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CONSERVATION IN FARM COUNTRY:

What makes a good farm environmental scheme?

Matt McIntosh
August, 2025

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SCHOLAR PROFILE

***Figure 1**: An enjoyable (but rather lackluster) trout catch.*

Matt McIntosh is an award-winning journalist, farmer, and outdoorsman with a passion for agricultural landscapes, the natural world, and rural communities.

At home, Matt works alongside his family on their sixth-generation farm in Essex County, Ontario. In his capacity as a journalist, communications professional, and speaker, he contributes to a range of publications and organizations both within and outside the agriculture sector on issues ranging from environment and agronomy to geopolitics and policy.

Matt has also worked in agricultural communications and extension with Farm & Food Care, the University of Guelph, and various commodity organizations. He holds a BA (Hons.) in Political Science – with a focus on agriculture issues – from the University of Guelph, and is an active member of both the Eastern Canada Farm Writers' Association (a chapter of the Canadian Farm Writers' Federation) and his local Soil and Crop Improvement Association.

Matt's connection with soil, flora, and fauna is very deep, fostered from a young age by his family – and particularly by his late Granddad, Duane McIntosh. A passionate advocate for farming and the outdoors, Duane's mentorship helped ensure the relationship between agriculture and ecology would comprise a significant part of Matt's personal and professional life.

His experiences in post-secondary education – and conversely, within the agricultural industry itself – also highlighted a critical need for cross-cultural communication, understanding, knowledge sharing, and proactive engagement between those directly involved with agriculture and those further removed. His overarching goal is to foster positive environmental, social, and economic change by encouraging critical thinking and connecting people with the landscapes on which they live.

ACKNOWLEDGMENTS

Ventures such as these require an immense amount of support, from the professional and financial to emotional, and indeed, at times physical.

To my parents, Tim and Deb – my sincere thanks for having my back throughout this adventure. The knowledge you both would be there if I, or indeed any of our small clan, found ourselves in a tough spot continues to be a great sense of comfort. More generally, your generosity and sacrifices in helping me get involved in the family farm are always forefront in my mind. The exposure to the outdoors which you afforded throughout our young lives, too, did much to spur interest in both natural wonders and agricultural landscapes.

To my brother, Kyle – you're an alright fella, I have to say. The occasional phone chat, and good laugh while I was far from home did much to keep me relatively sane, and pursuant of my research goals.

To Tayler – my beautiful keystone. You have never been anything but encouraging, reassuring, and clear about your confidence in me, even when I seriously doubt myself. You took the hardest gig in the world, the care of our young daughter, in absolute stride during our times apart. It was very hard leaving for parts of this expedition – itself a testament to how much I love and value you both. I am surely among the luckiest of farm kids to have you in my life. *Ghrá mo chroí*, you are.

Finally, I'd like to thank my late Granddad, Duane McIntosh.

I've been lucky enough to see the great outdoors with many family members and friends, but none did so much to foster my interest in landscapes, flora, and fauna as Granddad. He was one of the greatest mentors a person could have, and someone with whom I spent countless hours. We hunted, fished, watched Michigan Out of Doors with religious regularity, went for walks, picnics, hikes, and much more, both on and off the farm. He took the time to share his knowledge, his passions, and support for conservation – and without either of us realizing it, shaped both my profession and future lifelong friendships. He enabled me to see the forest and its individual trees. As the man himself would have said, "thank ye kindly," Granddad.

Further acknowledgements:

The following individuals comprise a range of friends, colleagues, Nuffield acquaintances, and other people who have made a difference through this adventure, and beyond.

Our 2024 Nuffield Canada cohort – Lauren Benoit, Cheryl Haskett, Sally Bernard, Tatum Claypool, and Renny Grilz. It's rare to make so many good friends so quickly. The ability to share anxieties, triumphs, experiences, and knowledge keeps a guy going. Much love and solidarity to you all.

To my friends, Adam Hicks, Andrew Taves, Brandon Good, Scott Reid, and others too numerous to mention – I'm honoured and privileged to have you all in my life. Thank you for everything. I consider you members of my extended family (whether you like it or not).

Finally, thanks to all the farmers, Nuffield Scholars, researchers, journalists, and other wonderful humans who helped along the way:

- Emma Gillbard (and family), Devon, United Kingdom
- Alice Mead, Leicestershire, United Kingdom
- Dan Smith, Monmouth, United Kingdom
- Matt Griffin, Peebles, United Kingdom
- Jock Gibson, Moray, United Kingdom
- Harry Winslet, Bristol, United Kingdom
- Alasdair and Nial Fraser (and Clan McIntosh), Moy, United Kingdom
- Robbie Byrne (and family), Co. Louth, Ireland
- Claire Mc Cormack, Co. Westmeath, Ireland
- Grace McCullen (and family), Co. Meath, Ireland
- Tommy Bolan, Co. Dublin, Ireland
- Neil Jackman, Co. Tipperary, Ireland
- Cathal McCarthy and Patrick McCormick, Co. Tipperary, Ireland
- Martin Crowe and Gearoid Maher, Co. Limerick, Ireland
- Ray Ó Foghlú, Co. Clare, Ireland
- Aoife Forde, Co. Clare, Ireland
- Brendan Dunford, Co. Clare, Ireland
- Samuel Dean, Co. Cork, Ireland
- Lotte Van Der Layen, Gelderland, The Netherlands
- Dennis Jakobsen, Sealand, Denmark
- Iben (Marie Bojsen) & Anders Møller, Sealand, Denmark
- Brian Kronvang, Midtjylland, Denmark
- Mark J. McCarthy, Tartu, Estonia
- Vineta Gailite, Tartu, Estonia
- Viesturs Lārmanis, Valka, Latvia
- Sanita & Ainis Āboliņi, Valka, Latvia
- Stephanie Tabone, Sydney, Australia
- Peter Templeton, Southland, New Zealand
- Ed White, Manitoba, Canada
- Toban Dyck, Manitoba, Canada
- Scott Mowbray, Manitoba, Canada
- Arron Nerbas, Manitoba, Canada
- Sean Smith, Manitoba, Canada
- Craig Lester, Alberta, Canada
- Eric Paige, Ontario, Canada
- Lauren Des Marteaux, Ontario, Canada
- Blake Vince (and family) Ontario, Canada

SPONSORSHIP

Thank you to Nuffield Canada for sponsoring the core of my scholarship. It was heartening getting to know the organization's commitment to professional development and the betterment of Canadian agriculture. The organization's sponsorship afforded me the funds and flexibility to get going on what was a truly gunshot start in January, 2024.

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Additionally, thank you to the Municipality of Leamington for seeing the value in this project. Together, our local governments, conservation groups, farm associations, and individual farmers can find solutions to the environmental challenges facing our corner of the world.

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Finally, thank you to my community peers – Emma Epp, of Epp Ag Solutions, Mitch Lang, of Corteva, and the Essex County Soil & Crop Improvement Association board of directors – for supporting my investigations of more profitable and environmentally beneficial agri-environmental programs.

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EXECUTIVE SUMMARY

Declining biodiversity and the loss of natural landscapes are an unfortunate reality across the globe. This is driven by many factors, from rising populations and increasing pace of urban and industrial development to harmful farming practices, the economic realities of producing food, and beyond. There are, however, opportunities for farmers and ranchers to make a much larger difference in landscape conservation and restoration, particularly in forests, fencerows, wetlands, and culturally significant areas.

