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Introduction

Agricultural practices have the potential to produce benefits beyond commodities produced for sale in the market. Conversely, agricultural practices sometimes inflict costs on society, for example in terms of negative environmental impacts. The market does not always provide the appropriate signals to producers so that they may make socially and financially optimal decisions.

There are several mechanisms that can capture these previously ‘hidden’ elements, and incorporate them into market decisions. Government regulation, private initiatives, and government programs can all be used to address this issue. Solutions may focus on reducing harmful effects (negative externalities) or encouraging desirable benefits (positive externalities). This document outlines the reasons why costs and benefits might be invisible to the market, and gives examples of instruments that have been used around the world to shed light on the whole picture.

Background

Public Goods and Market Failure

Agricultural practices have the potential to produce benefits that are not usually recognized by the market. These benefits are sometimes referred to as ecological goods and services (EG&S), or more broadly, the multifunctionality of agriculture. Benefits that can be provided by agriculture include: preserving or restoring wildlife habitat, filtering water supplies, flood and erosion control, carbon sequestration, supporting rural communities, and ensuring local food security.

Why are these benefits not recognized by the market? Often, the beneficial outputs that are or could be produced by agriculture are a type of good called a ‘public good’. A good is considered a public good if one person’s use does not diminish other people’s use, and if people cannot be excluded from benefiting from the production of that good. Examples of public goods include clean air, street lights, and national defense. These types of goods are normally paid for by government, as there is little or no incentive for individuals to bear the full cost of goods which benefit society in general.

Public goods produced by agriculture are usually not factored into cost/benefit analysis of producers’ decisions as there is not an appropriate market signal – which leads to the underproduction of EG&S. This type of market failure is termed an ‘externality’. An externality is a benefit or cost that is not included in the market transaction.

Positive externality

The graph below displays the effect of externalities on the price and quantity of goods sold in the marketplace. In this example, there is a positive externality associated with the good being produced. This means that there are benefits to society that are not being captured in the
market transaction. This results in a lower price to producers, and lower quantity produced than is socially optimal.

In this example, we can consider that the market demands agricultural commodities, and that society demands EG&S. The market failure here is that there is no mechanism for farmers to recognize and respond to society’s demand for EG&S, leading to an underproduction of these goods and services.

Figure 1: Positive externality

Negative externality

Figure 2 illustrates an example of a negative externality. In this case, there is a cost to society that is associated with the actions of the producer. The ‘Supply’ curve shows what the level of supply for this good would be if the cost of the negative externality is not properly accounted for. The price that a producer receives for this good would be lower, and the quantity produced would be higher than in the socially optimal circumstance.
Another reason that benefits may not be included in the market is due to incomplete information. Food that is produced according to high environmental standards may be worth more to consumers if they know about and trust these standards. Farmers may not be effectively marketing their practices (or not choosing to undertake these practices) because they are not aware of the potential price premium, or because they have no mechanism at their disposal to assure consumers of the quality of their product.

**Ecological Goods and Services and Multifunctionality**

Most nations have recognized that there are multiple outputs from agriculture that are socially desirable. Focus in the United States has been primarily on EG&S such as wildlife habitat or watershed management, although this seems to be expanding over time. The purchase of development rights on agricultural lands have been used in the U.S. to meet several objectives, including “protecting rural amenities, local food supplies, water and air quality, natural resource jobs, and reducing urban sprawl.” (Amber Waves, July 2006, p.3).

The E.U. has consistently supported broader initiatives such as agri-tourism, rural economic development, assistance with promoting organic and environmentally sustainable farming methods, and food security. The E.U. Common Agricultural plan has two pillars: market support and provision of public goods. The second pillar is as much about rural economic development as it is about environmental protection. The E.U. states that the function of the second pillar is to “support agriculture as a provider of public goods in its environmental and rural functions, and rural areas in their development” (E.U. 2006, p.5).
E.U. agri-environmental programs that aim to reduce negative externalities, or encourage the production of positive externalities must conform to the principles of *cross-compliance* and *usual good farming practice*. *Cross-compliance* is the principle that farmers are required to comply with specific environmental protection requirements as a condition for benefiting from market support. In the E.U. this can mean the reduction or withdrawal of farm aid in cases where farmers do not meet the terms of environmental regulations. *Usual Good Farming Practices* consist of “mandatory legal requirements and a level of environmental care that a reasonable farmer is expected to apply anyway,” (E.U., 2005, p.4). E.U. and member nation agri-environmental schemes must require that farmers go beyond usual good farming practices in their provision of EG&S. Agri-environmental payments are also limited to compensating farmers for extra costs incurred, or for loss of income as a result of the agri-environmental program. This is to ensure that the payments are not considered trade distorting by the WTO.

