most likely to achieve agri-environmental objectives. Our goal was to estimate the contribution that payments for producing EG&S make to farm income in these countries.

We begin this report by defining concepts—the broader concept of the multifunctionality of agriculture, and the narrower concept of EG&S. We then formally address the linkage between these two concepts. Next, we review those programs in France, Switzerland, and the Walloon Region of Belgium that apply these two concepts, which we attempt to distinguish when possible. In each case, we then attempt to quantify the relative importance of direct payments to farmers for the production of EG&S in the countries concerned.

CHAPTER 2

The Concept of Ecological Goods and Services in the Definition of the Multifunctionality of Agriculture

The first time that the concept of agricultural multifunctionality arose in international policy debates was at the Rio Summit of 1992[1] (Pingault 2001, p.53). But multifunctionality would scarcely seem to be a recent attribute of agriculture, so why has it only recently become the focus of international attention? According to Losch (2002), this debate on multifunctionality has resulted from the convergence of four major trends in the last quarter of the 20th century (Losch 2002). The first of these has been the critique of the productivist model. This model has increased efficiency, but has also had negative impacts, including overproduction, a reduction in the number of farmers (with an attendant reduction in the vitality of rural communities), and degradation of the environment. The second trend has been a steadily growing interest in the management of natural resources. The Rio Summit[2] and the Kyoto Protocol[3] are eloquent testimony to world concern about this issue. The third trend has been the growing need to ensure food safety, following health-related incidents such as the outbreak of mad cow disease. Lastly, the inclusion of agriculture in international trade negotiations has drawn attention to the size of the subsidies that the industrialized countries pay and the protective barriers that they erect in this sector. The end of the "agricultural exception" has raised fears that these barriers will be dismantled and has resulted in a resurgence of demands for the recognition of agriculture as a distinct economic sector (Losch 2002, p.168).

The concept of EG&S is directly related to the first two trends that Losch identifies: the degradation of the environment and the management of natural resources. The concept of multifunctionality, which is broader than just the production of EG&S, has thus emerged under conditions of steadily growing agricultural productivity, declining prices paid to farmers, and reduced government assistance to agriculture. These conditions prevent agriculture from fully perform-

1. *Chapter 14 of Agenda 21 of the Rio Summit includes a section entitled "Agricultural policy review, planning and integrated programming in the light of the multifunctional aspect of agriculture, particularly with regard to food security and sustainable development."*
2. *United Nations Conference on Environment and Development, held in Rio de Janeiro in June 1992.*
3. *Protocol adopted under the United Nations Framework Convention on Climate Change and signed by 166 countries in 1992 to combat global warming.*

ing its traditional functions, in particular its environmental and social ones. In this sense, the recognition of the multifunctionality of agriculture is an approach intended to compensate for the shortcomings in a production model that focuses chiefly on raw agricultural output.

2.1 The Concept of the Multifunctionality of Agriculture

Beyond producing food and fibre, the functions of agriculture include maintaining the rural landscape, maintaining the economic and social fabric of rural communities, and maintaining food security and safety (Gouin 2000, p. 61). These other functions of agriculture are not generally remunerated by the market, but they do have an indirect utility for society. Indeed, society benefits widely from the other goods and services that agriculture provides, including managing natural resources (such as water, soil, and air), protecting against environmental hazards such as fires and floods, maintaining land occupancy in remote areas, and maintaining acceptable levels of food security and safety.

The many functions ascribed to agriculture differ from one institution and one author to another. The following three lists show those functions that are cited most often in the literature. These lists clearly are not exhaustive, but do provide a fairly accurate picture of the scope of agricultural multifunctionality. The first list shows agriculture's economic functions, the second its environmental functions, and the third its social functions.

The economic functions of agriculture include:

- producing goods that are primary necessities, such as foods and fibres, and thus ensuring a quantitatively sufficient food supply (OECD 1998, FAO/Netherlands 1999, Laurent 2001, Blanchemanche et al. 2000, Gouin 2000, Hervieu 2002, Delorme 2002);
- providing raw materials to the textile and agri-food industries (Hervieu 2002, Vounouki 2002);
- helping to develop green tourism (Switzerland 2000, OECD 2001, Hervieu 2002);
- creating value-added, in particular through niche markets (OECD 2001, Hervieu 2002).

The environmental functions of agriculture include:

- protecting biodiversity (OECD 1998, Aumand et al. 2001, Hervieu 2002, Delorme 2002);
- conserving the land and shaping the landscape (OECD 1998, Gouin 2000, Laurent 2001, Blanchemanche et al. 2000, Switzerland 2000, Aumand et al. 2001, Delorme 2002, Hervieu 2002);
- managing renewable resources sustainably (OECD 1998, Arfini and Donati 2002);
- fighting soil erosion, maintaining soil quality, and protecting the environment by controlling pollutants of agricultural origin (OECD 1998, Blanchemanche et al. 2000, Laurent 2001, Aumand et al. 2001, OECD 2001);
- reducing greenhouse gas emissions (OECD 2001).

The social functions of agriculture include:

- ensuring food security and safety (a quantitatively sufficient and qualitatively safe food supply) (Laurent 2001, Blanchemanche et al. 2000, Switzerland 2000, Arfini and Donati 2002);
- generating rural employment (Laurent 2001, OECD 2001, Aumand et al. 2001, Delorme 2002);
- helping to maintain a viable, dynamic social fabric in rural areas (OECD 1998, Gouin 2000, Laurent 2001, Blanchemanche et al. 2000, Aumand 2001, Arfini and Donati 2002);
- developing or establishing agricultural lands (Hervieu 2002);
- preserving and transmitting cultural heritage (FAO/Netherlands 1999, Blanchemanche et al. 2000, Laurent 2001, Switzerland 2000, OECD 2001);
- improving the welfare of animals[4] (Laurent 2001, OECD 2001).

2.2 Recognizing the Production of Ecological Goods and Services as Part of the Multifunctionality of Agriculture

The preceding brief overview of the multiple functions of agriculture highlights several points of similarity with EG&S. In one of its publications, the Millennium Ecosystem Assessment provides a list of EG&S, divided into four cate-gories: provisioning, regulating, cultural, and supporting services (Millennium Ecosystem Assessment 2003, p. 56).[5]

Provisioning services are products that people obtain from ecosystems:

- food and fibre;
- fuel;
- genetic resources;
- biochemicals, natural medicines, and pharmaceuticals;
- ornamental resources (flowers, animals products, shells, etc.);
- water.

4. *It is important to note that opinions about agriculture's role in improving animal welfare are not unanimous. This issue often comes down to a philosophical debate.*

5. *This description of the various services comes from Ecosystems and Human Well-Being: A Framework for Assessment, pp. 56-60, available on-line at http://www.millenniumassessment.org/en/Products.EHWB.aspx*

Regulating services are the benefits that people obtain from the regulation of ecosystem processes:

- climate and water regulation;
- erosion control;
- water purification;
- treatment of organic wastes;
- protection against natural disasters;
- pollination;
- biological control;
- air quality maintenance;
- regulation of human diseases.

Cultural services are the non-material benefits that people obtain from ecosystems:

- cultural diversity;
- esthetic and cultural heritage values;
- spiritual, religious, and educational values;
- ecotourism;
- social relations;
- inspiration;
- knowledge systems (traditional and formal).

Lastly, supporting services are those services that are necessary for the production of all other ecosystem services. Supporting services include:

- production of biomass and oxygen;
- soil formation;
- creation of habitat for plant and animal species;
- nutrient cycling;
- water cycling.

Through its multiple functions, agriculture produces EG&S. It provides ecological regulating services by controlling soil erosion and by managing natural resources through the preservation of wetlands. It provides an ecological supporting service by furnishing wildlife habitat. It provides ecological cultural services by shaping the landscape and preserving cultural heritage. Thus, agriculture's social functions (preserving cultural heritage, establishing agricultural lands) and its environmental functions (protecting biodiversity, managing renew-able natural resources, protecting the environment, shaping and maintaining the landscape) may rightly be regarded as EG&S produced by agriculture.

These two concepts thus overlap tightly. In either case, the question arises as to the possibility of providing support to agriculture not only for the production of agricultural goods, but also for the other functions that agriculture performs, and in particular for the production of certain categories of EG&S. In the present study, we focus on those forms of support that farmers receive not for investing to reduce negative externalities of their operations (for example, building a liquid-manure storage facility), but rather for producing positive externalities (such as maintaining the rural landscape).