While many success stories exist, an array of barriers can limit the ability of farmers and ranchers to implement conservation and restoration efforts at a larger scale or with greater consistency. In some cases, there is funding available to foster significant landscape-level change – but that change is rarely realized in full, if at all. At the local level, clear environmental issues can go unaddressed due to a lack of awareness or ownership of the problem, cultural barriers, low financial resources, and other factors.

This report explores government programs and policies, local initiatives, and individual efforts aimed at restoring natural landscapes and important cultural spaces. Cultural spaces are included since communities value many natural ecosystems for reasons beyond pure ecological significance. Some case studies offer successful examples which could be applied in other political jurisdictions. Others provide cautionary tales, identifying less-than-effective approaches to environmental restoration, as well as the dynamic between environmental restoration and the economic and cultural conditions of farming communities.

Case studies and broader themes have been gleaned from Estonia, Latvia, Denmark, the United Kingdom, Ireland, Brazil, the United States, and Canada. Initiatives observed cut across levels of governance, from the national and intranational to provincial and local. Individuals met include those working across a range of agricultural sectors – dairy, beef, sheep, grain, field vegetables, etc. – as well as academics, journalists, ecologists, and archaeologists.

This report is thematically structured by characteristics considered critical in the success, or lack thereof, of agri-environmental initiatives. Citations are provided where possible. Additional elements are derived from conversations, informal analyses, and other assessments from Nuffield-related travels, as well as the author's general experience. The report is framed largely within an Ontario context, but is meant to be applicable across Canada, if not further afield.

The conclusion summarizes common barriers to further agriculture-adjacent environmental remediation efforts, as well as potential opportunities to empower farmers' sense of purpose in ecological rehabilitation. The need for strategic vision, investment in extension services, grassroots participation, flexibility in programming, and fostering of ecosystem services as a viable, complementary means of farming are determined to be critical requirements for successful agri-environmental initiatives.

KEY TERMS

The following are terms employed throughout this report. Additional terms and respective definitions are identified in the Glossary.

Agri-environmental initiative:
Any program or effort, regardless of scale and origin, intended to support conservation or restoration work in agricultural settings. The term is employed to reference both environmental and cultural projects. Environmental initiative, scheme, program, and other similar terms should be considered interchangeable.

Ecological goods and services:
The performance of environmental management work important for both people and ecology.

Extension:
Support services enabling farmers, ranchers, and other landowners to participate and succeed in conservation or restoration initiatives through agronomic, ecological, land-use planning, bureaucratic, and other forms of expertise.

Practitioner:
Referring to farmers and ranchers, generally, or anyone tasked with making change on the ground. Practitioner, farmer, rancher, and landowner should be considered interchangeable.

DISCLAIMER

This report has been prepared in good faith but is not intended to be a scientific study or an academic paper. It is a collection of my current thoughts and findings on discussions, research and visits undertaken during my Nuffield Farming Scholarship.

It illustrates my thought process and my quest for improvements to my knowledge base. It is not a manual with step-by-step instructions to implement procedures.

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1.1 Carolinian Canada

The geographical area between Ontario's Essex County, Niagara region, southern Huron County, and the Greater Toronto Area comprise the upper range of North America's Carolinian zone – a biome characterized by highly diverse broadleaf forests, wetlands, alvars, savannahs, and other unique ecosystems.

The Government of Canada describes the region as climatically warmer than any other part of Ontario, fostering levels of biological diversity unsurpassed elsewhere in the province, and typical of more southern climates. Tree species such as the tulip, sassafras, Kentucky coffee-tree, cucumber tree, black gum, and pawpaw typify this ecosystem, as do a wide range of unique reptiles, amphibians, birds, mammals, and other fauna. Comprising just one per cent of Canada's landmass, the region is home to some 50 per cent of all federally-listed Species at Risk.[1]

The vast majority of Ontario's Carolinian forests and wetlands have been lost. As highlighted by Carolinian Canada (*Figure 2*), perilously few natural areas of any size remain outside of protected areas, such as national and provincial parks like Point Pelee and Long Point.[2]

Throughout the wider region, pressures from urban expansion, increased industrialization, and the intensification of agricultural production have caused extensive wildlife habitat destruction. In parts of this zone, the Government of Canada estimates "over 90 per cent of the original forests are gone," and most of the remaining forests are "too small and isolated" to accommodate at-risk forest species that depend on the specialized habitats found in larger forest tracts.[3]

[1] Environment and Climate Change Canada. "Chapter 1 – Ontario's Carolinian Forests: A Rich but Endangered Ecosystem." *Government of Canada*. July 25, 2019.
[2] Carolinian Canada Coalition. "Explore Carolinian Canada." *Carolinian Canada*.
[3] Environment and Climate Change Canada. "Chapter 1 – Ontario's Carolinian Forests: A Rich but Endangered Ecosystem." *Government of Canada*. July 25, 2019.

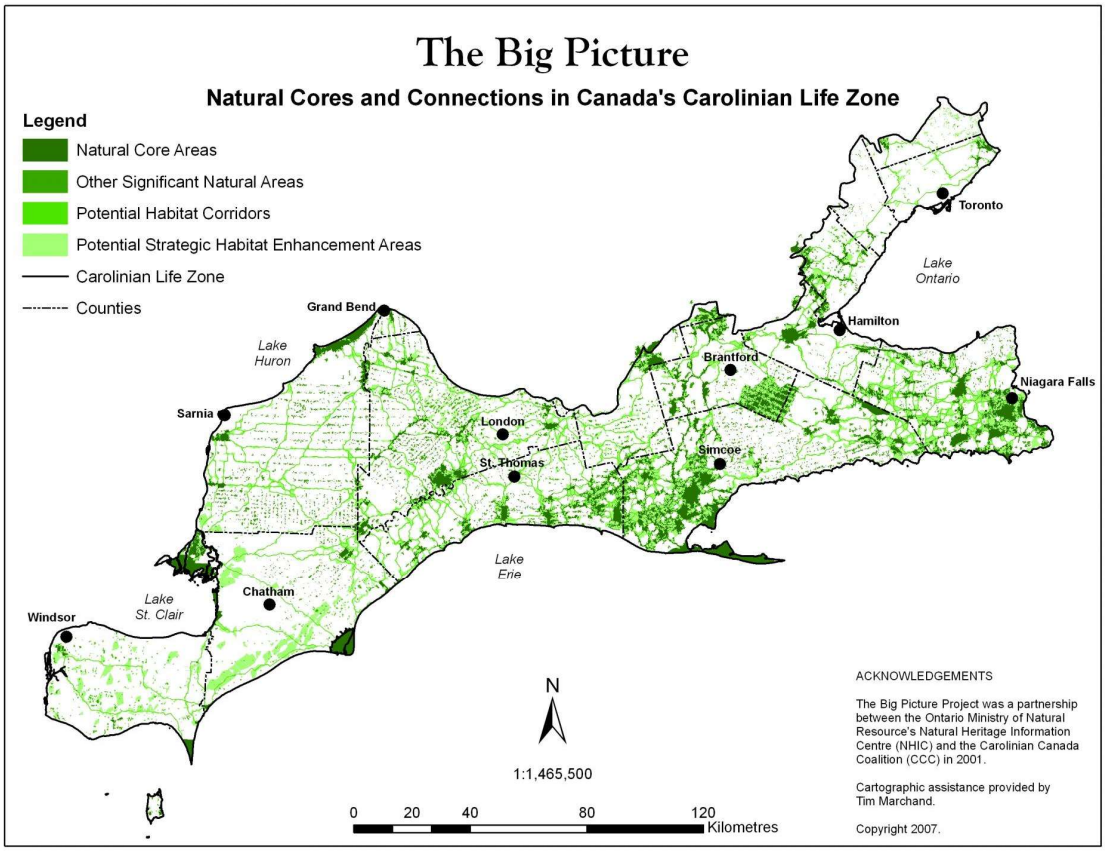

***Figure 2**: Carolinian Canada's 2007 assessment of natural areas - or lack thereof - in southern Ontario. Development, agriculture, and other factors continue pressuring natural areas across the province. Image sourced from Carolinian Canada resources.*