Nevertheless, the E.U. concept of multifunctionality is somewhat contested. Agriculture exporting countries of the Cairns Group (which includes Canada) have argued that European countries are simply using the idea as an excuse to continue protectionist agricultural trade practices. Arguments for the cultural or aesthetic value of agriculture are fuzzier than those for EG&S such as watershed management or provision of wildlife habitat. In 2001, the Organization for Economic Co-operation and Development (OECD) published a paper that attempted to establish a definition and an analytical framework for the term ‘multifunctionality’.

The main principle in evaluating the trade impacts of agricultural interventions is ‘jointness’. It is important to determine if non-commodity goods are necessarily jointly produced with commodity goods. If not, then incentives for the production of non-commodity goods may be considered separately from trade issues. Otherwise it is inevitable that incentives for non-commodity goods will impact international trade of commodities. Either way, the OECD report recommends focusing policy instruments on non-commodity outcomes, as this is likely to be less distortionary. It is important to note that this approach may increase transaction costs in delivering programs.

**General examples of internalizing non-market benefits and costs**

There are literally dozens of everyday examples of businesses or governments acting to include externalities in market transactions. One common example is coffee shops that offer a discount on coffee if the customer brings their own mug. For example, Dalhousie University has instituted a ten-cent rebate for customers who use re-usable mugs at campus coffee shops, to encourage waste reduction. This rebate is higher than the marginal cost of the paper cup, and so is addressing an externality. Customers who do not bring a mug are paying slightly extra for convenience of the disposable cup. Including the cost of waste in the market price encourages customers to change their behaviour, lessening the amount of waste generated by disposable coffee cups.

Another type of policy that attempts to encourage waste reduction is deposits on recyclable containers. Aluminum and plastic beverage containers are subject to a small deposit fee, which consumers may recoup if they return the container to a recycling depot. Refunding the deposit provides an incentive for consumers to make the effort to recycle goods. Even if
individuals are not willing to make the effort themselves, the deposit ensures that there is an incentive for someone else to collect discarded containers.

The recent carbon tax implemented by Quebec government is another example of internalizing non-market costs. It is targeted at wholesalers who sell hydrocarbon products in bulk to retailers -- non-renewable fossil fuels such as heavy oil, gas, natural gas and propane. The Quebec government plans to raise $200- million/year over the next six years to finance a Green Fund that will be used to meet Kyoto greenhouse gas reduction goals. This is an example of a revenue-neutral tax, or tax-shifting. A tax on a good or service which is environmentally ‘bad’ serves two purposes. Higher prices encourage consumers to change their behaviour – by either conserving expensive fossil fuels, or finding less expensive ‘cleaner’ alternatives. Secondly, the money raised can be used to offset some of the negative externalities of the production and consumption of the ‘bad’ good.
Review of Programs and Initiatives

Reducing Negative Externalities

New York Watershed

Sometimes government regulation can act as an impetus for costs external to the market to be recognized. The 1989 Clean Water Act required water filtration for city water supplies unless it could be proven that filtration was not required (i.e. that it was being provided naturally). Rather than invest $6 billion dollars in a water filtration system (with an estimated $300 million per year operating cost), in the early 1990’s New York City convinced the EPA that they could maintain their watersheds at safe clean levels through good stewardship.

After consultation and mediation between New York and affected communities, in 1997 various stakeholders signed a Memorandum of Agreement. The city agreed to solicit for the purchase of 143,745 hectares of land in northern New York State over the next 10 years. Land would be purchased on a willing-buyer, willing-seller basis, at fair market value. Other elements of the plan include:

- Voluntary conservation easements\(^1\). The city pays landowners to forgo some use rights on a portion of their land.
- Setbacks. Setbacks are a measured distance separating potential pollution sites from water sources, and were established through zoning.
- Riparian Buffer zones. These are a vegetated strip adjacent to a watercourse. Buffer zones are most effective when accompanied by best management practices. The New York Watershed program promotes buffers through the Conservation Reserve Enhancement Program (CREP). CREP makes long term (10-15 year) rental agreements with annual payments to farmers, reimbursing them for land set-asides and best management practices.
- Land trusts. Non-profit entities called land trusts buy undeveloped real estate with the intention of preserving it. As of 2000, about 600 hectares had been acquired by land trusts in the New York Watersheds. Since land trusts are non-profit organizations, they are exempt from property taxes, so this option does have repercussions for the local municipality’s fundraising abilities.
- Improved water sanitation systems for watershed residents and economic development grants to offset negative economic impacts from maintaining undeveloped land.