CHAPTER 3

Multifunctionality in France, Switzerland and the Walloon Region of Belgium

Some countries, such as Switzerland and France, and some regions, such as the French-speaking Walloon Region in Belgium, do recognize the multifunctional role of agriculture and incorporate it into their agriculture policies. These policies do not officially define a category of EG&S, but they do encompass such goods and services and encourage their production. For example, various agri-environmental measures (AEMs) and ecological set-aside measures have been introduced in these countries to encourage farmers to adopt more environmentally friendly practices or to maintain the landscape in disadvantaged areas. Sections 3.1 through 3.3 describe the programs in each of these three countries. Each section presents the program's objectives, the types of farmers it targets, and the environmental outcomes it is designed to achieve. Each section then provides an analysis of the economic importance of these payments, their levels, and their contribution to farm incomes.

3.1 France: Recognizing agricultural multifunctionality in the New Agriculture Policy Act

Recognition of the multifunctional nature of agriculture became permanently entrenched in French agriculture policy on July 9, 1999, with the adoption of the new agriculture policy act. The tool chosen to translate this concept into concrete action was the farmland management contract (CTE - Contrat territorial d'exploitation).

3.1.1 Description of Farmland Management Contracts (FMCs)

Every FMC has two components: an economic component that deals with employment and value-added, and an environmental component that deals with the protection of nature and of the land. Though rural employment can contribute to the production of goods and services related to cultural heritage, it is with the environmental component of the FMC program that EG&S are more closely associated.

Specifically, a FMC is an overall plan for the management of a particular farm, based on an environmental assessment of its operations and formalized in a contract. Under this contract, the farmer receives a direct payment if he or she carries out a specified set of measures to meet the

objectives of the plan. A list of the types of AEMs that may be included in FMC contracts is provided in Appendix 1. The term of these contracts is five years. Since one objective of FMCs is to redistribute government assistance more appropriately, these contracts apply "degressive" payment schedules that favour small farms. To harmonize the plan for each individual farm with the government's objectives for the broader geographic area or agricultural sector concerned, a framework is established. Certain measures are mandatory and must be included in all FMCs within the administrative region concerned (Waszkiel 2002, p.193). For example, in areas that are sensitive to erosion, AEMs to control erosion are mandatory. In addition to these mandatory measures, the FMC contains a set of "optional" measures that the farmer chooses to implement to achieve his own objectives within the framework of the FMC.

The two main objectives of the FMC program are "to secure recognition of the multifunctionality of agriculture through adequate remuneration of its various functions" and to redistribute assistance to the farms that need it most (Waszkiel 2002, p.193). The contracts are designed to achieve environmental performance objectives by encouraging farmers both to produce positive externalities (for example, by protecting biodiversity and preserving landscape) and to limit negative ones (for example, by reducing pollution of agricultural origin and by controlling erosion).

For each of the FMC program's operational objectives, a set of performance indicators has been defined in order to measure the results (MAAPAR 2003, p.99). To date, the program's actual environmental results are still unknown. But in 2004, AScA, a Paris-based environmental consulting firm, produced an interim evaluation report on the AEMs provided for both in FMCs and in other French government programs. This report concluded that the FMCs had done more to make farmers aware of environmental issues than the other programs, because of the environmental assessment that must be conducted for each farm before a FMC contract is signed (AScA 2004, p. 12). Covering 13.6% of the utilized agricultural area (UAA) of France, the AEMs incorporated into FMCs are achieving their objective of "extending the principle of the agri-environment" (MAAPAR 2003, p.94). The report adds that the measures for the extensive management of meadowlands and the maintenance of hedges have been effective in maintaining biodiversity and landscape quality in mixed cropping and livestock rearing areas and in grazing areas. But FMCs have not succeeded in improving the management of natural resources, especially in intensive farming areas, because the percentage of farmers who sign these contracts in such areas is low, and their farms are geographically scattered, limiting the overall effect for any given area. Thus the FMCs appear to have achieved their objective of encouraging positive externalities more effectively than that of limiting negative ones (MAAPAR 2003, p.94).

All French farmers age 21 to 56 who have a specified level of professional qualifications are eligible for the FMC program. Interestingly, however, farms in disadvantaged areas, and especially in mountain regions, have shown a greater tendency to sign FMCs than farms in the plains or in the periphery of urban areas (MAAPAR 2003, p.27). The farms that sign these contracts are also larger than the average. The rate of contract signing is highest among farms larger than 200 ha—17.4%—the reason being that the people signing these contracts are mostly professional farmers. The sectors of agriculture most heavily represented among the farms signing contracts are, in descending order, combined beef/dairy operations (24%); other combinations of crops and livestock (23%); sheep, goats, and other grazing livestock (18%); mixed livestock, mainly grain-eating animals (15%); and beef cattle (13%) (MAAPAR 2003, p.33).

As of the end of July 2003, a total of 49,368 FMC contracts had been signed in France, which represented a participation rate of 12% of all professional farms (MAAPAR 2003, p.25).

3.1.2 Economic Importance of Payments for Farmland Management Contracts (FMCs)

Under FMC contracts, farmers receive funding in two different ways (MAAPAR 2000, p.4). The first involves investments and expenditures for social/economic or environmental/land management purposes. This form of funding is limited to €15,245[6] over the five years of each contract. The second form of funding consists of direct payments per hectare or per livestock unit, which are paid annually. These payments are tied to the farmer's commitment to implement specified AEMs, and multiple payments can be made for multiple measures implemented on the same farmland, provided that they are complementary and compatible. Table 1 shows a few examples of the maximum amounts of AEM payments and the economic rationale for these amounts.

The FMC payment amounts are designed to offset the additional costs incurred or the income lost as a result of implementing the measures to which the farmer has committed. Thus these amounts do not provide any additional economic incentives to carry out these measures. A report presented by the environmental consulting firm AScA states that the measures that have been the most popular with farmers have been those that fit most naturally into the logical development path for their production systems, those that require the least change in their current practices, and those that provide a payback for the work they entail. These extra benefits are the result of rational behaviour on the part of farmers who seek to maximize the remuneration they receive in relation to the constraints they accept by implementing the measures (AScA 2004, p.11).

As a general rule, the larger a farm is in economic terms, the larger the amount of FMC payments it receives. According to the 2003 evaluation report by MAAPAR (the French Ministry of Agriculture, Food, Fisheries, and Rural Affairs), the FMC program appears to have maintained the income differentials among the various sizes of farms, though it has not accentuated them. The FMC has therefore failed in its objective of redistributing assistance to the farms that need it most. However, the figures for the amounts of assistance provided to farms according to their economic size in European Size Units (ESUs)[7] show that from 2000 to 2001, the assistance received by small farms (8 to 40 ESUs) rose by 26%, compared with only 11% for farms of 100 ESUs or more and 12% for all sizes of farms combined (MAAPAR 2003, p.124).

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6. The average value of the euro in Canadian dollars was 1.3704 in 2000, 1.3868 in 2001, 1.4832 in 2002, and 1.5826 in 2003. (http://www.bankofcanada.ca/en/exchange_avg_pdf.html).

7. The economic size of a farm in ESUs is calculated from its standard gross margin (the value of its output per hectare minus the cost of the inputs required to produce that output). One ESU is equivalent to the production value of 1.5 ha of wheat, or €1,200.

Table 1: Maximum Amounts of Direct Agri-Environmental Payments under FMCs, France

Agri-Environmental Measure (AEM)	Maximum Direct Payment	Economic Rationale
Converting cropland into temporary meadowland	€375/ha/year	Difference in gross margin between a crop and a temporary meadow
Adding a crop to the original rotation	€600/ha/year for the percentage of the UAA occupied by the new crop	Difference in gross margin between the original crop rotation and the rotation under the FMC contract, calculated per ha of the portion of the UAA concerned
Replacing chemical fertilizers with organic fertilizers	€76/ha/year	Additional costs associated with substituting manure for chemical fertilizers
Implementing biological controls	€183/ha/year	Additional purchasing costs + hours of labour and assumption of risk
Establishing crops with special value for wildlife and vegetation	From €145/ha/year to €600/ha/year	Loss of income associated with not harvesting the cover before late summer/fall
Planting and maintaining hedges	€366/100 linear metres/year	Loss of UAA in saleable crops, cost of plants, planting, protection, trimming, annual weed control
Replacing chemical weed controls with mechanical weed controls	€183/ha/year (adjusted for type of crop)	Additional hours of work, savings on inputs
Using plant genetic resources that are naturally adapted to local conditions	€442/ha/year	Lower yield than more productive varieties
Clearing heavy brush from a plot of land and keeping it clear	€274/ha/year	Hours of work for clearing brush and keeping land clear

Source: MAAPAR 2000, circular on the implementation of FMCs.

