Ecological Goods and Services and Agricultural Land Use in Manitoba

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Executive Summary

This report focuses on the effectiveness of ecological goods and services (EG&S) programming and its impact on production and land use decisions.

EG&S programming in Manitoba is delivered by watershed districts, government, and non-profit organizations and consists of conservation easements, cost-shared beneficial management practices (BMPs), and education.

Based on a series of interviews, KAP found that farmers who implemented EG&S projects viewed such initiatives positively. Reported outcomes from EG&S projects vary; some farmers experienced economic advances (e.g., increased production), some experienced environmental advances (e.g., cleaner water) and others experienced a combination of both. A farmer's level of environmental interest, along with available incentives, influence uptake in EG&S projects. Completing an EG&S project is also an indicator of a farmer's inclination to consider future environmental projects.

KAP research indicates that incentives are an important element for making EG&S projects appealing. Farmers value EG&S projects that are financially beneficial, minimize opportunity costs, and align to their expectations. Financial payments should not be regarded as the only solution in advancing EG&S in Manitoba, rather, they are part of a larger policy framework intended to positively influence farming practices.

KAP recommends government and nonprofit organizations expand EG&S education, provide adequate project incentives, and foster opportunities for discussion to increase farmer awareness and program uptake.

1.0 Ecological Goods and Services Research Report

EG&S are the benefits and products created by an ecosystem. Agriculture can provide these benefits and rely on them.[1] In Manitoba, farmers are significant landowners, with over 17.6 million acres.[2] Whether the land is owned or rented, farmers have an important role in being stewards and deliverers of EG&S.

This paper looks at the effectiveness of EG&S programming along with its impact on production and land use decisions. Farming decisions are influenced by profit maximization, market forces, government regulation, climate factors, financial incentives, and personal factors.

Farming is a business, so farmers are interested in production value and profitability. Advancing EG&S initiatives can present challenges since farmers may view parts of an ecosystem (e.g., wetlands, grasslands) as areas of potential development rather than conservation. The lack of a market mechanism that would reward environmental stewardship means that "environmental stewardship services are often undersupplied by farmers due to absent or weak pricing signals".[1] As a result, action is typically required from government to incentivize EG&S where both the farmer and society benefit.

2.0 Research Project Scope and Design

The empirical data in this paper represent the findings of research conducted from April to July 2020 in Manitoba. To better understand a farmer's perspective, semi-structured interviews were conducted by telephone. Nine interviews were conducted with farmers from Manitoba. Additional interviews were conducted with Manitoba Finance, Manitoba Agriculture and Resource Development, the Rural Municipality of Dufferin, Ducks Unlimited, Nature Conservancy of Canada, Manitoba Beef Producers, Delta Waterfowl, Manitoba Habitat Heritage Corporation, Alternative Land Use Services (ALUS) Canada, and the Manitoba Association of Watersheds. Interviews were also held with various watershed districts including: Whitemud, Pembina Valley, Assiniboine West, Souris River, Central Assiniboine, and West Interlake.

This paper is designed to be read by farmers, policymakers and anyone that is interested in better understanding the interplay between EG&S programming and agriculture.

3.0 Ecological Goods and Services

An ecosystem is made up of complex processes with many parts that interact interdependently with one another to produce EG&S.[3] Given the rising population and demand for resources, it is

[1] Roy, D., Venema, H.D. & McCandless, M. (2011). Ecological Goods and Services: A review of best practice in policy and programing. Winnipeg: International Institute for Sustainable Development.
[2] Government of Manitoba. (2017). Agriculture Statistics. Retrieved from https://www.gov.mb.ca/agriculture/markets-and-statistics/statistics-tables/pubs/census-of-agriculture-mb-profile.pdf
[3] Wilson, S. (2009). Status of Current Work-Measurement and Valuation of Ecological Goods and Services in Canada. Retrieved from https://mspace.lib.umanitoba.ca/handle/1993/23371

increasingly important that EG&S programming continue for generations to come.