The New York Watershed plan is an excellent example of an externality being integrated into the decisions of market actors. New York had enjoyed the benefit of clean water from the upstate watershed for years. In order to ensure that it continued to be able to do so, the city had to compensate residents and farmers for higher levels of good stewardship. That is, they had to fund a reduction in the negative externalities produced by upstate development and agriculture.

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\(^{1}\) An easement is a right to use or prevent use of land. This right is held by someone other than the landowner. Easements are attached to land, not landowners. This means that an easement preventing (or preserving) agricultural use of land is binding for anyone who purchases that land.
The following examples will cover various programs put in place to reduce negative externalities in agriculture. Since the primary benefit of conversion to organic farming is a reduction in the use of harmful pesticides, herbicides, and/or fertilizers, programs encouraging farmers to switch to organic production is classified as reducing negative externalities. Establishing tradable credits and offset systems also attempt to mitigate negative effects, and so belong in this category as well.

**Supporting organic conversion**

Minnesota has one of the largest organic sectors in the United States, and has one of the broadest support programs in place for organic farmers. Included in their arsenal is a certification cost share program implemented in 1999. The program covers two-thirds of the cost of certification, up to $200/year for five years. Minnesota also organizes conventions, an organic farmer mentoring hotline, and research into organic production. Their website is full of information and tools to aid farmers in a successful transition.

The USDA has implemented relatively small programs aimed at organic farming, when compared to their programs for traditional agriculture. The National Organic Certification Cost-Share Program was established under the 2002 Farm Act, with $5 million in available funds. The intent was similar to Minnesota’s organic certification cost sharing program, but with a slightly higher level of support. The maximum federal share of certification costs is 75% or $500/year. The USDA also set aside $3 million for organic research grants from 2003-2007.

In June 2005 Woodbury County, Iowa took a unique step in offering a 5-year 100% ($20/acre) property tax rebate for farms converting to organic production. The maximum rebate for any one producer is capped at $10,000/year (or 500 acres), and the county had budgeted for $250,000 of tax expenditures over 5 years. Six months later, they added a “Local Food Purchase Policy”, which directed the county jail to purchase locally grown organic food if available. There is now an annual organic farmer’s convention in the county, to inform farmers about best practices in organic farming. There is also an organic farmer mentoring hotline, where existing organic producers offer support and share knowledge with recent entrants. The community college has started a one year diploma program in organic farming. The county has provided the college with 15 acres of land to be used as an organic farm lab in conjunction with this diploma program.

Scotland’s Organic Aid Scheme is common to many European countries. The scheme pays a larger amount in the first two years, with rates declining over a ten year period. For example, for the first two years of organic conversion on land in fruit or vegetable production producers are eligible to receive £300/hectare. This falls to £40 for years 3-5, and £14 for years 6-10. Scotland also supports specific capital costs that may be required, such as special fencing, water troughs, or hedge rows. This type of scheme provides an incentive for producers to undertake the risks and costs of converting to organic production. Generally, it is expected that the market will eventually provide enough incentive for growers to continue to produce organically.
Finland takes a different approach to encouraging organic conversion. Farmers receive a flat fee in the first year, which requires them to undertake specific measures. In the next year, they are expected to implement at least one additional measure. Each measure is assigned a value, so as farmers increase their participation, they receive more compensation.

The U.K. Environmental Stewardship program is similar to the Finnish approach, but uses a unique point system. The Environmental Stewardship program replaces a variety of other stewardship programs, encompassing entry level stewardship (ELS), higher level stewardship (HLS), and organic entry level stewardship (OELS). This program allows farmers to choose from 50 different management practices that have all been assigned a point value. For ELS and OELS, the practices chosen must add up to 30 points per hectare. Eligible ELS agricultural producers receive a payment of £30 per hectare, per year and contracts are for 5 years. The OELS payment is £60 per hectare, per year on land registered with an organic inspection body. Farmers with land registered under OELS are eligible for top-ups on land or orchards that are under conversion to organic production. To receive this top-up the land must be registered officially as being “in conversion” with an organic inspection body. The payment rate for land under conversion to organic is £175 per hectare per year for 2 years. For established orchards under conversion, producers are eligible to receive £600 per hectare per year for 3 years. The HLS is normally combined with either the ELS and/or OELS. Plans and payments for HLS are determined on a case by case basis.

Trading Carbon and Nutrient Credits

Larger polluters, such as power plants, may find that it is cheaper and easier to pay someone else to reduce their emissions, rather than finding ways to lower their own emissions. As governments have increased regulations regarding carbon and other emissions, market based solutions around tradable rights have become more popular. There are two main types, those that establish a maximum daily load within a watershed, and broader system of tradable atmospheric emission rights.