This state of affairs is perhaps most pronounced in Chatham-Kent and Essex County, where the land is particularly flat and thus particularly suitable for broad-acre crop production. The region's current lack of tree cover is a stark contrast to descriptions of the area from centuries past, including those made by famed conservationist and local resident, Jack Miner, about his family's homestead near the town of Kingsville in the late 1870s:

"I wish all the people of America could have a genuine aerial view of our little seven-acre cavity in the woods."[4]

In 2025, very few woodlands of any size remain in the county of Essex.

[4] Jack Miner. *Wild Goose Jack*. Richmond Hill (Simon & Shuster of Canada). 1972. Page 65.

1.2 Water quality – or the lack thereof

Ontario has a wealth of waterways large and small, and borders all but one of the North American Great Lakes. Not all watercourses are considered healthy, however. Lake Erie – the most southerly and shallowest Great Lake – provides an example of how development pressure from heavy industry, infrastructure, housing, and agriculture have negatively impacted many of the province's aquatic ecosystems.

Once declared "dead" due to excessive pollution,[5] cross-border pollution-reduction efforts from the United States and Canada contributed to an overall improvement in Lake Erie's water quality during the latter decades of the 20th century.[6] Nutrient loading – and the resulting blooms of toxic cyanobacteria (*Figure 3*) – have since returned, pressuring aquatic organisms, and posing serious risks to drinking water for lakeside communities, as well as one of the world's largest freshwater fishing industries.[7]

In Essex County, for example, some Lake Erie tributaries are considered to be "the most polluted in the province of Ontario with respect to phosphorus and nitrate."[8] While the level of nutrient loading does vary between tributary watercourses, it is generally acknowledged agriculture – including arable crop production, greenhouse production, and other sectors – are key contributors to the overall problem in Lake Erie, and elsewhere.[9] Thus, agriculture must also be part of the solution.

[5] Domske, Helen M. "Lake Erie Fact Sheet." *New York Sea Grant*. April 2013,
[6] International Joint Commission. "Canada-US Achievements in Protecting the Great Lakes: Highlights from the 2022 Progress Report of the Parties." Great Lakes Connection, International Joint Commission, September 22, 2022.
[7] McIntosh, Matt. "Lake Erie Is Full of Algae Again. Southwestern Ontario's Exploding Greenhouse Sector Won't Help." *The Narwhal*. October 16, 2023.
[8] Ontario Ministry of the Environment. *Greenhouse Wastewater Monitoring Project (2010 and 2011.* Southwestern Regional Office. January, 2012.
[9] McCarthy, Mark J. Justin A. Myers, and Silvia E. Newell. "Old Habits Are Hard to Break: Modern HABs, Nitrogen, Lake Management." *LakeLine* 37. No. 2. Summer, 2017.
Essex Region Conservation Authority. "Expanding greenhouse sector in Essex County, ON and downstream water quality degradation: Kingsville Leamington Nutrient Project 2012-2022." Essex Region Conservation Authority. July, 2023.

***Figure 3**: International Joint Commission satellite image of cyanobacteria bloom in western Lake Erie, circa 2011. The scale and severity of such blooms varies year-to-year, but have once again become a regular occurrence in the lake. Image sourced from International Joint Commission resources.*

1.3 Increasing development pressure – less environmental protection

Despite the significant loss of Carolinian forest and wetlands – the latter being particularly important for both terrestrial and aquatic biodiversity, as well as water quality – the risks to remaining natural spaces from development pressure in southern Ontario continue to increase. This is highlighted by projects and policies such as the proposed Highway 413,[10] the opening of protected agricultural land to housing developments[11] – and continued urban sprawl more generally – the expropriation of land for large-scale manufacturing,[12] overriding of local government planning processes,[13] suppression of Conservation Authority power to limit or even advise on development in key natural areas,[14] scrapping of environmental restrictions and local planning assessments in "special economic zones,"[15] proposals to privatize lands within provincial parks,[16] and other actions.

[10] McIntosh, Emma. "Ontario's Highway 413 to Move Ahead Without Federal Review — Again." *The Narwhal*. December 23, 2024.
[11] Canadian Broadcasting Corporation. "Ontario Greenbelt Timeline." *CBC News.* July 14, 2023.
[12] De Bono, Norman. "Slimy, underhanded': St. Thomas industrial-land buy hurts agriculture, Elgin farmer." *London Free Press*. June 11, 2022.
[13] Ministry of Municipal Affairs and Housing. "Proposed Regulatory Changes under the Planning Act Relating to the Cutting Red Tape to Build More Homes Act. *Ministry of Municipal Affairs and Housing*. December 4, 2024.
[14] Syed, Fatima. "Ontario Weakens Watershed Protections (Again) as Natural Resources Minister Gets New Powers." *The Narwhal*, March 7, 2024.
[15] Waters, Shannon. "Ontario's New Mining and Development Law, Bill 5, Explained." *The Narwhal*. June 25, 2025.
[16] Bilhete, Britnei. "Proposed Wasaga Beach sale could set 'awful precedent,' environmentalists say." *CBC News*. July 26, 2025.

Natural ecosystems aside, a significant and sustained loss of prime farmland is also occurring. As of 2021, Ontario lost an average of 319 acres to development each day – a number significantly higher than the 175 acres per-day loss documented in 2016, and quite possibly, much lower than what will be revealed in Statistics Canada's next Census of Agriculture, given changes to development policy since 2021.[17]

1.4 Property rights, distrust, and historical baggage

Many factors within the farming community itself – some practical, others cultural – have also proven no friend to Ontario's Carolinian land and waterscapes.

The use of ever-larger machinery and drive for operational efficiency leaves less room for trees and fencerows. Farm consolidation, a trend common across the country,[18] has also been tied to fencerow and woodlot loss.[19] Underpinning these and other trends is the wider historical drive for production maximization, perhaps best characterized by Earl Butz, head of the United States Department of Agriculture under the Nixon Administration, in his vision for farmers to "plant fencerow to fencerow," and "go big or get out."[20] Butz's focus on production above all has proven weighty historical baggage for farmers worldwide, many of whom have known no environment other than that which incentivizes mass production, generally at the expense of biodiversity and other sustainability factors.[21]

Other cultural tendencies are also at play – specifically, the prioritization (and occasionally dogmatic pursuit) of property rights.