Table 2 shows the average total direct payments over the entire five-year term of FMC contracts according to the size of the farm in hectares. For all sizes of farms combined, these payments averaged about €40 000 per farm. The amounts shown in this table should be interpreted cautiously, however. The method used to compute the investment assistance provided and the indemnities paid in connection with the AEMs required by FMC contracts does not provide the exact amounts committed for the entire duration of these contracts (MAAPAR 2003, p.28). Moreover, because the national system for tracking the expenditures is not yet fully operational, the exact amount of the contracts cannot be determined. The amounts shown in this table include contracts for conversions to organic farming, which inflates the average amount of the contracts and in many cases may even double it. The amounts shown in this table also include assistance for investments, which may account for as much as 25% of the average total amount of the FMCs (MAAPAR 2003, p.28 and 30).

Table 2: Average Total Direct Payments over Five-Year Terms of FMCs by Farm Size in Hectares, France

Farm Size	Average Amount in Euros
less than 1 ha	18,657
1 to 4 ha	14,384
4 to 20 ha	21,880
5 to 50 ha	29,814
50 to 100 ha	38,284
100 to 200 ha	52,109
Over 200 ha	81,725
Average, all farms	40,000

Source: MAAPAR 2000, p.30.

To understand how FMCs are funded, one must go back to March 1999, when the Member States of the European Union adopted Agenda 2000 and established the two pillars of the Common Agricultural Policy (CAP) (Lévêque 2005, p.1). The Second Pillar, funded by the European Agricultural Guidance and Guarantee Fund (EAGGF), is implemented through two instruments: the European Rural Development Regulation and community initiative programs. As the French Senate's Web site describes it, the Rural Development Regulation "covers all European activities that are aimed at developing agricultural structures and rural areas and that previously came either under structural policies or under measures accompanying the CAP" and is implemented in France through the National Rural Development Plan.[8] The activities conducted under this national plan include the FMC contracts and are co-funded by France and the EAGGF. Thus FMCs are ultimately funded from two sources: the government of France and the European Union.

The amounts paid under FMC contracts in France can therefore be classified as payments under the Second Pillar of the European CAP. However, we were unable to distinguish the exact amounts of these payments from payments under other programs in France, such as the Compensatory Indemnities for Natural Disadvantages (ICHN) and AEM programs. By signing FMC contracts, French farmers can obtain larger direct payments. But even without signing such contracts, any farmer in France can access the AEM program, and some can access the ICHN program, which also comes under the Second Pillar of the CAP.

Our analysis of the contribution of FMC payments to the total direct payments to French farmers provides a mixed picture. In 2001, on average, for all types of farming[9] combined, those farms that had signed FMCs received €30,307 in assistance, or 44% more than the €21,119 received by farms that had not signed FMCs (see Table 3). Even when we look only at payments under the

8. http://www.senat.fr/rap/a02-070-3/a02-070-32.html

9. *The standardized classification for types of farming used in France includes the following types: wines; flowers; fruits and market garden vegetables; sheep, goats, and other grazing livestock; mixed cropping and mixed livestock; cattle-dairying; other combinations of cropping and livestock; cattle-rearing and fattening/cattle-rearing and fattening and dairying combined; cereals and field crops.*

First Pillar[10] of the European CAP, farms with FMC contracts received more assistance than farms without. The reason is that farms with FMCs are larger, on average, and include a higher proportion of livestock operations. Consequently, the FMC program is not itself responsible for this difference between the results for contracting and non-contracting farms.

On the other hand, the payments that farms with FMCs received under the Second Pillar of the CAP were also greater, by over €5,000, than the Second Pillar payments received by non-contracting farms.

Table 3: Direct Payments per farm under First and Second Pillars of the CAP, France, 2001 (all types of farming combined)

	Farmers with FMC Contracts (€)	Farmers without FMC Contracts (€)
1st Pillar		
Crop assistance	14,049	13,623
Livestock assistance	8,780	5,083
Total 1st Pillar	22,828	18,706
2nd Pillar		
ICHN*	1,750	1,120
AEM*	4,171	587
Other	1,557	707
Total 2nd Pillar	7,478	2,414
Total direct payments	30,307	21,119

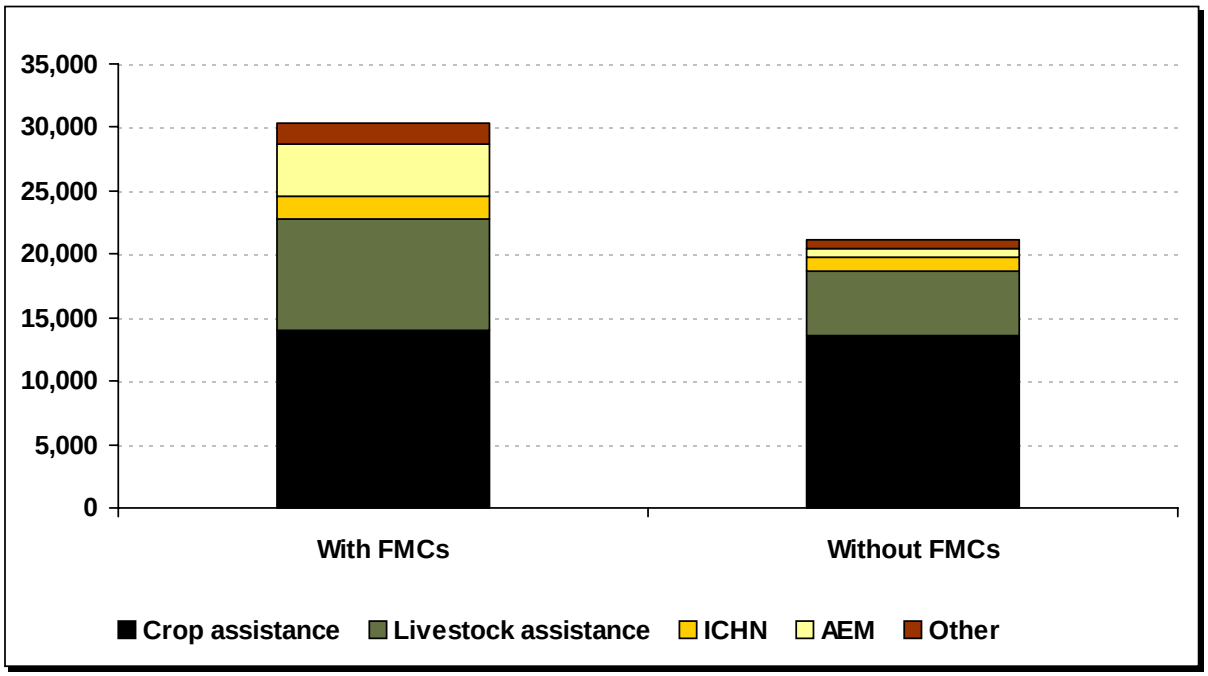
**ICHN: Compensatory Indemnities for Natural Disadvantages.*
AEM: Agri-Environmental Measures.

Source: FADN 2001, traitement DAF/BEPE in MAAPAR 2003.

Figure 1 illustrates the proportions of the various types of direct payments under the two pillars of the CAP. Note that AEM account for a far higher proportion of the total direct payments to farms with FMC contracts than to farms without them.

10. *The First Pillar of the CAP deals with market mechanisms and policy. It is divided into two components: an internal component that comprises pricing, compensatory assistance and intervention mechanisms, and an external component that manages the regimes governing trade with third countries. The Second Pillar deals with rural development policy and also has two main components: measures accompanying the CAP reform of 1992 and measures for modernizing and diversifying farm operations. France's AEMs and indemnities for natural disadvantages are classified as part of the first component, "Accompanying Measures" (Loyat and Petit 2002, pp. 67 and 72).*

Figure 1: Average Direct Payments under First and Second Pillars of the CAP, France, 2001 (all types of farming combined)



Source: RICA 2001, DAF/BEPE Treatment, from MAAPAR 2003.