In the first type of system, polluters within a region are assigned a certain number of pollution credits. If they wish to exceed the credits that they have been assigned, they may purchase unused credits from other agents in the same area. This has been used in the United States to reduce phosphorus and nitrogen loads. Polluters can pay farmers directly, or governments already engaged in cost-sharing arrangements with farmers can trade credits with polluters. Although a creative solution, this is tricky to implement in agriculture because it is difficult to determine exact nutrient load savings from good farming practices. This often results in governments requiring polluters to pay for more reductions than they are allowed to use (i.e. pay for a 3 tonne reduction to be allowed a 1 tonne increase).

The same problem does not exist for green-house gas (GHG) emissions. The USDA has published clear guidelines for the accurate reporting of GHG emissions reduction from agricultural practices. This allows farmers to undertake specific practices that are easily verified, such as reduced tillage, and installation of waste digesters. Private agents may bundle verified GHG savings from a group of farmers together, and sell them to agents seeking higher GHG emissions. The idea is that the government sets an acceptable limit of GHG emissions, and
agents that are more easily able to reduce their emissions will have the incentive to do so because there is a market price for this ecological good. The higher the demand for GHG credits, the higher the price will be, which should ensure a sufficient supply. Putting a price on emissions also ensures that agents who cannot easily reduce their emissions now have to face a financial cost to polluting. This is exactly what is meant by internalizing externalities.

**Mitigation Banking**

In 1995 the United States government decided to allow no further loss of wetlands. Developers whose projects could not avoid damaging wetlands were required to restore or create an equivalent area of wetland. Developers often did not have the expertise to do this themselves, and larger-scale wetland restoration proved to be more successful than small-scale wetland creation. As a result, wetland mitigation banking became a popular option. Private or non-profit enterprises that focus on restoration or creation of wetlands sell credits to developers who are required to mitigate the environmental cost of their development. By doing so, developers transfer all responsibility for the maintenance of the wetland area to the mitigation bankers. Agricultural producers are providers of previous wetland areas to be restored. It may be easier and less expensive to restore wetland from agricultural use than from many other uses.

This concept is similar to trading carbon credits. It is sometimes more efficient for agricultural users to reduce their negative impacts than it is for other market actors. Again, we see that this solution is the result of government regulation, since it is society as a whole that values the existence of wetlands.

**Major USDA Conservation Programs**

There are two major types of conservation programs – those that retire land and those that aim to improve stewardship on land currently in agricultural use. The USDA Environmental Quality Incentives Program (EQIP) provides technical assistance, cost-sharing, or incentive payments to assist livestock and crop producers with conservation and environmental improvements in their production process. Funding is sometimes used to share the costs of compliance with new environmental regulation, such as the new Clean Water Act regulation for manure handling and disposal (Amber Waves, July 2006, p.8). Table 1, below, outlines the major U.S. conservation programs, their objectives, and their recent level of funding.
Non-Commodity Benefits of Agriculture

The OECD refers to positive externalities arising from agriculture as non-commodity benefits (NCBs) of agriculture. Some of the most common NCBs include supporting rural communities, preserving rural views, and ensuring local food security. The following examples outline policies implemented by various levels of government and market actors.

Agricultural zoning

In 1975, Tulare County, California, adopted an exclusive agricultural zone covering 856,000 acres, called the Rural Valley Lands Plan. Residential development is only allowed for farm owners, families, and employees. Unfortunately the plan does not limit annexation and development by cities in the development area. It is not clear if this has been an issue, but the county is conducting a general plan update. This policy ensures that agricultural land does not become over-priced due to population pressures. This makes it easier for new farmers to enter the business, but may result in a loss to current owners if land value falls below the price they paid for it originally.

Purchasing Development Rights

The Marin Agricultural Land Trust (MALT) in California was the first organization in the U.S. to purchase development rights from farmers to ensure that land remained in agricultural production. This strategy usually involves permanent easements, where farmers or ranchers are paid to surrender their rights to develop the land, but continue to own the land and use it for agricultural production. This ensures that urban sprawl does not eat into valuable agricultural land, and also ensures that farmers are not denied the value of their land. Contracts for the purchase of development rights may include environmental or social responsibilities for the farmer. Marin County has augmented the efforts of the land trust through zoning regulations that limit the density of rural housing to one house per 60 acres. Plans that aim to preserve a ‘critical mass’ of farmland are more likely to be successful in preserving agriculture in the long term, and provide the additional benefit of preserving rural views.