Generally speaking, farmers are independently-minded business people who want (and arguably deserve) latitude in managing their land, in whatever way they consider best fits their businesses. This can, at times, cause friction within communities as the approach to management conflicts with the interests, perceived or otherwise, of their neighbours. Though not always avoidable – sometimes the management of a farm business necessitates actions which others might find objectionable, hence Ontario's legal protections for "normal farm practices"[22] – there are cases where a farmer's adherence to independence and operational freedom fails to account for, or outright disregards, the wider public's concern over genuine issues within the community.

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[17] Ontario Federation of Agriculture. "Ontario Farmland under Intense Pressure." Ontario Federation of Agriculture. June 10, 2022.
[18] National Farmers Union, "Farmland Ownership and Consolidation." National Farmers Union.
[19] Fahrig, Lenore. "Smaller farmer's fields can reduce biodiversity loss and increase wild plants, birds, beetles and bats." The Royal Society of Canada. July 10, 2020.
[20] Welte, Peter. "Considering the Lessons of Earl Butz." *Agweek*. April 1, 2018.
[21] Balmford, Andrew. Ian J. Bateman, Alison Eyres, Tom Swinfield and Thomas S. Ball. "Sustainable high-yield farming is essential for bending the curve of biodiversity loss." *Philosophical Transactions B*. Royal Society. 2024.
[22] Government of Ontario, Rural and North. "Farming and Food Production Protection Act." Government of Ontario.

Attempts to control tree felling in the Ontario's county of Chatham-Kent provides an example.

Chatham-Kent, a largely deforested jurisdiction, adopted a Natural Heritage Strategy in 2013-2014 with the intent of better preserving the region's remaining forest ecology. Fearing potential restrictions on tree-felling, some farmers opted to get ahead of the Strategy by energetically clearing woodlands before the Strategy's formal adoption. As the Strategy came up for review some years later, the local government tried to prevent a similar spike in pre-emptive tree-felling by adopting a temporary 120-day bylaw prohibiting the removal of woodlots more than half an acre in size, and a specified density of trees.[23]

Some in Chatham-Kent's agricultural community were frustrated by the temporary bylaw, arguing it was exclusionary and unfair to farmers who have otherwise been good environmental stewards. While this may be true to a degree, the fact that members of the region's local government felt a temporary prohibition on woodlot clearing was necessary, prior to a review of an already enshrined heritage strategy, indicates significant community concern with past reactions from the agriculture sector, and more broadly, how some farmers view land use and property rights – specifically, that landowners ought to have sole authority over the ground legally entitled to them.

The fear of operational restrictions on the part of farmers is not baseless. In a world where fewer and fewer people are involved in and understand the complexities of growing crops and raising animals, where politics often appear to trump well-thought policy, and where seemingly endless and competing demands pull in multiple directions simultaneously – farmers can be forgiven for seeing tigers in the bushes, even when such predators are not actually there. The problem, from all parties, is one of trust.

The challenge of fostering trust among farmers – and opportunities for doing so – is articulated by Tom Nudds, conservation biologist and professor emeritus at the University of Guelph, in a Canadian Agri-Food Policy Institute report on Species at Risk within agricultural landscapes. Highlighting the need for better population data for Species at Risk, Nudds argues a new relationship between conservationists, government, and farmers must be adopted:

"To improve scientific inference about the state of [Species at Risk] and its cause(s), researchers confront a Catch 22: private landowners are often reluctant to permit access to acquire data. However, two key opportunities are apparent to break it.

The first, in return for land access, is to provide legal assurances that will alleviate landowners' concerns about liability if [Species at Risk] are present on their land…The second, consistent with [Environment and Climate Change Canada's] pan-Canadian Approach to Transforming Species at Risk Conservation in Canada, is to continue to engage fulsomely with stakeholders in the agri-food sector in collaborative decision-making with respect to conservation of [Species at Risk]

[23] McIntosh, Matt. "Farmers push back against Chatham clear-cut bylaw." *Farmtario.* July 22, 2021.

and biodiversity. In particular, tools and techniques from the fields of decision, management and statistical sciences not yet widespread in conservation, hold significant promise for eliciting, incorporating and using also local and traditional knowledge in the agri-food sector in participatory research to inform species' threat assessments.

Together with improved data collection, investment in collaborative, transparent and open science holds significant promise for further transforming a pan-Canadian approach to conserving at-risk species on agricultural landscapes."[24]

In summary, Nudds argues shedding the adversarial relationship between farmers, ranchers, and ecologists will benefit both parties and their respective objectives – wildlife conservation and business management. The barrier to further success is rooted in psychology, and specifically tribalism, where each party perceives the other as a threat. Protections must therefore be adopted to mitigate risks from the other, whether perceived or real. Though speaking in specific reference to at-risk species, Nudds' argument is pertinent for any agri-environmental scheme necessitating engagement between farming and non-farming parties. Mechanisms to build trust are required.

1.5 Prospect theory

Finally, psychological conservatism – and the cultural weight of hard currency – are also barriers to on-farm environmental improvements.

Economic pressures, a dearth of incentives for biodiversity, lack of trust in government as well as non-farming segments of the public and other factors all contribute to a climate of apprehension within farming communities as pertains to agri-environmental improvement schemes. The presence of Prospect Theory among farmers, where the fear of potential loss is weighted higher than the potential for equivalent or greater gains[25] – further reduces openness to agri-environmental improvement initiatives.

Such conservatism is, again, not unwarranted. John Kenneth Galbraith, the famed economist, diplomat, American public official, and intellectual, detailed the justification for hesitancy in adopting new management techniques in his humorous anthropological memoir, *The Scotch*, about his experience coming of age in a typical southern Ontario Scottish-Canadian farming community:

[24] Nudds, Tom D. "Science, Policy, and Governance for the Conservation of Biodiversity and Species at Risk on Canadian Agricultural Landscapes." Canadian Agri-Food Policy Institute. May, 2025.
[25] Kahneman, Daniel, and Amos Tversky. "Prospect Theory: An Analysis of Decision under Risk." *Econometrica* 47. No. 2 (March 1979): 263–291.

"What is often deplored as the conservatism of farmers or peasants is, in fact, the healthy respect of men with a small margin for error for what is fully proven within the range of their own eyesight."[26]

Written in the early 1960s about a community of the early 20th century (Ontario's Elgin County), Galbraith's words remain applicable to many farming communities in 2025. Though for reasons different from those pressuring his peers of the 1920s, little room for error is still a reality with which farmers and ranchers frequently contend. Success in agri-environmental programming necessitates recognition of this reality.

1.6 Multifunctionality

A false dichotomy also exists, in that our landscape can either be purposed for agricultural production or ecosystem preservation. In reality, both ecological improvement and agricultural production can exist simultaneously.

Ehsan Pashanejad, environmental researcher at the University of British Columbia, argues "multifunctionality" – the idea that some landscapes are particularly well suited to accomplish multiple goods simultaneously – is a necessary lens with which to approach ecological improvement. In his own Canadian Agri-Food Policy Institute report, Pashanejad indicates landscapes exhibiting "higher multifunctionality support both agricultural and biological diversity, promoting resilience across spatial and temporal scales."

"However, a social-ecological lens is essential for understanding the mechanisms that enable multifunctionality. By aligning land use practices with ecological processes, it is possible to create synergies that reinforce food security and farmer livelihoods while ensuring biodiversity conservation."[27]

Put another way, agriculture may not be nature's best friend. It does not, however, have to be its greatest nemesis.