We used the data in Table 2 and Table 3 to estimate the average annual amount received by a contracting farmer. To do so, we subtracted the assistance for investment from the average amount of FMC payments, leaving only the amount associated with direct payments. The average amount of investment assistance is equivalent to about €10,000[11] per FMC. Subtracting this amount, we get an average total of €30,000 in direct payments per FMC over five years. This means that the annual amount received by contracting farms would be on the order of €6,000 per year. This amount obviously is not precise; it is an approximation, just like the average amounts reported for FMCs in the studies that we consulted. Meanwhile, the data in Table 3 show that contracting farms receive about €5,000 more from the Second Pillar (which includes the FMC payments) than non-contracting farms do. Though we cannot reconcile these two amounts from the available data, the average additional assistance received by each farm that has a FMC contract would thus appear to be on the order of €5,000 to €6,000 per year.

We could not find the average farm income of contracting farms in order to calculate the contribution of FMC payments to their income. But we were able to compile some data showing how the average characteristics of French farms and the direct payments they receive varied over the years 2000 through 2002. The results are shown in Table 4.

11. *In its 2003 evaluation report on the FMC program, MAAPAR cites a study conducted jointly by the CNASEA (French national centre for the development of farming structures and operations) and the DEPSE (farms, social policy, and employment directorate) in which the average amount of a FMC totalled €44,475, of which €11,003 consisted of investment assistance (MAAPAR 2003, p.28). In the present study, we are using the amount of €10,000 of investment assistance for an average amount of €40,000 per FMC.*

Table 4: Average Characteristics of Farms and Contribution of Direct Payments to Family Farm Income, France, 2000-02

	2000	2001	2002
Number of farms represented	393,730	396,370	389,050
UAA (ha)	68.0	67.6	69.8
Total output[1] (€)	118,815	118,019	120,328
Gross farm income[2] (€)	67,776	67,106	69,063
Family farm income[3] (€)	28,712	27,851	28,726
Direct payments[4] (€)	19,778	21,416	22,936
Net farm income[5](€)	8,934	6,435	5,790
ICHN payments[6] (€)	1,040	1,136	1,123
AEM payments[6] (€)	609	747	1,100
Direct payments as a percentage of family farm income	69%	77%	80%
AEM payments as a percentage of family farm income	2%	3%	4%

[1] *Total output: total of output of crops and crop products, livestock and livestock products, and other output + sales and use of products and livestock + change in product inventory + change in valuation of livestock - purchases of livestock + miscellaneous non-exceptional items.*

[2] *Gross farm income: output – intermediate consumption + balance of farm subsidies and taxes.*

[3] *Family farm income: payment for family fixed factors of production (work, land and capital) and for entrepreneur's risks (loss/profit) in the accounting year.*

[4] *Direct payments: subsidies on current operations linked to production (excluding investments).*

[5] *Calculation: family farm income – direct payments.*

[6] *ICHN: Compensatory Indemnities for Natural Disadvantages AEM: Agri-Environmental Measures*

Source: FADN and our calculations; all definitions for income and payment items are available at the following address: http://europa.eu.int/comm/agriculture/rica/definitions_en.cfm.

Direct payments rose from 69% of family farm income in 2000 to 80% in 2002. Agri-environmental direct payments increased steadily and accounted for 4% of family farm income in 2002. Income, for its part, stagnated over this period. Using the average family farm income of French farms, it is possible to calculate, with certain reservations, the contribution of the average annual amount of a FMC to income. Though average family farm income is not exactly the same as that of the contracting farms, this calculation does provide a rough estimate of the contribution of FMC payments to income. Thus, based on the FMC payment amounts calculated previously, in 2001, FMC payments accounted for 18% to 22% of family farm income.[12] This calculation can also be done to find the percentage of family farm income that AEM payments represented in 2001 for farms that had FMCs and for farms that did not. If we divide the amount of the AEM payments in Table 3 by the family farm income in Table 4, we find that AEM payments accoun-

12. *Our calculation was done as follows: average amount of FMCs calculated previously (€5,000 to €6,000) divided by family farm income as shown in Table 4 (€27,851).*

ted for 15% of family farm income for farms with FMCs and 2% for farms without FMCs. As just mentioned, these figures must obviously be interpreted cautiously.

Overall, direct payments under FMCs would appear to account for 20% of family farm income, which is far from negligible for certain farms. As the French agriculture ministry's evaluation report on the FMC program states, "in certain sectors of agriculture, the FMC has helped farmers to ride out the crisis, by providing an indispensable source of income support" (MAAPAR 2003, p. 105).

The FMC program was highly ambitious, but its implementation in practice has been far from simple. The individual approach for each FMC involves a heavy, time-consuming, and costly administrative burden (Kroll 2002, p. 41). In addition to a preliminary environmental assessment for each farm, the FMC mechanism requires the provision of precise land survey documents and an in-depth knowledge of the file-review procedures. The costs associated with the lengthy procedures have raised several questions about the assistance ultimately provided to farmers. But the importance of the FMC in France's agriculture policy has nevertheless remained minimal. The total public funding for the FMC contracts over seven years (2000 to 2006) amounts to €3.4 billion. In comparison, the total budget envelope allocated for agriculture in France in a single year—2001—amounted to €11.4 billion (MAPAAR 2003, p.10). If we assume that the €3.4 billion in FMC payments were distributed evenly over the seven years in question, the annual expen-ditures on FMCs would total about €486 million, or 4.2% of the agricultural budget envelope for the year 2001.

In conclusion, direct payments associated with AEMs and FMCs represent only a small portion of the total support paid to French agriculture. As regards the FMC program, the available data do not allow us to break the payments down into the program's two components, one economic, and the other environmental. Since EG&S are related more to the second of these components, the proportion of direct payments devoted to such goods and services is thus even lower than our estimates.

3.1.3 From the Farmland Management Contract (FMC) to the Sustainable Agriculture Contract (Contrat d'agriculture durable - CAD)

In 2002, France replaced the FMC with the Sustainable Agriculture Contract (SAC), a tool that focuses much more on protecting the environment and much less on the multifunctionality of agriculture. In fact, the main measures supported by SACs are centred on the top-priority environmental concerns (Gervasoni 2003, p.7). In a sense, the SAC thus abandons the economic component of the FMCs and confines itself to a concept of sustainable development that is far narrower than the concept of the multi-functionality of agriculture.

The existing FMC contracts will continue in force until their five-year terms expire, so farmers will continue to receive support under them for a few more years. But the SACs are taking over, and their funding is subject to better controls than the FMCs'. Henceforth, budgets will be managed at the regional level on the basis of the credits that the national government provides (see MAAPAR Web site[13]). The average amount per five-year contract in each administrative region must not exceed €27,000. The total amount devoted to FMCs and SACs in 2004 was approximately €450 million (Lévêque 2003, p.4).

13. http://www.agriculture.gouv.fr/spip/ressources.themes.exploitationsagricoles.contratsdagriculturedurablecad_r589.html

The amounts already budgeted for FMCs and the projected budgets for SACs indicate that in the coming years, the total amounts that the French government pays farmers to produce EG&S may well remain fairly minimal compared with the total direct payments that it makes to farmers. This likelihood is all the greater in that the latest reform of the CAP, in 2003, has accelerated the trend toward reduced price supports for agricultural products—a reduction partly offset by an increase in direct payments to income, with the untying of payments as the underlying logic to a certain extent.

As regards the explicit or implicit liability incurred by the farmers, our research did not yield any data on the additional costs generated by the implementation of the measures in relation to the level of payments received.

3.2 Switzerland: Making Ecological Direct Payments

In Switzerland, the landscape (mountains) makes difficult the practice of highly intensive agriculture, while the scarcity of land keeps production costs high. Hence the Swiss authorities understood early on that for agriculture to survive in their country, government assistance would be required. In 1992, the Swiss national agricultural policy introduced decoupled direct payments to support Swiss farmers. Five years later, following a referendum, the principle of the multifunctionality of agriculture was entrenched in the Federal Constitution of the Swiss Confederation. The measures that Switzerland has implemented to recognize the multifunctionality of agriculture consist of direct payments that supplement the income of people who live on the land.