The challenge with EG&S and agriculture is trying to create a marketplace that incentivizes the positive aspects that flow from the ecosystem (e.g., carbon capture, flood reduction, reduced runoff).[1] The benefits that EG&S provide are not accounted for in a producer's financial statement or bought and sold freely like normal goods. Society views EG&S from farmland as being in 'short supply', so there is a need to increase this supply to satisfy societal demands.[4]

3.1 Environmental Benefits

The table below summarizes the goods and services that derive from ecosystems.

Ecosystem Component	Benefits and Goods
Forests	Caron sequestration, soil formation, waste treatment, biological control, air quality, cultural, stormwater control, recreation, raw materials (timber), wind protection, and genetic resources
Grasslands	Water regulation, erosion control, soil formation, waste treatment, pollination, biological control, food production and carbon sequestration
Wetlands	Water supply and treatment, carbon sequestration, food production, cultural, habitat, and flood prevention
Lakes, Rivers & Riparian Zones	Food production, recreation, waste treatment, and water supply
Crops	Scenery, habitat, and food production

Source: Sauer, A. (2002). The Values of Conservation Easements. Retrieved from http://www.landscope.org/rhythmyx/action/conserve/easements/item20493.pdf

Forests, grasslands, wetlands, and soils remove greenhouse gases and play a role in "reducing the scale and future impacts of climate change".[5] For Canada to meet its commitments under the Paris Agreement greenhouse gas emissions must be reduced 30% from 2005 levels by 2030.

3.2 Landowner Benefits

EG&S projects can encourage sustainable land use practices and improve net economic return.[6] For example, shelterbelts along livestock buildings can reduce the need for snow clearing and lower heating costs in the winter.[7] A shelterbelt can also, in some cases, increase property

[4] Gerowitt. B., Isselstein, J. & Marggraf, R. (2003). Rewards for ecological goods-requirements and perspectives for agricultural land use. Agriculture, Ecosystems, and Environment, 98, 541-547.
[5] Daba, M. & Dejene, S. (2018). The Role of Biodiversity and Ecosystem Services in Carbon Sequestration and its Implication for Climate Change Mitigation. International Journal of Environmental Sciences and Natural Resources, 11(2), 53-62.
[6] Asgedom, K. (2011). Beneficial management practices and mitigation of greenhouse gas emissions in the agriculture of the Canadian Prairie: a review. Agronomy Sustainable Development, 31, 433-451.
[7] Agriculture and Agri-Food Canada. (2011). Ecological Goods and Services (EG&S) and Agroforestry: the Benefits for Farmers and the Interest for Society

value and improve yields canola yields.[8] Perennial vegetation around wetlands can help with moisture retention, weed control and soil erosion. A riparian area along a stream can reduce erosion and flood damage and can filter nutrients (e.g., phosphorus, nitrogen).

3.2.1 Limitations

Some research on riparian areas has shown potential benefits while other research has shown limitations. For example, riparian areas in regions with sandy soils make buffer areas less effective compared to other soil types.[9] These soil type variations can have an impact on the effectiveness of certain EG&S projects. This creates challenges and opportunities for government to offer incentives for EG&S while minimizing the opportunity costs.

3.3 EG&S Approaches in Manitoba

The initiatives listed below are examples of EG&S programs that are available in Manitoba.

3.3.1 Tax Credits

Wetlands and waterways are considered non-arable land and lack production value. Landowners are required to pay tax on these areas. A higher tax rate applies to arable land whereas non-arable land (e.g., forest and wetlands) is taxed at a lower rate. Despite low taxation rates on non-arable land, financial incentives such as tax credits may be offered to prevent the conversion of non-arable land into cropland.

3.3.2 Conservation Easements

A conservation easement is an agreement between two parties that is "designed for conservation purposes and given legal authority to protect a range of ecological, cultural, heritage, and other values depending on the legislation".[10] A conservation easement can focus on habitat protection, wetland maintenance or the restriction of further development. In Manitoba, the Conservation Agreements Act governs this arrangement.

Ducks Unlimited, Manitoba Habitat Heritage Corporation, and the Nature Conservancy of Canada are examples of organizations that have conservation easements with farmers.