[26] Galbraith, John Kenneth. *The Scotch*. Cambridge, Massachusetts (Riverside Press): 1964 1963. Page 63.
[27] Pashanejad, Ehsan. "Balancing Conservation and Agriculture on the Canadian Prairies." Canadian Agri-Food Policy Institute. May, 2025.

1.7 Agri-environmental programming in Ontario

The factors pressuring ecological and cultural preservation in southern Ontario are significant and diverse. There are, however, an array of government programs, administrative bodies, and others helping practitioners make positive environmental impacts. In 2025, this includes, but is by no means limited to, the following:

Resilient Agriculture Landscapes Program:

A wide-ranging federal program from Agriculture and Agri-Food Canada, the Resilient Agricultural Landscape Program is a $250-million cost-share program under the 2015-2025 Sustainable Canada Agriculture Policy. The nation-wide program is designed to help farmers and ranchers conserve and enhance the resiliency of agricultural landscapes through an ecological goods and services payment approach to support on-farm adoption. It also complements other programs.[28]

Ontario Soil and Crop Improvement Association:

Responsible for government agri-environmental programming delivery in Ontario, the Ontario Soil and Crop Improvement Association manages an extensive portfolio. Among its many tasks, the organization manages the initiatives within the Resilient Agriculture Landscape Program, pesticide collection programs, and Ontario's Environmental Farm Plan.

Environmental Farm Plan:

The Environmental Farm Plan is an assessment voluntarily prepared by farmers to increase their environmental awareness in up to 23 different areas on their farm. Through the plan process, participants highlight their farm's environmental strengths, identify areas of environmental concern, and set realistic action plans with time tables to improve environmental conditions. The Environmental Farm Plan can then be leveraged to access funding through programs offered by the Ontario Soil and Crop Improvement Association.[29]

Alternative Land Use Services:

Alternative Land Use Services is a non-profit organization offering guidance, resources, and financial incentives to landowners for the establishment and management of habitat projects, providing ecosystem goods and services. The organization leverages funding from both the public and private sectors to pay farmers for their ecosystem support work. From launching the

[28] Agriculture and Agri-Food Canada. "Resilient Agricultural Landscape Program Investing in Improved Agricultural Lands." Government of Canada. July 16, 2024.
[29] Ontario Soil and Crop Improvement Association. "Canada-Ontario Environmental Farm Plan." *Ontario Soil and Crop Improvement Association*.

first pilot in 2006, it now administers projects across Canada, including in many regions within Ontario. [30]

Conservation Authority agricultural programming:

The province of Ontario maintains 36 Conservation Authorities – local watershed management agencies, mandated to ensure the conservation, restoration and responsible management of Ontario's water, land and natural habitats through programs that balance human, environmental, and economic needs. Part of this portfolio includes administering and supporting agri-environmental schemes. While the details and availability of schemes can differ between watersheds, common programs for farmers include cost-share cover crop and tree planting, drainage works, and buffer-strip establishment, among others.[31]

1.8 A winning formula?

These summarizations describe a sample of avenues by which Ontario farmers and landowners can access support in their efforts to improve soil health, water quality, carbon sequestration, and biodiversity. Other avenues also exist. However, how closely an initiative can align the capital needed to pay for sustainable environmental improvements, the extension and community support required to implement, maintain, and develop those improvements, and the willingness of farmers to engage, will determine overall effectiveness.

At its most simple formula, the effectiveness of agri-environmental initiatives can be visualized in a diagram (*Figure 4*) consisting of: Farmer willingness/interest, Extension capacity/support, and Capital/financial return. The more elements of a given initiative support these components, the closer each move to the overlapping centre – thus expanding the pool of farmers and ranchers willing to participate in the initiative, and increasing potential impact.

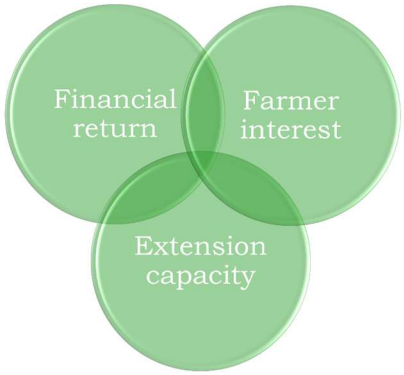

***Figure 4**: Agri-environmental initiatives supporting each sector increase overlap, or the pool of practitioners likely to participate.*

This representation may appear simple or obvious. However, it is not how many initiatives operate. With this in mind, the following chapters identify characteristics of agri-environmental programs which, to one degree or another, encourage greater or lesser overlap between each category. Pitfalls to avoid are also highlighted throughout.

[30] "Where Agriculture and Nature Meet." Alternative Land Use Services.
[31] "Watershed Stewardship Programs." Conservation Ontario.

2.0 EXTENSION SUPPORT – THE IMPORTANCE OF

2.1 Danish wetland restoration

The value of adequate extension support – whether from independent agronomists, program coordinators, ecologists, or other professionals – cannot be understated. At a national level, and as detailed by Dr. Brian Kronvang, professor of ecological science at Aarhus University, Denmark's wetland preservation efforts provide an example of how extension services are integral to achieving national and intra-national environmental restoration targets.

Facing ecological restoration mandates from the European Union's Nature Restoration Law, Denmark has adopted The Green Tripartite Agreement – legislation aimed at restoring the country's natural landscape, including 140,000 hectares of woodland and wetland, by 2030.

On the ground, regional governments have a hand in identifying what lands should be restored. Land is then purchased from the farmer, or other land is acquired to trade to the farmer for parcels designated for restoration. A combination of the two compensation methods is also possible. Farmer representatives, appointed by their regional peers, participate in the process in part by establishing the value of land to be acquired and traded.

Kronvang, himself long involved in wetland restoration and other water management projects across Denmark's agricultural landscape, says the inclusion of farmers in land valuation and acquisition will be vital to the success of what is a very ambitious and complicated Tripartide initiative.

The previous decade saw Denmark restore or establish some 40,000 hectares of wetland. Speaking in April 2025, Kronvang says such achievements indicate widespread water quality and biodiversity improvements can be achieved if landscape restoration efforts are also beneficial for farmers, and a good fit for their business (*Figure 5*).