3.2.1 General and Ecological Direct Payments

The direct payments[14] made to farmers in Switzerland fall into two categories: general direct payments and ecological direct payments (FOAG 2004). The primary purpose of these direct payments is to remunerate farmers for the multiple functions they perform in connection with their agricultural activities, including, in particular, the functions of protecting and maintaining the rural landscape, ensuring a safe and sufficient food supply, preserving natural heritage and biodiversity, improving the well-being of animals, and reducing pollution of agricultural origin. General direct payments compensate farmers for services of public value that they perform. The types of general direct payments are as follows:

- 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.

Ecological direct payments are designed to encourage farmers to perform ecological services that the market does not reward, so these payments are closely linked to the idea of EG&S. The types of ecological direct payments are as follows:

- payments for ecological set-aside areas;
- payments for extensive farming of cereals and rapeseed (canola);

14. *The Swiss literature calls these payments "contributions" and "compensations," but to make this report easier to read and to facilitate its comparisons between countries, we use the term "direct payments" here.*

- payments for organic farming;
- payments for humane husbandry of commercial livestock;
- payments for summering livestock in mountain pastures;
- payments for protecting water;
- payments for contributions to the quality of the environment.

The ecological payment programs are independent of one another, and farmers can receive payments under more than one at a time. Direct payments for ecological set-aside areas include payments for extensive meadows; low-intensity meadows; areas used to grow livestock bedding materials;[15] hedges, groves, and wooded shorelines; fallow strips (or "floral fallow"); fallow fields (or "rotating fallow"); extensive crop strips; and tall fruit trees.

Because the present study deals primarily with the production of EG&S, we cannot examine all of the different types of ecological direct payments that are made to farmers in Switzerland. Specifically, we will not cover payments related to livestock welfare, organic farming, or summering of livestock in mountain pastures.

To receive direct payments, farmers must meet certain criteria (including structural and social ones such as age, income, and assets) and must provide certain required ecological services (prestations écologiques requises, or PERs)[16] (FOAG 2004, p.148). As of 1992, over 96% of Swiss farmers met these requirements (Multagri 2005, p.10).

In 2000 and 2001, the Swiss Federal Office for Agriculture (FOAG) produced two interim reports evaluating its ecological measures and humane livestock husbandry programs. These reports assessed the environmental impacts of the Office's ecological measures in three areas—biodiversity, nitrogen and phosphorus pollution, and crop treatment products—based on specific, predetermined objectives of two kinds: general objectives and implementation objectives (FOAG 2001). The objectives for all three areas are shown in Table 5.

Regarding the first of these three, the Office has conducted studies since 1997 to determine how the ecological set-aside areas for which it makes payments to farmers have affected biodiversity. To assess the quality of these areas, the Office examines trends in bio-indicators such as the presence of spiders, beetles, birds, butterflies, and grass-hoppers. The preliminary results indicate that unlike intensive pasturelands, natural areas and extensive-farming areas have a positive effect on species diversity. In fact, an increase in the diversity of certain biotopes has been observed in those areas where the Office's ecological measures have been applied (FOAG 2001, p.4).

15. *Wetlands and swamps which are cultivated extensively to produce bedding materials for livestock.*

16. *These services include using properly balanced fertilizers, rotating crops regularly, protecting the soil properly, using plant treatment products prudently, protecting livestock welfare, and maintaining a minimum amount of ecological set-aside area (FOAG 2004, p. 150).*

Table 5: Objectives for Ecological Measures Regarding Biodiversity, Nitrogen/Phosphorus Pollution, and Crop Treatment Products in Switzerland

Area	General Objectives	Implementation Objectives*
Biodiversity	Promote biological diversity Stop species from disappearing	Increase ecological set-aside areas to at least 10% of the total UAA in Switzerland
Nitrogen and phosphorus pollution	Achieve a 5 mg/L reduction in the nitrate levels found in representative samples of groundwater and spring water	Reduce the excess nitrogen in the overall input/output balance for Swiss agriculture by 1/3 (44,000 t)
	Achieve a 50% reduction in the levels of phosphorus of agricultural origin in surface water	Reduce the excess phosphorus in the input/output balance by 1/2
Crop treatment products	Reduces discharges into surface water by 50%	Reduce the number of tonnes of these products used by 30%

**Objectives to be achieved by 2005.*

Source: FOAG 2000.

The results of the ecological measures designed to reduce excess nitrogen and phosphorus in the overall input/output balance for Swiss agriculture have been more mixed. As of 1992, when ecological direct payments were introduced, excess nitrogen totalled 133,000 t, and the target set was to reduce this excess by one-third (44,000 t) by 2005. As of 1998, an 18,000 t reduction had been achieved, essentially through reduced use of chemical fertilizers (FOAG 2001, p.5). This reduction was substantial, but not enough to achieve the specified target by 2005. Starting in 1997-98, however, fertilizer use increased, causing overall nitrogen emissions to rise again from 1998 to 2002 and making the 44,000 t reduction target even more distant (FOAG 2004, p.91). In the case of phosphorus, the objective was to reduce the excess in the input/output balance by one-half, and this objective was achieved by 1996. For example, the Office's fourth interim evaluation report on its ecological measures indicates that phosphorus pollution of streams in the Lippenrütibach drainage basin decreased by 13%. In the Frienisberg region, the reduction in pollution due to phosphorus was 22% (FOAG 2001, p.6).

Some time in 2005, the Office will know whether these objectives have been achieved. But it is already clear that the land area of ecological set-asides has increased steadily, from 51,461 ha in 1993 to 96,887 ha in 2003 (FOAG 2001, p.2 and FOAG 2004, p.170). As of 2003, ecological set-asides represented 9% of Switzerland's UAA[17] (FOAG 2004, Appendix A2).

3.2.2 Economic Importance of Direct Payments

The direct payments made in Switzerland on the basis of farm size are degressive. Farms of up to 30 ha receive CHF 1,200[18]/ha; farms from 30 to 60 ha receive CHF 900/ha, farms from 60 to 90 ha receive CHF 600/ha, and farms exceeding 90 ha do not receive this assistance (FOAG 2004,

17. *The total UAA in Switzerland in 2003 was 1,067,055 ha.*

18. *The average value of the Swiss franc in Canadian dollars was 0.8793 in 2000, 0.9184 in 2001, 1.0112 in 2002, and 1.0418 in 2003 (http://www.bankofcanada.ca/en/exchange_avg_pdf.html).*

p. 156). The purpose of these size-based payments is to remunerate farmers for services that they provide to society in general, such as protecting and maintaining the landscape, ensuring a safe and sufficient food supply, and preserving natural heritage. Table 6 summarizes the direct payments based on farm size that were made in Switzerland in 2003.

Table 6: Direct payments based on farm size, Switzerland, 2003

Characteristic	Total
Surface area (ha)	1,027,321
Number of farms	57,397
Average area per farm (ha)	17.9
Direct payments per farm (CHF)	22,962
Total direct payments (CHF)	1,317,956,000

Source: FOAG, Agricultural Report 2004.

The purpose of the payments for farming livestock fed on roughage is to improve the competitiveness of meat producers who feed a roughage diet to their livestock. Through this measure, the Swiss government seeks to optimize the use of agricultural land. The annual payments per roughage-feeding-livestock unit total CHF 900 for cattle, horses and other equines, bison, milking goats and milking ewes, and CHF 400 for other goats and sheep, deer, lamas, and alpacas (FOAG 2004, p.159). These payments are subject to a maximum number of roughage-feeding-livestock units per hectare, and this maximum varies from one type of terrain to another. In those mountainous areas where agricultural and climatic conditions are most difficult, the limit is 0.8 units per hectare, while in flatter, lower-lying areas, it is 2.0 units per hectare.

The purpose of the direct payments for farming livestock under difficult production conditions is to encourage land use in foothill and mountain areas. These payments are based on the number of roughage-feeding-livestock units, up to a maximum of 20. The average payment is CHF 260 per roughage-feeding-livestock unit in foothill areas and CHF 813 per unit in mountain areas (FOAG 2004, p.160).

The purpose of the direct payments for farming on steep slopes is to compensate farmers who operate pastures, grow crops for livestock bedding, or grow crops in rotation under difficult conditions. Farmers receive a payment of CHF 370/ha for farming on slopes of 18% to 35% and CHF 510/ha for farming on slopes exceeding 35% (FOAG 2004, p.162).

In addition to the preceding general direct payments for ecological services that they are required to provide, farmers can also receive ecological direct payments by participating in the special ecological contributions program. It is the payments under this program that are the most closely related to the concept of EG&S.