3.3.3 Watershed District Programming

Manitoba has 14 watershed districts that offer environmental programs and services to landowners within their watershed. Watershed districts offer projects that advance EG&S such

[8] Briere, K. (2020). Shelterbelts' carbon capture potential touted. Retrieved from https://www.producer.com/2020/05/shelterbelts-carbon-capture-potential-touted/?utm_source=Western+Producer&utm_campaign=48bbec905a-Producer+Daily+-+2020-05-26&utm_medium=email&utm_term=0_a5b062b4c9-48bbec905a-89130137

[9] Weaver, D. & Summers, R. (2014). Fit-for-purpose phosphorus management: do riparian buffers qualify in catchments with sandy soils? Environment Monitor Assessment, 186, 2867-2884.

[10] Atkins, J., Hillyer, A. & Kwasniak, A. (2004). Conservation Easements, Covenants and Servitudes in Canada. Ottawa: North American Wetlands Conservation Council.

as riparian area management, small dams, grassed waterways, shelterbelts, forage seed assistance, gully and streambank stabilization, and livestock crossings.

3.3.4 Beneficial Management Practices (BMPs)

BMPs are "any agricultural management practice that: ensures the long-term health and sustainability of land-related resources used for agricultural production; positively impacts the long-term economic and environmental viability of the agricultural industry; and minimizes negative impacts and risk to the environment".[11] These practices can be supported through cost-sharing initiatives such as the Canadian Agricultural Partnership (CAP) or financed by farmers. BMPs can reduce greenhouse gas emissions, improve soil and water quality, and reduce soil erosion.[6]

3.3.5 Environmental Farm Plan

The environmental farm plan (EFP) program is a voluntary self-assessment of on-farm environmental risks. Completing an EFP results in an action plan that assists farmers to address potential risks while optimizing their assets.

A completed EFP is required to apply for some CAP project funding. Completed EFPs are also a contract requirement for companies like McCain's and Roquette and will be included in future environmental proAction standards by the Dairy Farmers of Canada.[12]

3.4 Current Funding

All levels of government are involved in funding EG&S programming. Some funding flows through nonprofit agencies (e.g., watershed districts, Ducks Unlimited, Nature Conservancy of Canada, ALUS). Watershed districts receive funding from the Government of Manitoba, municipal levies, federal grants, and organizations like ALUS Canada.

The Government of Manitoba has increased funding for EG&S programming through the development of the GROW and Conservation Trusts. The GROW Trust is aimed at strengthening watershed health and water quality. The Conservation Trust provides funding for projects that promote soil health, wildlife, conservation planning, and human/nature relations. In total, $204 million is enshrined within the two trusts and is intended to provide consistent and secure long-term funding. The interest incurred within the trusts is available to watershed districts and nonprofit organizations to fund projects. The province expects that annual available funds, in

[11] Sparling, B., Klimas, M., Brethour, C. & Bucknell, D. Ecological Goods and Services: Estimating Program Uptake and the Nature of Costs/Benefits in Agro-Manitoba.
[12] Dairy Farmers of Canada. (n.d). Retrieved from https://www.dairyfarmers.ca/proaction#environment

both trusts, will be almost five million dollars.

4.0 Farmers Interviews

The farmers interviewed for this report own and/or rent their land, ranging from 80 to 6,300 acres. Interviewees had an awareness of EG&S programming but with varying levels of involvement. Three farmers owned cattle while others produced crops that included canola, wheat, corn, soybean, oats, rye grass, barley, and millet. The farmers were from various watershed districts such as Whitemud, Redboine, Pembina Valley, Souris River, Central Assiniboine, and West Interlake.

4.1 Farming Values

Every farmer interviewed saw the value of EG&S and were aware of their role in environmental sustainability. Their environmental values influence their farming practices and level of involvement with environmental initiatives.

A reoccurring theme among several farmers interviewed was the importance of keeping the landscape in its natural state. Farmers see the value of habitat diversity, continuous environmental improvement, water management, conservation, and being good stewards of the land. This is often referred to in the literature as a 'moral obligation' to act in a way that positively impacts the environment.[13]

4.2 Outcomes

The farmers interviewed described numerous positive changes resulting from their EG&S projects. This included production advances, clean water, improved pasture, and better water management.