Mitigation

In 1995, the City of Davis in California introduced a plan which required developers to purchase conservations easements on an area of farmland equal to the amount of land they were converting to non-agricultural use. In 2001, this was increased to 2 acres of conservation easements for every acre developed, with the additional stipulation that the land preserved must be adjacent to that being developed. The idea was to create a boundary to city growth. To date, the program has collected more than $1 million and protected about 3,000 acres of farmland.

Zoning + Mitigation + Development Rights

In South Livermore, California, a clash over new development resulted in a creative plan to halt urban sprawl and revitalize the local wine-growing industry. The County of South Livermore and the City of Livermore both implemented a plan in the mid-1990’s to create a...
southern boundary to the city. For every acre and housing unit developed within a specific urban area, one acre of farm or ranchland in a designated rural area must be preserved under conservation easements and be planted in wine grapes, both at developer expense. The vineyards then become an effective buffer between the city and undeveloped land to the south. This program stalled urban sprawl, supported a local industry, and improved rural views. In 1999, the City added a transfer of development rights program which has resulted in permanent protection of another 490 acres of ranchland.

Fiscal measures

In Sonoma County, California a ¼ % county sales tax was implemented to raise funds for the purchase of conservation easements. The sales tax has generated $13-17 million annually (a total of $169 million to date). This has allowed the county’s Open Space District to permanently protect 65,400 acres of farm and ranch land.

Sustainable Agriculture Contracts

In 1999 Local Farm Contracts were introduced in France. In 2002 the budget was reduced, and the program became the Sustainable Agriculture Contract. Applicants submit proposals, outlining the measures they intend to undertake (contracts are for a minimum of five years). Remuneration is in the form of annual rental payments, with the amount depending on the specific actions of the producer. Measures may include environmental protection, rural economic development, and protecting bio-diversity through raising endangered breeds of livestock. French sociologist Jacques Rémy suggests that the transition from production oriented farming to multifunctionality and sustainable agriculture is a long term process. This needs to be factored into policies and evaluations of sustainable agriculture policies, to avoid potentially damaging mid-stream changes in government programs, which may discourage farmers from future participation in sustainable agriculture programs.

Alternative Land Use Services (ALUS)

ALUS is a voluntary, incentive-based environmental program compensates farmers for beneficial land management practices on qualifying land. The first pilot project was launched in Manitoba in November 2005, and is scheduled to run for three years. Over 20,000 acres, 70% of eligible land, have been enrolled in the project to date. Compensation under the Manitoba project varies, depending on the type of land enrolled, and the level of management stipulated in the contract with the landowner. Managed grazing areas are worth 5 dollars an acre. Natural areas\(^2\), riparian areas, and wetlands that are taken out of agricultural production pay up to 15 dollars an acre. Partial use contracts on these lands allow activities such as managed use of wood or haying, and pay $7.50 /acre. Ecologically sensitive lands can receive up to 25 dollars an acre. Qualifying ecologically sensitive lands must have been cultivated within the past 20 years, and be at risk for erosion, flooding, leaching, etc. A landowner may enroll 20% of their ecologically sensitive land, and they must have permanent cover in place prior to enrolling the land. Pilot project proposals have been developed in P.E.I., Ontario, Saskatchewan, and Alberta.

\(^2\) Natural areas are defined as land with native grasslands, shrubs, or trees.
Ontario’s Greenbelt – Legislating Protection, Using Connections

In 2005, the government of Ontario established a 1.8 million acre permanently protected zone across Southern Ontario, called the Greenbelt. The Greenbelt was established through provincial legislation, and was intended to protect environmentally sensitive land and productive farmlands from urban development and sprawl. Most of the protected area is farmland - close to 1.2 million acres. The government works with stakeholder groups to ensure that the region is appropriately protected. Stakeholders include farmers, the tourism industry, and environmental groups.

The Greenbelt is notable not only for its size, but for the integration and co-operation of various stakeholder groups. One such group is LFP – originally Local Food Plus, now Local Flavour Plus. LFP is a non-profit organization that certifies local farmers in environmentally and socially sustainable food production, and links them with local purchasers. Farmers in the Greenbelt do not have to pay for the cost of certification. The organization benefits from the protection of the farmland, farmers benefit from the brand of the organization, and the connections that it can provide. This level of co-operation makes it more likely that ‘local food’ is a marketable success.

Eco-labeling

The Netherlands implemented a national eco-labeling system in the 1990’s and is still expanding it to cover a wide variety of products. A consumer survey indicated that it wasn’t necessarily something that they looked for when purchasing a product. Systems that are accompanied with widespread consumer educational programs seem to do better. This type of program is very expensive to set up, market, and enforce.