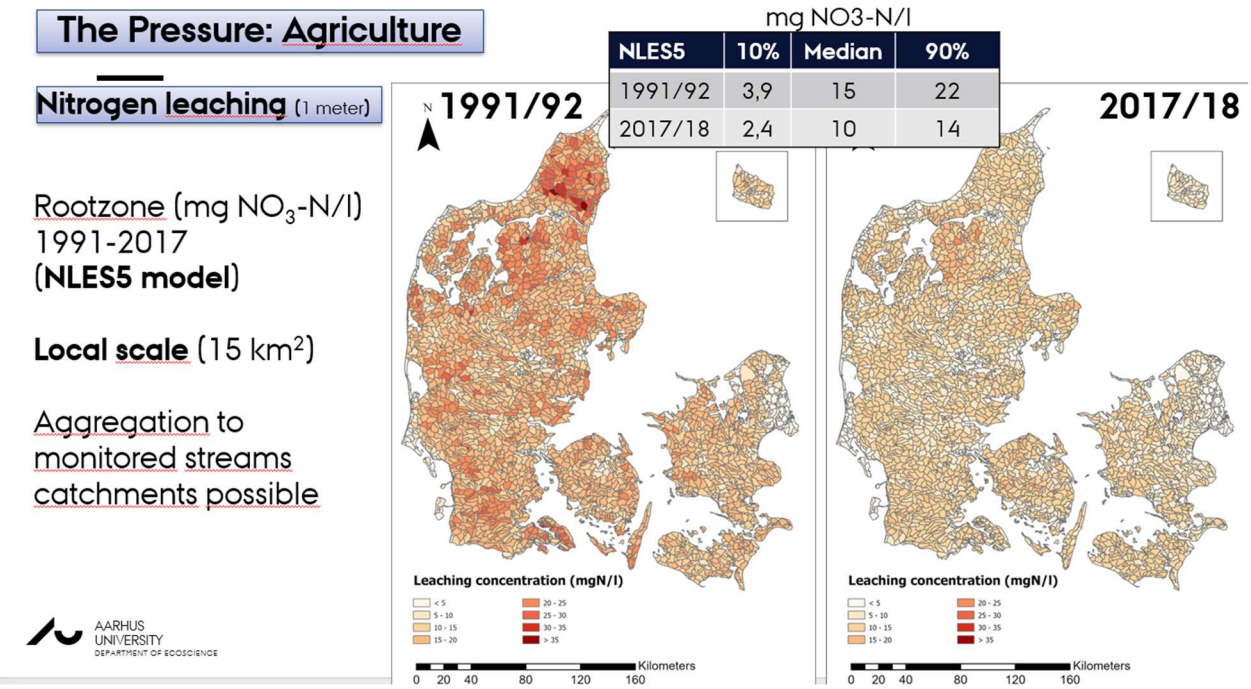

***Figure 5**: Denmark nitrogen loading maps – then and now. Denmark has recorded significant improvements in both inland and coastal water quality over time. This was accomplished through a variety of means, including by lessening nitrogen loading through wetland establishment, cover cropping mandates, and other agricultural requirements between 1991 and 2018. Image courtesy of Brian Kronvang.*

While Kronvang considers such water quality improvement a dramatic success, he believes the country's 140,000-hectares by 2030 goal a nigh impossible target, partially due to a dearth of extension support.

More specifically, Kronvang says there are too few trained consultants available to help farmers and local governments identify what lands ought to be acquired, traded, and re-wetted in a manner equitable for both the farming and non-farming community. Like farmers engaging experts to help design, implement, assess, and adjust on-farm projects, regional planners will have to do the same – and the people available to help are likely to be stretched quite thin.

Kronvang describes this extension gap existing despite significant interest among regional administrations, as well as in the farming community, to support the country's overarching strategy. And while he does not believe more extension professionals would solve every challenge in meeting the objectives set by Tripartite Agreement, such professionals are nonetheless a critical element in the ability of local officials to plan, apply for, and navigate what he refers to as Denmark's "very complicated" bureaucracy.[32]

[32] Kronvang, Brian. Interview. April, 2025. Central Denmark.

2.2 Measuring Sustainable Farming Incentives

A similar state of affairs exists with the United Kingdom's Sustainable Farming Incentives.[33]

Designed to promote nature-supporting farming methods, Sustainable Farming Incentives cover a wide range of initiatives, from tree planting, hedgerow establishment, multi-species grazing pastures (known as "swards" in Ireland and the United Kingdom), and so forth. These initiatives provide funding covering both up-front costs, as well as regular income for maintaining and improving ecological goods and services.[34]

Hedgerow establishment offers a representative example of some Sustainable Farming Incentive funding structures. As described by Emma Gillbard – Devon dairy farmer, journalist, and arable editor with *Farmers Weekly* – landowners can stack subsidy payments for every 100 metres of hedge they maintain, or for the number of trees contained within that 100-metre span. This applies to new hedgerows — such as those recently established in regions with substantially less hedge and tree cover — as well as pre-existing hedges. Previous hedgerow-promotion programs did not cover pre-existing hedges, like those that have long been part of the Devon landscape.

Questions remain, however. How large does a tree have to be to garner a payment under the scheme? If there are several dozen trees in the 100-metre span, does the landowner receive separate payments for each? If so, is there a limit? How will landowners and government measure and determine everything at scale? Is throwing significant capital at the problem truly going to accomplish the goals which the government itself has set, or will it simply create another false marketplace?

The fundamental problem, according to David Gillbard – Emma Gillbard's father and current family patriarch – is the tendency for government to micromanage environmental policy and how it's implemented at the farm level in England. By doing so, farmers who know and understand their unique conditions and production systems have less flexibility and spend more time trying to figure out how to remain compliant with shifting and sometimes competing requirements. This is where extension staff – those helping navigate the system, as well as plan and follow up with Sustainable Farming Initiatives – would otherwise shine. From David Gillbard's perspective, though, a dearth of such professionals is a major stumbling block to further participation.

Note – the sentiments expressed by the Gillbard family were communicated in January 2024, prior to funding and structural changes for Sustainable Farming Incentives in England.

[33] Department for Environment, Food & Rural Affairs. "Farming Is Changing." Government of the United Kingdom.
[34] Gillbard, Emma. Interview. January, 2024. Black Dog, Devon, United Kingdom.

***Figure 6**: The hedgerows of Devon, United Kingdom, are famed for their biodiversity and cultural importance. Management restrictions have some questioning whether local ecology would be better off if such restrictions did not apply. Image courtesy of Emma Gillbard.*

2.3 Effective research extension investment

Investment in extension and knowledge transfer by the Allerton Project – a farming-focused wildlife conservation and regenerative agriculture research foundation in Leicestershire, United Kingdom – has been profoundly popular, highlighting how hungry farming communities can be for such services.

Also speaking in January 2024, Alice Mead, now head of the Allerton Project, describes the organization's purpose as one "building resilient [agricultural] systems…rather than maximizing systems."[35] This is accomplished through an ever-growing suite of farmer extension workshops based on knowledge gathered from multi-year, at-scale field trials on a wide range of ecology-focused farming methods. Support for research and subsequent workshop programming comes from partnerships with public, private, and non-profit entities. Significant investment in

[35] Mead, Alice. Interview, January, 2024. Loddington, Leicestershire, United Kingdom

research and extension communication, from Mead's perspective, has helped disseminate significantly more knowledge than would be the case if outreach efforts were not an integral part of the Allerton strategy. The takeaway message is farmers want to learn from each other and science conducted in real-world conditions. The Allerton Project's approach, by consequence, is to put research and collaborative knowledge-sharing first.

2.4 A martial analogy:

Recognizing the need for effective extension, governments, non-governmental organizations, and agricultural groups invest in primary-producer engagement. In Ontario, field days hosted by the Ontario Soil and Crop Improvement Association, University of Guelph, Grain Farmers of Ontario, the Ontario Ministry of Agriculture, Food, and Rural Affairs, and many other bodies, offer a smattering of ecology-adjacent engagement opportunities each year. Funding for agricultural extension has, however, not been a historical priority for many governments. This trend continues today,[36] widening a void between policy directives, available resources, and the farmers tasked with implementing more environmentally-friendly practices.