One farmer in the Central Assiniboine Watershed District commented on the positive changes to his land when a neglected portion was properly drained, which resulted in better production outcomes.

A cattle farmer installed riparian fencing on her property that prolonged the life of her water supply. She valued the ability to separate the cattle in different sections that improved her pasture and expanded her production capacity.

A farmer in the West Interlake Watershed District was thankful for funding for the winter off-site watering system. Without the funding she could not improve her pastureland.

A watershed district manager explained how the community tree nursery program budget significantly increased over the years. Rising demand along with a bigger budget resulted in

[13] Xiong, Y., Xiao, Li. & He, Peng. (2016). Farmers' adoption of pollution-free vegetable farming in China: Economic, informational, or moral motivation? Cogent Food & Agriculture, 2, 1-16.

farmers planting trees that were washed away during the 2011 flood.

Another watershed district manager explained how programs are shaped by the local climate and topography. For example, in dry years water retention BMPs are often used while wet years result in more shelterbelts to soak up excessive water.

5.0 BMP Funding and Enrollment

EFP participation rates and BMP application rates demonstrate a direct link between BMP funding and EFP participation. In 2019/20, 309 farmers enrolled in EFP workshops that resulted in 143 completed workbooks. For 2019/20, 246 BMP projects were approved by the Province of Manitoba under the AgAction Manitoba Assurance BMP program for total funding of approximately $1.945 million. Funding for 2018/19 resulted in funding approval for 165 projects at a total of $1.3M and 304 completed EFPs. BMP funding and EFP enrollment are important metrics since BMPs have the ability to "sustain or increase net economic return.[6]

5.1 Protected Habitats

Between 1998 to 2012, MHHC initiated 594 conservation agreements representing 113,000 protected acres. Despite the number of conservation agreements a reoccurring topic in several interviews with environmental organizations was the challenge in creating metrics. For example, organization's comments focused on the ease in reporting the number of acres protected or funds distributed, but challenges occur when the task is to report critical data like carbon sequestration. Thus, "the difficulty lies not in measuring carbon stocks but in devising measurement/monitoring/verification systems that are accurate yet cost-effective."[14]

5.2 Watershed District Incentives

Watershed districts may provide cost-sharing arrangements with farmers that include payments per acre or a lump sum amount depending on the project. Provincial funding influences a watershed district's budget and ultimately the programming they provide.

Despite budgetary constraints, one watershed district manager explained they attempt to cover the full cost of each project because of its societal benefit. Another commented on the importance of cost sharing projects since it enables farmers to take ownership of the project. Depending on the project, contracts may be signed between the watershed district and a farmer to ensure the benefits of a project are achieved.

5.3 Incentive Example

Government and nonprofits organizations offer funding that motivates farmers to consider an EG&S project. A successful incentive within one community is the wetland tax credit offered in the Rural Municipality of Dufferin. The annual tax credit rate is set at $40 per acre of wetland

[14] Conant, R. (2010). Challenges and opportunities for carbon sequestration in grassland systems. Rome: Food and Agriculture Organization of the United Nations.

and requires landowners to sign a 3-year contract.

Currently, 48 farmers use this tax credit. This equates to 411 wetland acres protected on a $21,000 budget. This tax credit resulted improved better flood management, fewer infrastructure repair costs for the municipality, and a number of farmers reversing their intention to drain a wetland.

A similar tax credit incentive for riparian areas was offered by the Manitoba Government. The Riparian Tax Credit program provided landowners between $20-28 per acre annually. Landowners were required to commit to a five-year contract and manage eligible riparian areas on their property. In a high year approximately $30,000 was distributed in tax credits. The program was eventually cancelled due to low demand.