A group of farmers in the Netherlands are co-operating with an environmental conservation group. They raise awareness for a threatened bird by putting it on their label, and are working to promote agri-and eco-tourism. Members of the environmental groups act as independent monitors of the environmental practices in place on the farms. This lends the brand environmental credibility, and raises awareness for the conservation group.

In France, regional parks promote farm products that are produced in an environmentally sensitive manner, are locally distinctive, and have a high quality image. There is a labeling scheme, which can be used by restaurants and hotels that use these products and have interests that are compatible to the parks. This also falls into the ‘Marketing Local’ category as well.

Marketing Local

Non-commodity benefits from marketing locally include: reduced food miles, rural economic development, food security, and in some cases higher environmental standards. A wide variety of activities fall under the idea of local marketing. These include: buy local programs, Farmer’s markets, food box schemes, U-picks, road stands, and community supported agriculture. Some of the most common types of local marketing are described below.
*Farmer’s Markets* - increasing in popularity, farmer’s markets are one supply-side answer to ‘buy local’. It is a great opportunity for producers to market directly to consumers, and to tailor production to local demand. Consumers who use farmer’s markets tend to enjoy the social aspect of the weekly gathering. Consumers often also value getting to know where their food comes from. Government can help by assisting with infrastructure or education, as is the case in Nova Scotia.

*Food Boxes* – another way for local producers to reach consumers is through a food box program. Consumers sign up and order produce to be delivered to their home once a week. These programs may be wholly local produce and therefore seasonal, or supplemented with imported goods. For example, in Rodenberg, Germany a year round service supplements their boxes with certified organic imports in the winter. This scheme involves a partnership between about 20 farms, and serves 400 families. Boxes contain information about the food and recipes as well. Food boxes may be a more convenient alternative for those who want fresh produce from local farmers, but do not have the time to spend at the farmer’s market.

*Community Supported Agriculture (CSA)* – extends the idea of food boxes. Consumers buy shares in a farm or co-op, in return for weekly in season produce. Shares may be paid up front, or throughout the season, and may require some time in labour on the farm as well. Some CSA’s have meetings and boards, where shareholders have some input into what they would like to see from the farm. Consumers either come to the farm to pick their weekly produce, or it may be collected at a common drop-off. A review of CSA’s in the United States indicates that several small farms working together is optimal for risk-management. Multiple growers also make it easier for the CSA to provide the variety of produce that consumers want. Farmers said that requiring labour from shareholders often creates more work for them, but that they would prefer shareholders come to the farm to pick up their produce.

*Chisan-chisou* – is a Japanese concept that means ‘produce locally – consume locally’. In Japan, the prefecture of Mie promotes chisan-chisou by funding a small arms-length organization. The organization’s primary goal is to gather information on chisan-chisou retailers, markets, and events in the prefecture, and advertise them through their website and newsletter. The organization also provides funding to chisan-chisou projects, such as cooking classes that use local products and workshops on the topic of chisan-chisou. The nature of chisan-chisou is that it involves small, local, voluntary projects. Government can provide invaluable support to these projects by enabling information flow, and educating the general population on the benefits of chisan-chisou in general.

*Agriculture and tourism links*

*Maintaining Rural Views*

Weißensee is a small community in the mountainous region of southern Austria, with close to 800 residents. Tourism is the primary economic activity, with a small amount of agriculture in the surrounding mountain areas. Farmers in mountain areas are unable to implement productivity enhancing mechanized technologies, and so face a serious disadvantage

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3 Japan has 47 prefectures, which are the level of government immediately below the central government.
in the marketplace. The community felt strongly enough about the interdependence of agriculture and tourism to implement a program to support local mountain farmers. They founded the “Landscape Conservation Program”, and the “Landscape Conservation Organization” to oversee the program. This group is staffed mainly by volunteers.

The community levies a small local tourist fee (just over one euro) per person, per night. About seven cents of this fee is transferred to the Landscape Conservation Organization. This covers roughly half of the costs of the program. The other half comes directly from community (i.e. municipal) funds. There are 26 farmers in the area, and they are all participants in the Landscape Conservation Program.

Payments to farmers are determined by a point system, which rates the difficulty of cultivation (due to elevation, inclination, etc.). Farms with higher degrees of difficulty receive higher payments. To qualify for payments, farmers must agree to a number of conservation conditions. These include: mowing grassland at least once per year; removing cut grass; eliminating the use of chemical fertilizer, pesticide, herbicide, and fungicide; maintaining a livestock density between 0.5 and 2.0 livestock units. Points are deducted if farmers do not comply with one or more of these conditions. Most farmers have completely converted to organic production. The community and the farmers had hoped that the conversion to organic production would provide more revenue for farmers and improve the competitiveness of local agriculture. As of 2001, this goal had not been realized.