Speaking generally, a lack of extension investment contributes to a degradation of resiliency within Canadian agriculture. Addressing the need for resiliency in Canadian farm systems, Geneviève Grossenbacher, director of policy with Farmers for Climate Solutions, describes the state-of-play thusly:

"Extend technical training and support for farmers…We cannot afford to wait longer." [37]

A martial comparison might be employed to highlight the lacklustre performance of many agri-environmental schemes. Specifically, one between the level of investment in public agricultural extension services and the emphasis placed on materiel and delivery within military operations.

In military studies, great emphasis is placed on logistics and investments in supply chains. American army General Omar Bradly, of Second World War European theatre fame, is said to have stated, *"Amateurs talk strategy. Professionals talk logistics."*[38] This was Bradley's version of the much-vaunted argument, made about the importance of getting resources to the fighting front, by 19th-century Prussian general Carl Von Clausewitz. His thoughts, as detailed in *On War*, are as follows:

[36] Western Producer Editorial. "Ag Extension System Works, but Co-ordination Is a Must." *The Western Producer*. May 27, 2025.
[37] McIntosh, Matt. "Canada Needs Innovation, Extension, Unity to Overcome Risk." *Farmtario.* March 24, 2025.
[38] Wille, Dennis. "Army Logistics in the Pacific: Introduction." *New America*.

"The end for which a soldier is recruited, clothed, armed, and trained, the whole objective of his sleeping, eating, drinking, and marching is simply that he should fight at the right place and the right time."[39]

***Figure 7**: Carl von Clausewitz in Prussian service; portrait by Wilhelm Wach, early 1830s. Image sourced from Wikipedia.*

The fighter, in other words, is only effective when he is provided with the resources and expertise to get there and win. Far from the realm of agri-environmental programming Bradly and Clausewitz might have been, their observations apply to schemes which, even when fully resourced financially, lack the means to allow their practitioners – farmers and ranchers, as opposed to soldiers – to take full advantage of the strategic opportunities afforded to them.

Extension professionals are, in some sense, agriculture's equivalent of a quartermaster – the logistical professional necessary to administer the required kit – combined with mid-level officers – those charged with implementation and troubleshooting on the ground – enabling combatants to achieve objectives. Lack of investment in this realm means agricultural practitioners are much more likely to miss the time and place of engagement, make sub-optimal gains, or incur opportunity costs despite the best intentions of higher-level commanders developing and driving the scheme in question.

Summary:

Farmers and ranchers are the frontline practitioners. Policy makers, whether public or private, are the higher echelon officers making strategic decisions. Initiatives will fail to meet potential if there is a profound disconnect between the two. Chronic lack of investment in extension services hampers implementation and effectiveness in agri-environmental initiatives. Concentrated effort in extension could significantly amplify the ability of practitioners to have positive impacts.

[39] Wissler, John E. "Logistics: The Lifeblood of Military Power." *Heritage Foundation*. October 4, 2018.

3.0 ESTABLISHING STRATEGIC VISION

Agriculture and environmental improvement schemes require time, capital, and often, not insignificant risk for farmers. For publicly supported programs, there is also a risk to the taxpayer. This is particularly true when environmental programming is set at the national and intra-national level, given the scale of investment involved. At such levels, establishing a strategic vision is an essential first step in developing the framework within which agri-environmental investments are made.

3.1 National – Brazilian conservation mandates

For the government of Brazil, recognition of a tarnished agricultural brand informs its strategic approach to the environment, and thus trade. Biodiversity conservation mandates, for example, are meant to address Brazil's historical use of deforestation to expand its farming sector, and the negative impact land clearing has had on export markets for agricultural goods.[40]

Under current conservation mandates, Brazilian farmers and ranchers are required to maintain a minimum percentage of land as native vegetation – the amount of set-aside land varying based on a variety of factors, including topography and biome importance (*Figure 8*). In some areas, up to 80 per cent of a given land parcel must remain under forest.[41] Further clear felling is illegal. The conservation mandates thus accomplish environmental objectives, in pursuit of strategic economic objectives (access to European markets, primarily).

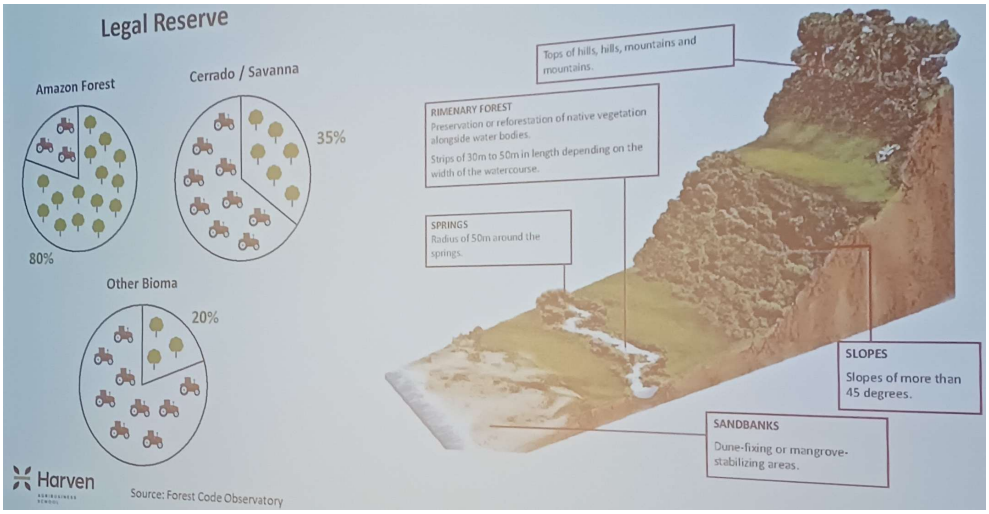

***Figure 8**: Infographic detailing Brazil's ecosystem offset limits by region and topography, as presented at the 2024 Nuffield Contemporary Scholar Conference in Mato Grosso du Sul, Brazil. Image credit, Matt McIntosh.*

[40] Paraguassu, Lisandra. "Brazil Asks EU to Hold Off on Implementing Deforestation Law." *Reuters*. September 11, 2024.
[41] Food and Agriculture Organization of the United Nations. *Law No. 12.651 on the Protection of Native Forests*. July 31, 2024.

The Devil is in the proverbial details. Illegal deforestation, a lack corporate responsibility, and other elements muddy the waters.[42] By consequence, the effectiveness of Brazil's conservation mandates remains in question. Regardless, successive national governments have recognized the damage deforestation has done to the country's global brand. It's strategic agri-environmental vision – agriculture without large-scale deforestation – is its means of rectifying that damage.

3.2 Intra-national – Europe's Nature Restoration Law

The European Union's strategic agri-environmental vision includes an all-encompassing approach to nature conservation under the (aforementioned) Nature Restoration Law.

The European Union currently assesses 80 per cent of the continent's habitats are in poor condition, with "alarming" rates of ongoing decline. Government resources argue this does not have to be a permanent trend, and specifically, how concerted efforts to restore wetlands, rivers, forests, grasslands, marine ecosystems, and the species they host will increase biodiversity, improve the continent's carbon footprint, build resiliency against natural disasters, and mitigate environmental risks to food security.[43] Member countries are thus tasked with implementing strategies to conserve at least 20 per cent of land and sea areas by 2030, and "all ecosystems in need of restoration" by 2050.

Some member state objectives – Denmark's goal of restoring 140,000 hectares of woodland and wetland in a mere handful of years, for example – can appear more ambitious than practical. However, Europeans deforested much of their continent in centuries and millennia past. The political block's current focus on deforestation is a recognition that it continues to be an important environmental problem, both in Europe and elsewhere, in the modern era.