Although it is difficult to know the exact reasons (e.g., promotion, persuasion, appealing offer) why the wetland tax credit in the Rural Municipality of Dufferin is successful, policymakers should not ignore the positive role incentive payments can have on farmer behavior.[15]

5.4 Economic Viewpoint

Both economic rationale and environmental stewardship play a role in the adoption of environmental practices.[15] Profit generation was a topic mentioned often by farmers during interviews. Farmers, whether they produce crops or manage livestock, view many of their decisions through an economic lens. This rationale is incorporated into decisions whether it is purchasing new land, taking existing land out of production, deciding what crops to plant, or participating in environmental programs.

The economic mindset of reducing inefficiency and maximizing land use is prevalent amongst farmers. One farmer stated that, “as a larger farmer we are the mindset of drain and let it go”. Another farmer who was actively involved with EG&S projects saw the inefficiencies wetlands create and wished they could be drained.

5.5 Barriers

Farms are businesses, so farmers assess the costs and benefits of EG&S programming. Budgetary constraints and political priorities mean that only certain funding is available for organizations which translates into a limited number of project approvals. Organizations in Manitoba that implement EG&S projects may encounter hurdles such as building rapport with farmers, limited farmer awareness of programming, and programming restrictions.

5.6 Opportunity Cost

A common theme from the farmer interviews is the potential opportunity cost of implementing

[15] Wang, T., Jin, H., Kasu, B., Jacquet, J. & Kumar, S. (2019). Soil Conservation Practice Adoption in the Northern Great Plains: Economic versus Stewardship Motivations. Journal of Agricultural and Resource Economics, 44(2), 404-421.

EG&S projects. In other words, what are farmers willing to give up if it means not draining a wetland or not converting grassland into cropland? Providing suitable incentives for EG&S is one way to overcome this hurdle due to the potential impact incentives have on program adoption.[15]

The farmers interviewed were open to the idea of conserving non-arable land if it meant receiving adequate financial incentives. The amount mentioned was often tied to cover part or all of the local land rental rates. Direct payments are advantageous because they are often viewed as cost efficient.[16]

Incentive payments should not be seen as the only solution, but as part of the solution.[16] Policy tools such as education, cost sharing agreements, conservation easements or incentive payments, each have a common goal of advancing EG&S, yet offer different pathways in achieving this goal.

6.0 The Complementary Nature of EG&S Initiatives

Regulation, incentive payments, and education are all policy instruments that have varying degrees of influence on farming activities. Many nonprofits organizations emphasize the need to work alongside farmers and design programs that can both benefit the environment and appeal to farmers.

Farmers involved with EG&S projects did not portray their involvement or the costs incurred as negative. Rather, the interviews revealed a strong emphasis on the environmental or economic advantages compared to the financial expenditures or opportunity cost.

The actions of farmers described in the interviews also reveal the tendency to participate in further EG&S initiatives after completing an environmental project. In this sense, a cascading effect occurred. Previous enrollment in EG&S projects acts as an indicator of the inclination to consider future EG&S projects.

Farmers operate in an environment that is full of choice as well as constraint. Positive results have occurred from farmers implementing EG&S projects. These results are improvements to the ecosystem or, in some cases, positive impacts to farm production. It is important that future funding and programming remain adaptive and continue to align to the needs of farmers in Manitoba. In doing so, society, the environment, and farmers benefit.

7.0 Recommendations

1.) Government and environmental organizations should ensure that farmers are fairly compensated for participating in EG&S programming. Farmers have an interest in the environment while simultaneously depending on it to be profitable. Increasing incentives

[16] Ferraro, P. & Kiss, A. (2002). Direct Payment to Conserve Biodiversity. Science, 298, 1718-1719.

offered by government and nonprofits organizations will positively impact enrollment in EG&S.

2.) Government and industry should expand education aimed at farmers that highlights the importance of EG&S and related programming. It is important that government and nonprofit organizations not merely offer cash payments, but to also educate farmers on the important role they play in maintaining healthy ecosystems and the variety of EG&S programming that is available.

3.) Government and industry should increase the conversation around EG&S. EG&S is not often discussed by farmers in Manitoba. Increasing the discussion and involving all stakeholders can help adjust the focus on EG&S programming and broaden awareness.