This program has maintained clear views of the Weißensee Lake by ensuring that grassland areas adjacent to the lake are well-managed and clear of overgrown trees and bushes. As well, excellent water quality has been maintained in the lake.

This is an interesting case study, highlighting the multifunctionality of agriculture. The main service being provided is maintenance of the alpine landscape (this includes mowing, cultivating pastures, maintaining a rural road and trail network). It also combines some elements of reducing negative effects, which has resulted in very high quality water for the community. These services could be provided apart from agriculture, and so this program is truly multifunctional.

Using positive externalities to improve tourism

The Flam Railway is a popular tourist attraction in Norway, offering spectacular views of mountain and fjord landscapes. There is also a walking and biking trail that runs parallel to the railway, which was converted from a railway construction road. Over time an overgrown birch forest beside the railway began to obstruct these views. This was partly due to a reduction in goat farming in the area. Goats are good at clearing brush and bushes; however government subsidies and market prices had made sheep the most popular local grazing animal for producers.

In 2000, a controlled grazing project was initiated by three goat farmers and a local landscaping company (Aurland Naturverkstad) to improve cultural views in the area. The
railway offered to support the project if the areas selected for grazing improved the view from the railway. The project ran from 2000-2002, but may have been reinstituted. In 2001 and 2002 each of the three farmers were paid 100 Norwegian Krone (NOK) per goat or kid (1 NOK \approx 0.12 \) The payment was meant to compensate farmers for the additional effort involved in controlled grazing. Aurland Naturverkstad estimated that an additional payment of 200 NOK per goat and 100 NOK per kid was required to make goat farming as profitable as sheep farming.

Funds were contributed by the Flam Railway, a national government program aimed at preserving agricultural landscapes (STILK), and district development funds (BU). Aurland Naturverkstad’s fees for management of the project amounted to 25% of the project’s budget in 2001 and 2002. Another expense was an individual who was employed full-time in 2001 and 2002 to clear bushes and put up fences.

The railway backed out in 2002, citing the high transaction costs. They are considering implementing a 1 NOK environmental tax for each passenger, which would cover the costs of the project, and enable them to continue to participate. (A single one-way railway ticket costs between 170 - 190 NOK.)

Although the long-term success of this project is uncertain, it provides a useful case study. Agriculture may have the potential to provide services more efficiently than other market actors. If specific beneficiaries can be identified, such as the tourism industry, farmers may be able to make a case for their co-operation in the continued provision of agricultural EG&S.

Discussion and Recommendations

Agriculture has the potential to provide EG&S through reducing harmful outputs, or through the production of beneficial non-commodity outputs. Reduction of environmental harm beyond existing regulatory standards is possible, but this usually requires appropriate market incentives. Beneficial non-commodity outputs are often not recognized until they are under threat. In both cases, it may be market agents, non-profit groups, or government who takes action. The specific case studies that we have outlined in this paper show that circumstances dictate the most appropriate and efficient agents to incorporate externalities into market decisions.

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4 The Flam Railway website - http://www.flaamsbana.no/eng/Index.html - mentions the presence of 300 goats along the railway’s path, but does not mention if the Railway supports their presence there as part of maintaining the viewscape.
Works Cited