These ecological direct payments are designed to protect biodiversity and preserve typical landscape elements of agricultural ecosystems (FOAG 2004, p.165). Within this category, the amounts are the same for three types of ecological set-aside areas: extensive meadows; areas used to grow livestock bedding materials; and hedges, groves, and wooded shorelines. Extensive meadows may not be mowed before mid-June, so as to let the seeds mature and encourage their natural dispersion, as well as the reproduction of small mammals and ground-nesting birds. Fertilizers

and plant protection products may not be used on this land. Areas used to grow livestock bedding may not be mowed before September 1. Hedges, groves, and wooded shorelines may not be fertilized or treated with plant protection products. A grassy strip at least 3 m wide must be provided along the edge of these wooded areas.

For each of these three types of ecological set-asides that farmers provide, they receive a payment per hectare. The amount per hectare depends on the type of terrain on which their farms are located (see Table 7). Apparently, there is no ceiling on the amount of these payments.

Table 7: Payment Scale for Extensive Meadows, Areas Used To Grow Livestock Bedding, and Hedges, Groves, and Wooded Shorelines, Switzerland, 2003

Type of Terrain	CHF/ha
Plains and transitional areas	1,500
Foothill areas	1.200
Category I and II mountain areas*	700
Category III and IV mountain areas*	450

**Mountain areas are classified into four categories, ranging from Category I, where conditions are relatively favourable for agriculture to Category IV, where they are especially difficult.*

Source: FOAG, Agricultural Report 2004.

The payment rates for low-intensity meadows are CHF 650/ha in plains and foothill areas, CHF 450/ha in category I and II mountain areas, and CHF 300/ha in category III and IV mountain areas (FOAG 2004, p.167). No plant treatment products may be applied in these meadows, and any fertilizers used must be organic. The reason that the amounts of these direct payments for extensification are higher in the plains and foothills than in the mountains is that the loss of income is expected to be greater, since intensification is of course greater in the plains than in the mountains.

The purpose of fallow strips (or "floral fallow") is to protect endangered species of wild grasses and provide habitat for insects and small animals. The annual payment for fallow strips in plains and foothill regions is CHF 3,000/ha. Fallow fields (or "rotating fallow") are defined as "areas that are seeded, for one or two years, with indigenous wild plant species accompanying crops" and that serve as habitat for small animals and birds (FOAG 2004, p. 168). The annual payment for these fields in plains and foothill areas is CHF 2,500/ha.

Extensive crop strips are strips of land 3 to 12 m wide that are farmed extensively (without chemical fertilizers, pesticides, or mechanical treatments). These strips may be seeded with cereals (except corn), rapeseed (canola), sunflowers, peas, high-protein oilseed crops, field beans, or soybeans. These strips allow the survival of the plant species that traditionally grow with the crops. The annual payment for this measure is CHF 1,500/ha, and it is available in plains and foothill areas only (FOAG 2004, p.169).

Lastly, the direct payments for tall fruit trees are CHF 15/tree/year, with a minimum of 20 trees per farmer. These trees must not be part of a fruit-growing operation (FOAG 2004, p.169).

The direct payment for extensive farming of cereals and rapeseed is intended as an incentive to stop using growth regulators and pesticides on these crops. The payment is CHF 400/ha/year (FOAG 2004, p.174).

Table 8 shows the average amounts of the general and ecological direct payments that Swiss farms received in 2003. Out of a total of 65,866 Swiss farms, 57,397 received payments based on farm size, which averaged CHF 22,962 per farm. This category accounted by far for the largest volume of payments: a total of CHF 1.3 billion. Ecological direct payments accounted for 19.4% of total direct payments. This category comprises most of the payments that can be regarded as relating to the concept of EG&S.

Overall, the Swiss government made CHF 2.5 billion worth of direct payments to farms in 2003, out of the total CHF 3.9 billion that it spent on food and agriculture that year. The Swiss government's agricultural expenditures represented 7.8% of its total spending (FOAG 2004, p.19). Spending in the agricultural sector has held relatively steady since the year 2000.

Table 8: Direct Payments to Farms, Switzerland, 2003*

Type of Payment	Total Payments ('000 CHF)	Number of farms	Average payment per farm (CHF)
General direct payments			
Payments based on farm size	1,317,956	57,397	22,962
Payments for farming livestock fed on roughage	287,692	37,697	7,632
Payments for farming livestock under difficult conditions	287,289	34,399	8,352
Payments for farming on steep slopes	95,630	32,286	2,962
Payments for steeply sloped and terraced vineyards	10,524	2,841	3,704
Total general direct payments	**1,999,091**		
Ecological direct payments			
Payments for summering livestock in mountain pastures	91,381	**7,493**	**12,196**
Payments for protecting water	4,024		
Ecological payments	381,318		
Includes:			
Payments for ecological set-aside areas	124,927		
Payments under the ordinance on ecological quality	14,638	16,434	891
Payments for extensive farming of cereals and rapeseed	31,255	17,784	1,757
Payments for organic farming	27,135	6,182	4,389
Payments for humane husbandry of commercial livestock	183,363	18,477	2,341
Total direct ecological payments	**476,552**		
Reductions**	**17,138**		
Total direct payments	**2,458,677**		

* No direct comparison can be made with the Swiss government's official accounts, because they are based on the calendar year, while the figures in the 2004 agriculture report cover the entire payment year. This is why some of the data do not add up to the totals shown.

**Reductions based on legal and administrative ceilings and penalties.

Source: FOAG, Agricultural Report 2004.

Table 9 shows the number of Swiss farms that received ecological direct payments for ecological set-aside areas in 2003, and the average payment received by each farm. Despite the high average payments for fallow fields ("rotating fallow"), few farmers took advantage of them,

which suggests that these payments do not provide a sufficient financial incentive to compensate for the costs or work involved. Extensive meadows were the most popular measure among farmers, with a participation rate of 57% and an average direct payment of CHF 1,407 per farm.

Table 9: Direct Payments per Farm for Ecological Set-Aside Areas, Switzerland, 2003

Type of set-aside	Number of farms	Average direct payment per farm (CHF)
Extensive meadows	37,665	1,407
Areas used to grow livestock bedding	6,823	930
Hedges, groves, and wooded shore-lines	9,133	316
Low-intensity meadows	27,417	580
Fallow strips ("floral fallow")	2,594	2,802
Fallow fields ("rotating fallow")	946	3,463
Extensive crop strips	136	340
Tall fruit trees	35,619	1,016

Source: FOAG, Agricultural Report 2004.

The contribution of direct payments to farm income (total farm revenues minus actual costs) is very high in Switzerland, especially in mountain areas. As Table 10[19] shows, in areas classified as plains, direct payments account for 59% of farm income, while in foothill areas, they account for 86%. In mountain areas, the direct payments that farms receive from government are higher than the farm income they receive from market transactions. For all areas combined, direct payments account for 81% of farm income. Ecological direct payments account for about 14% of Swiss farm income, and the differences among the plains, the foothills, and the mountains are not very significant. Thus the contribution of direct payments for EG&S seems to be substantially higher in Switzerland than in France. This finding is not surprising, because Switzerland long ago decided that it would not base its agriculture on a productivist model but would instead support agriculture's many potential functions, and the production of EG&S in particular.

19. *These data come from the "centralized tabulation of agricultural accounting data," which constitutes a "sample of farms that is designed to represent the entire agriculture sector" in Switzerland (FAT 2000, p.3).*

Table 10: Contribution of Direct Payments to Farm Income, Switzerland, 2003

Type of set-aside	Plains	Foothills	Mountains	All areas
Number of farms	1,219	745	699	2,663
UAA/farm (ha)	19.8	18.8	18.6	19.1
Gross farm income* (CHF)	247,188	186,427	148,901	203,189
Actual costs	183,059	134,985	104,979	148,160
Farm income (CHF)**	**64,129**	**51,442**	**43,921**	**55,029**
Direct payments (CHF)	38,064	44,368	54,725	44,410
Includes:				
General direct payments	29,843	36,513	48,846	36,936
Ecological direct payments	8,221	7,856	5,878	7,474
Net farm income*** (CHF)	26,065	7,074	(10,804)	10,619
Direct payments as a percentage of gross farm income	15.4	23.8	36.8	21.9
Direct payments as a percentage of farm income	59.4	86.2	124.6	80.7
Ecological direct payments as a percentage of farm income	12.8	15.3	13.4	13.6

** Gross farm income includes direct payments and the value of sales of agricultural products.*
*** Farm income equals gross farm income minus actual costs.*
****Our computation: Farm income minus direct payments.*

Source: FOAG, Agricultural Report 2004 and our calculations.