<table>
<thead>
<tr>
<th>Program Name</th>
<th>Objective</th>
<th>Mechanism</th>
<th>Funding (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conservation Reserve Program (CRP)</strong></td>
<td>Supports conversion of environmentally sensitive land into grass or tree cover.</td>
<td>Annual payments and cost sharing of conversion.</td>
<td>2002-06 $7.3 billion</td>
</tr>
<tr>
<td><strong>Wetlands Reserve Program (WRP)</strong></td>
<td>Restoring wetlands on agricultural land.</td>
<td>Cost-sharing and long-term or permanent easements.</td>
<td>2002-06 $1.3 billion</td>
</tr>
<tr>
<td><strong>Environmental Quality Incentives Program (EQIP)</strong></td>
<td>Assist livestock and crop producers with conservation and environmental improvements on land currently in use.</td>
<td>Technical assistance, cost-sharing, or incentive payments.</td>
<td>2002-06 $3.95 billion</td>
</tr>
<tr>
<td><strong>Wildlife Habitat Incentives Program (WHIP)</strong></td>
<td>Develop and improve wildlife habitat.</td>
<td>Cost-sharing.</td>
<td>2002-06 $171 million</td>
</tr>
<tr>
<td><strong>Conservation Security Program (CSP)</strong></td>
<td>Promote environmental stewardship by agricultural producers.</td>
<td>Incentive payments for adopting or continuing good practices.</td>
<td>2004-06 $502 million</td>
</tr>
<tr>
<td><strong>Conservation Technical Assistance</strong></td>
<td>Improve environmental performance of agricultural producers.</td>
<td>Provide technical assistance.</td>
<td>2002-06 $3.5 billion</td>
</tr>
<tr>
<td><strong>Farm and Ranch Lands Protection Program (FRPP)</strong></td>
<td>Maintain productive farmland in agricultural production.</td>
<td>Purchase of development rights.</td>
<td>2002-06 $426 million</td>
</tr>
<tr>
<td><strong>Grassland Reserve Program (GRP)</strong></td>
<td>Improve and conserve native grass grazing lands.</td>
<td>Long-term rental agreements or permanent easements.</td>
<td>2003-06 $236 million</td>
</tr>
<tr>
<td>Table 2: Reducing negative externalities</td>
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<td>----------------------------------------</td>
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<tr>
<td><strong>Objective</strong></td>
<td><strong>Mechanism</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York Watershed</td>
<td>Maintain a clean watershed for New York City by supporting higher levels of good stewardship by upstate residents and farmers.</td>
<td>Conservation easements, buffer zones, land trusts, improved sanitation programs.</td>
<td></td>
</tr>
<tr>
<td>Supporting Organic Conversion</td>
<td>Reduction in the use of harmful pesticides, herbicides, and/or fertilizers.</td>
<td>• Government subsidies for the cost of certification, • Technical and mentoring supports, • Property tax rebates, • Government subsidy during conversion as incentive to undertake risks and costs associated, • Flexible government subsidy, payment based on ‘points per hectare’.</td>
<td></td>
</tr>
<tr>
<td>Trading Carbon and Nutrient Credits</td>
<td>Reduction of total atmospheric emissions / nutrient load.</td>
<td>• Government places a cap on emissions / pollutants, creating costs to exceeding limits. • Farmers can undertake practices such as reduced tillage, and sell their emissions reductions.</td>
<td></td>
</tr>
<tr>
<td>Mitigation Banking</td>
<td>Net zero loss of wetlands due to new developments.</td>
<td>• Mitigation banks restore or create, and then maintain, wetlands. • Developers purchase credits to offset negative impacts of their planned development.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 3: Encouraging positive externalities

<table>
<thead>
<tr>
<th>Program</th>
<th>NCB / Objective</th>
<th>Mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protecting Agricultural Land</td>
<td>Protecting rural spaces, fostering rural economies &amp; halting urban sprawl.</td>
<td>Zoning / Development Rights / Mitigation / Sales Tax</td>
</tr>
<tr>
<td>Contracts with farmers</td>
<td>Fostering sustainable agriculture and various EG&amp;S, such as: wildlife habitat,</td>
<td>• France: Individualized 5-year contracts, with rental payments based on</td>
</tr>
<tr>
<td></td>
<td>protecting bio-diversity, protecting ecologically sensitive lands, &amp; supporting</td>
<td>specific actions,</td>
</tr>
<tr>
<td></td>
<td>rural economies.</td>
<td>• U.K.: points system, with annual payment based on specific practices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>employed,</td>
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<td></td>
<td></td>
<td>• Canada: ALUS, incentive payment program based on type of land enrolled</td>
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<tr>
<td></td>
<td></td>
<td>and level of management undertaken.</td>
</tr>
<tr>
<td>Eco-labeling</td>
<td>Educating consumers about beneficial practices, in order to obtain price premium</td>
<td>• National standardized labeling system,</td>
</tr>
<tr>
<td></td>
<td>and recoup costs.</td>
<td>• Co-operation between producers and specific environmental groups,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Regional co-operation between parks, restaurants, hotels, and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>environmentally sensitive producers.</td>
</tr>
<tr>
<td>Marketing Local</td>
<td>Reduced food miles, rural economic development, improved local food security,</td>
<td>• Farmer’s Markets, Food Boxes, &amp; Community Supported Agriculture,</td>
</tr>
<tr>
<td></td>
<td>education of consumers, and possibly higher environmental standards.</td>
<td>• Government Public Awareness campaigns, information and infrastructure</td>
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<tr>
<td></td>
<td></td>
<td>support.</td>
</tr>
<tr>
<td>Agri-tourism links</td>
<td>Making connections between tourism business outcomes, and non-commodity benefits</td>
<td>• Austria: Community instituted a tourist fee to support local farmers.</td>
</tr>
<tr>
<td></td>
<td>of agriculture (i.e. clean water, rural views, rural road networks).</td>
<td>• Norway: Railway recognized value in goats clearing brush along railways,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and supported local goat farmers.</td>
</tr>
</tbody>
</table>