As regards the explicit or implicit liability incurred by the farmers, our research did not yield any data on the additional costs generated by the implementation of the measures in relation to the level of payments received.

3.3 Agri-Environmental Methods in the Walloon Region of Belgium

The following analysis deals mainly with the Walloon Region of Belgium. The government of this French-speaking region provides remuneration for the EG&S produced by its farms through an agriculture policy based on a "European model of multi-functional agriculture" (A.D.E. 2003, p.5). This region accounts for 24.5% of the value of Belgium's agricultural output and mainly grows field crops (Conseil supérieur wallon de l'Agri-culture, de l'Agro-alimentaire et de l'Alimentation 2005, p.145). The Walloon agriculture policy can be described as an intervention strategy based on 10 specific measures. (A.D.E. 2003, p.6). Each of these measures addresses one aspect of agricultural development that the Walloon government wants to encourage, such as helping young farmers get established, investing in farms, providing training, and so on. In the present study, we examine the measure that is related to the concept of EG&S: Measure 4, Agri-environment.[20]

20. *Measure 4, Agri-environment, includes incentive payments for organic farming, assistance for the production of pip fruit (chiefly apples and pears), and agri-environmental methods (Conseil supérieur wallon de l'Agriculture, de l'Agro-alimentaire et de l'Alimentation 2005, p.105).*

3.3.1 Description of Agri-Environmental Methods

The general objectives of the Walloon government's agri-environment measure match several of the objectives of EG&S: protecting and improving biodiversity, protecting surface water and groundwater, developing an ecological network, protecting soil, preserving and developing rural landscapes, preserving and protecting natural and genetic resources, developing practices that are more sound environmentally, and increasing the land area to which agri-environmental methods are applied (A.D.E. 2003, p.6). More broadly speaking, the Walloon government's agri-environment measure seeks to "encourage farmers to become active participants in the protection of the environment, by making them more aware of the application of agricultural practices that go beyond the usual best practices" (A.D.E. 2003, p.82).

To achieve these objectives, the Walloon government offers farmers five-year contracts under which they receive direct payments for employing any of 10 specified agri-environmental methods (Gouvernement wallon 2004). These methods fall into two categories: basic and targeted. To be eligible for payments for any of the targeted methods, farmers must first obtain a certification (avis conforme) from the government that the method in question is "appropriate for the environmental situation of the plot of land or farm concerned" (Gouvernement wallon 2004). The opportunity to sign an environmental contract is available to all farmers, and participation is entirely voluntary.

The 10 agri-environmental methods that can be covered by these contracts were selected on the basis of the Walloon Region's top environmental priorities. These methods should therefore yield positive environmental impacts provided that a "critical mass of adoption" is achieved (A.D.E. 2003, p. 83). As of the end of September 2002, 7,546 agri-environmental contracts had been signed, and 6% of the Walloon Region's total UAA was covered by these contracts. Though the number of farmers participating in this program increased substantially from 2000 to 2002, the results are still far from the objectives set in the Walloon Region's official Development Plan, except for the maintaining of hedges and windbreaks (A.D.E. 2003, p. 84). Table 11 shows the objectives set in the Single Programming Document, and the results achieved, for five of the agri-environmental methods covered by these contracts.

Table 11: Objectives and Results for Five Agri-Environmental Methods, Walloon Region, Belgium, 2002

Method	2002 results	Objectives under Single Programming Document
Extensive meadow strips (ha)	497	10,000
Maintaining hedges and windbreaks (ha)	21,277	5,000
Ponds and water points (ha)	289	3,750
Vegetated buffer strips* (ha)	1,163	10,000
Maintaining low livestock densities (ha)	5,475	10,000

** Strips along the edges of cultivated fields, providing buffer zones between crops and their immediate surroundings.*

Source: A.D.E. 2003, p. 86.

3.3.2 Economic Importance of Payments

In 2003, payments under the Walloon Region's AEM totalled €10.6 million, or 31% of the budget for the Walloon Rural Development Plan, which totalled €33.7 million (Conseil supérieur wallon de l'Agriculture, de l'Agro-alimentaire et de l'Alimentation 2005, p.105). For Belgium as a whole, this measure accounted for 29% of all public funding for 2000-03 and received 55.7% co-funding from the European Agricultural Guidance and Guarantee Fund (Conseil supérieur wallon de l'Agriculture, de l'Agro-alimentaire et de l'Alimentation 2005, p.105-106).[21]

As in France and Switzerland, the amount of the payments varies with the agri-environmental method applied. Table 12 summarizes the requirements and the payment rates for the 10 agri-environmental methods for which the Walloon Region provides direct payments.

The contribution that agri-environmental payments make to farm income in the Walloon Region was not examined explicitly or in depth in the documents that we reviewed. But the Walloon Rural Development Plan does make one cautious statement on this subject: that payments for applying agri-environmental methods (and thus, for producing EG&S) may contribute significantly to farm income for farmers in marginal areas. But for more intensive, more profitable farms, these payments would account for only a negligible portion of income (A.D.E. 2003, p. 89).

The only data that we could find on the contribution of agri-environmental direct payments to farm income in the Walloon Region were presented in table form in a document on trends in the agricultural and horticultural economy of this region in 2003 (Conseil supérieur wallon de l'Agriculture, de l'Agro-alimentaire et de l'Alimentation 2005). A portion of these data is reproduced in Table 13. Direct payments under the Second Pillar of the CAP include aid to disadvantaged areas, aid to organic farmers, agri-environmental assistance, and aid to integrated production, but not investment assistance. In total, payments under the Second Pillar accounted for 5.7% of earned income per work unit in the Walloon Region in 2003. In comparison, payments under the First Pillar accounted for 45.7% of earned income per work unit that same year (Conseil supérieur wallon de l'Agriculture, de l'Agro-alimentaire et de l'Alimentation 2005, p.127). The contribution of agri-environmental payments to the income of Walloon farms is thus very low, because even the 5.7% of earned income under the Second Pillar includes other forms of assistance as well.

21. For the year 2003.

Table 12: Agri-Environmental Methods Eligible for Direct Payments and Rates of Payment, Walloon Region, Belgium, 2002

Method	Requirements	Payment rate
"Basic" Methods		
Hedges and windbreaks	Preserve and maintain; no fertilizers or other treatments allowed; no trimming from April 15 to July 1.	€50/200 m no limit
Individual trees, shrubs, and bushes	Same as above	€25/10 trees, shrubs or bushes
Ponds	Preserve and maintain; minimum winter water area 10 m^2; no spraying or other applications within 10 m; limited livestock access.	€50/pond
Natural meadows	Permanent meadows – minimum 3,000 m^2; fertilize with manure or compost; nothing from January 1 to June 15; if mowed, leave 5% to shelter wildlife.	€200/ha
Vegetated buffer strips*	Ploughed crops or turn strips – minimum 200 m^2; max 8% of ploughed area; not along meadows except if hedge present; no fertilizers, other treatments, or pasturing; mow after July 1.	€18/200 m^2
Extensive meadow strips	Permanent meadows – minimum 100 m^2; max 8% of meadow area; no fertilizers, plant treatments, or other treatments; mow after July 1	€18/200 m^2
Winter ground cover	Plant before September 15, break up after January 1; maximum 50% legumes; no chemical nitrogen fertilizers; no fallowing.	€100/ha
Reduction of cereal inputs	Maximum 200 seeds/m^2 and minimum 3,000 m^2; no growth regulators; no corn.	€100/ha
Keeping endangered local breeds of livestock	Local breed in danger of disappearing; genealogical record; more than 2 years for cattle and horses; more than 6 months for sheep	€120/head of cattle €200/horse €30/sheep
Maintaining low livestock densities (ha)	0.6 to 1.4 livestock units/ha of meadow; production of meadow with value added by farm animals; all organic material applied must come from the farm's own animals.	€100/ha of meadow
Method	**Requirements**	**Payment rate**
"Targeted" Methods		
Meadows of high biological values	Permanent meadows; draining and clearing prohibited; nothing from January 1 to July 1; no fertilizers, plant treatment products, or fodder allowed; if mowed, leave 10% shelter for wildlife; pasturing allowed after August 15	€450/ha
Environmental set-aside strips	Ploughed crops or turn strips – minimum 200 m^2, 3 to 21 m wide; allowable farming practices depend on category of set-aside strip; no fertilizers, amendments, plant treatments, or other treatments	€25/200 m^2
Agri-environmental action plans	Environmental assessment of the farm and its practices; short- and medium-term objectives; list of actions to be taken and timetable for taking them	5% premium on total amount for agri-environmental methods

**Strips along the edges of cultivated fields, providing buffer zones between crops and their immediate surroundings.*
Source: Walloon Region governmental sector, October 2004.

Table 13: Direct Payments under the Second Pillar of the CAP as a Percentage of Earned Income per Work Unit,* Walloon Region, Belgium, 2001-03

	2001	2002	2003
Agricultural crops	2.6	2.4	2.0
Highly specialized dairy	7.8	10.5	11.2
Moderately specialized dairy	10.7	9.2	8.9
Mixed cattle	5.6	8.1	6.2
Beef cattle	18.7	18.6	10.3
Crops and dairy	2.4	2.7	2.3
Crops and non-dairy cattle	3.5	5.0	3.2
Total, Walloon Region	6.5	7.4	5.7

** The document consulted did not provide a precise definition of "earned income" or "work unit."*

Source: Direction générale de l'Agriculture, taken from Conseil supérieur wallon de l'Agriculture, de l'Agro-alimentaire et de l'Alimentation 2005, p. 127.

For Belgium as a whole, Table 14 shows the characteristics of farms and the contribution of direct payments to family farm income from 2000 to 2002. Direct payments for ICHNs and AEMs have been increasing but still represent only a very small portion of Belgian farm income. Hence the contribution of payments for the production of EG&S in the Walloon Region and in Belgium generally remains very low.

Table 14: Statistical Averages for Farms and Contribution of Direct Payments to Farm Income, Belgium, 2000-02

	2001	2002	2003
Number of farms represented	39,340	39,360	39,340
UAA (ha)	36.9	37.4	38.8
Total output* (€)	150,026	151,976	144,577
Gross farm income (€)	80,831	81,566	72,711
Family farm income (€)	**47,248**	**47,085**	**37,587**
Direct payments (€)	**8,891**	**12,648**	**12,812**
Net farm income** (€)	38,357	34,437	24,775
ICHN payments*** (€)	403	375	405
AEM payments*** (€)	196	357	436
Direct payments as a percentage of family farm income	18.8%	26.9%	34.1%
AEM payments as a percentage of family farm income	0.4%	0.8%	1.2%

** For definitions of income and payment statistics, see Table 4 of the present study.*

*** Our calculation: family farm income – direct payments.*

****ICHN: Compensatory Indemnities for Natural Disadvantages AEM: Agri-Environmental Measures.*

Source: FADN and our calculations.

We were unable to find any information on the additional costs associated with implementing the agri-environmental methods relative to the compensation received. But Walloon farmers participated most heavily in those measures that required few changes in their farming practices (A.D.E. 2003, p. 87). Next, farmers preferred those measures that provided the biggest payments. It thus appears that the premium paid for implementing certain methods does constitute an attractive economic incentive for many farmers.

CHAPTER 4

Conclusion

The primary purpose of this study was to assess the contribution that direct payments for the production of EG&S make to farm income in certain countries. To make this assessment, we analyzed programs in France, Switzerland, and the Walloon Region of Belgium that remunerate the multifunctionality of agriculture through direct payments, with an emphasis on payments associated with the production of EG&S. On the basis of this analysis, we have drawn the following conclusions.

As regards the achievement of environmental objectives, the amount of farmland covered by agri-environmental programs seems to be critical. In Switzerland, where the vast majority of farmers perform at least the minimum ecological services required to receive direct payments, the objectives for biodiversity and for the overall phosphorus balance of the agriculture sector are on their way to being achieved. In France and the Walloon Region of Belgium, the results are more mixed, because the number of hectares where ecological measures are being applied is relatively small, and the farms concerned are geographically scattered. Also, France and Belgium have long practiced intensive agriculture, unlike Switzerland, which has always emphasized agriculture's role in maintaining land occupancy and preserving the landscape. In this regard, Switzerland may thus be a step ahead.

As regards the contribution of payments for EG&S to farmers' incomes, the results differ from country to country. In Switzerland, ecological direct payments accounted for 14% of farm income in 2003. In France, payments for agri-environmental measures (AEMs) accounted for only 4% of total family farm income in 2002. For those French farms that had signed formal farmland management contracts (FMCs) with the French government, direct payments under the two components of these contracts—one economic, the other agri-environmental—accounted for about 20% of farm income. The data available did not let us determine the breakdown between these components, so we could not determine the exact contribution of the agri-environmental component to family farm income. But we were able to estimate that in the year 2001, payments made to farms for all of the AEMs that they applied represented nearly 15% of family farm income for those farms that had signed FMC contracts, as compared with only 2% for those farms that had not. For Belgium's Walloon Region, we were unable to determine the exact percentage of farm income that is provided by payments for EG&S. The closest we could come was that these payments are counted as part of those made under the Second Pillar of the European

Union's Common Agricultural Policy (CAP), which account for 5.7% of earned income per work unit. For Belgium as a whole, AEM payments represented only 1.2% of family farm income in 2003.

To sum up, as just described, the broader data that we were able to compile did not allow us to determine the exact contribution that payments for EG&S make to farm income. Obviously, the most effective and accurate means of obtaining this information would be a farm survey with direct access to the total amount of agri-environmental payments received by farmers and their operating income. We were unable, however, to find any studies that had performed this kind of analysis.

Our own analysis does shed some light on the debate over the possible directions that Canadian agriculture policy could take. First of all, Switzerland has achieved better results than the other countries we studied, by adopting an agricultural development model that is quite different from the models adopted in those countries or in Canada. Switzerland seems never to have been tempted to embrace the productivist model that has so decisively shaped the agriculture sectors of other developed countries. As a result, Switzerland has been able to move its agriculture policy toward officially encouraging the multifunctionality of agriculture, and more specifically the production of EG&S, without any major departure from the path that it had previously followed in developing its agriculture sector.

The same cannot be said of France or Belgium, where the past focus on a productivist vision of agriculture was very clear, as it is in Canada. France and the Walloon Region of Belgium are now making very real efforts to adjust their agricultural policies so as to place more emphasis on the multifunctionality of agriculture and to encourage the production of EG&S. But these efforts are still in the experimental stage. The budgets allocated for them are relatively small compared with the total budgets for agriculture, and the results, in the final analysis, are still quite modest. In these two countries, unlike in Switzerland, these efforts represent a potential break with the agriculture development choices made in past decades.

Moreover, Swiss society does not ask its farmers to embrace the globalization of their industry, which certainly cannot be said for France, Belgium, or Canada. In these countries, the agriculture and agri-food sector is still expected to contribute to economic growth, in particular through the balance of trade. The challenge for these countries is to reconcile the need to encourage agriculture to be highly productive and competitive for these economic purposes with the need to encourage it to produce EG&S for the benefit of their respective societies as a whole.

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APPENDIX A

Agri-Environmental Measures (AEMs) that may be included in Farmland Management Contracts (FMCs) in France

1. Converting cropland to meadowland
2. Lengthening crop rotations/diversifying crops in rotations
3. Reducing farm area left without ground cover in wintertime
4. Planting vegetated strips/creating buffer zones
5. Establishing stationary landscape elements
6. Maintaining/rehabilitating stationary landscape elements
7. Reorganizing farmland: dividing fields into smaller units
8. Modifying plant treatments to reduce pollution; developing integrated pest management and biological control programs
9. Modifying fertilization methods
10. Improving management of agricultural effluent
11. Reducing water use on farms
12. Creating and preserving flood expansion areas
13. Modifying cultivation methods
14. Establishing crops with special value for wildlife or vegetation
15. Preserving the genetic diversity of plants and livestock used in agriculture
16. Managing farmland so as to protect natural species
17. Adapting agricultural practices to protect livestock against predators
18. Preserving land uses of special heritage or landscape value
19. Rehabilitating disused agricultural land
20. Applying extensive management methods to meadows, pastures, and lawns
21. Converting to organic farming
22. Preserving agriculture land uses in urban fringe areas

Source: MAAPAR, 2000.