Expensive as the Nature Restoration Law may be – well over half a billion euros for eight years, according to one assessment from the Institute for European Environmental Policy[44] – The problem is recognized, and a framework has been developed to provide member states with the necessary funding to achieve the bloc's overarching strategic vision.

Whether said funding makes it to the frontline practitioners is another matter.

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[42] Watts, Jonathan. Naira Hofmeister, Daniel Camargos, Lucy Jordan, and Ana Aranha. "Revealed: World's Largest Meat Company May Break Amazon Deforestation Pledges Again." *The Guardian*. April 17, 2025.
[43] European Union. *Nature Restoration Regulation*.
[44] Aubert, Gabrielle. McDonald, Hugh, and Scholl Levin. "How Much Will the Implementation of the Nature Restoration Law Cost and How Much Funding Is Available." *Institute for European Environmental Policy.* December, 2022.

3.3 Sub-national – H2Ohio

The American state of Ohio provides an example of how strategic vision at a more regional level can have an outsized impact on biodiversity and water quality.

Ongoing water quality issues in Lake Erie and its tributaries prompted Ohio Governor Mike DeWine to implement a statewide water quality initiative, H2Ohio, in 2019. The initiative, as described by government resources, addresses "complex issues impacting Ohio waters" through a "comprehensive approach guided by science and data to reduce algal blooms, stop pollution, and improve access to clean drinking water."[45]

The state's Department of Agriculture, Department of Natural Resources, Environmental Protection Agency, and Lake Erie Commission are jointly involved in creating "long-term, sustainable, cost-effective and permanent" solutions, such as reducing nutrient runoff from farm fields, creating wetlands, and constructing quality sewer systems.[46] Support for farmers includes programs for best management soil practices, such as cover cropping and 4R variable rate nutrient application. Other initiatives within the wider H2Ohio program include road salt runoff reduction, litter cleanup, dam removal, land conservation and water infrastructure revitalization.

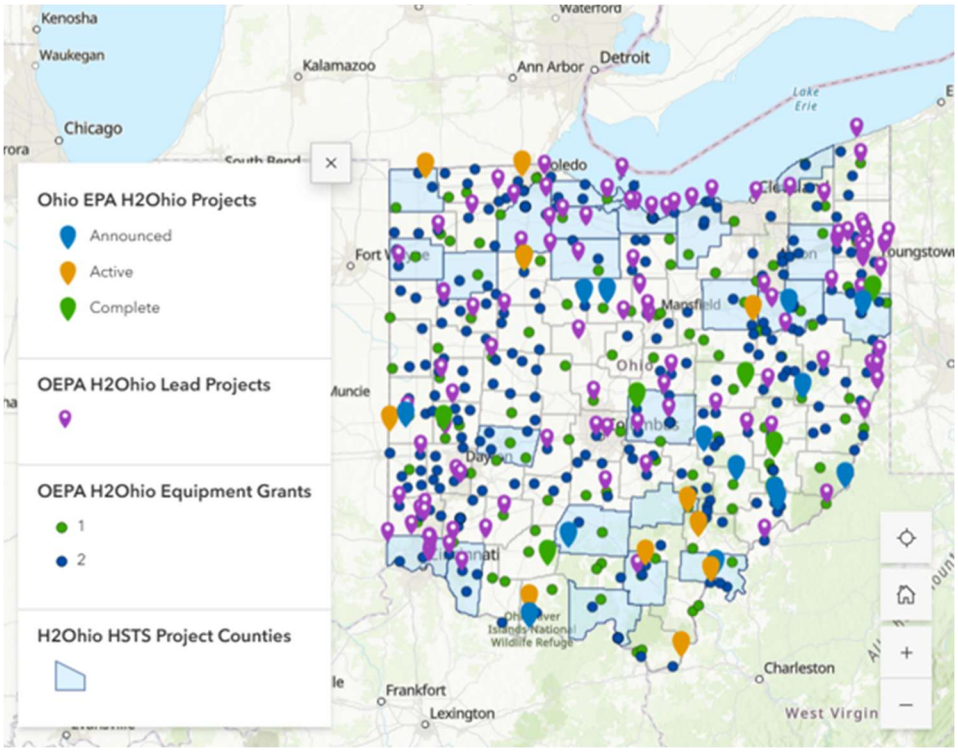

***Figure 9**: H2Ohio map highlighting breadth of programming. Image sourced from H2Ohio resources.*

[45] Ohio Department of Natural Resources. "About H2Ohio."
[46] Ohio Department of Natural Resources. Division of water Resources. H2Ohio.

The breadth of programming, combined with the number of project sites across the state, exemplifies what can be done when resources, collaboration, and extension combine under one strategic vision – in this case, for healthier aquatic ecosystems and more resilient communities by extension. The State of Ohio has identified a number of accomplishments thus far, including the completion of 83 wetland projects in 2023, and 43 new wetland projects initiated in 2024.[47] There is currently no comparable province-wide program or collaboration on Lake Erie's northern shore.

3.4 Political whims

Political currents can, of course, throw very significant branches into the spokes of agri-environmental programming, even when a strategic vision is present.

Nature restoration goals in Europe have been, according to some, watered down after the election of a more conservative European Parliament.[48] Farmers in the United Kingdom participating in Sustainable Farming Incentive programming experienced shocks in early 2025 as a new government slashed funding.[49] As of May 2025, H2Ohio is also facing drastic funding cuts, as proposed in the state's legislature.[50] Whether the projects completed under H2Ohio to date are indeed "long-term" and "permanent," as the Ohio Department of Natural Resources describes, may be tested sooner rather than later.

Summary:
Establishing a strategic vision for environmental restoration is critical to success on a large scale – whether sub-national, national, or intra-national. The risk of funding cuts and politically-motivated actions for programs initiated across wider geographies, however, are perennial. Measures to guard against such swings are worth consideration.

[47] H2Ohio. "H2Ohio Accomplishments for Fiscal Year 2024." Ohio State Government. 2024.
[48] Niranjan, Ajit. "European Parliament Votes for Watered-Down Law to Restore Nature." *The Guardian*. February 27, 2024.
[49] Case, Philip. "'Cruellest Betrayal' as Defra Halts New SFI Applications." *Farmers Weekly*. March 11, 2025.
[50] Wilson, Gary. "EPA 2026 Budget Cuts Target Clean Water Programs." *Great Lakes Now*. June 11, 2025.

4.0 THE POWER OF LOCAL INITIATIVES

Strategic vision is not solely associated with high levels of political governance. Indeed, local initiatives, including individual communities and farming associations, can have an outsize impact on the health of their respective regions environmentally, economically, and socially, through well-thought-out strategic planning. And while locally-focused landscape restoration efforts may not effect change to the degree required for, say, climate change mitigation, such efforts do identify how more tangible, long-term, positive change can be achieved with comparatively minimal resources.

4.1 Revitalizing biodiversity through ancient practices

The reestablishment of Burren winterage – an ancient cattle production system in Ireland's County Clare – exemplifies how local communities can, with science and communal history behind them, empower effective agri-environmental policy.

This example was, it must be noted, one of the core inspirations behind this particular Nuffield journey.

The Burren is broadly comprised of two ecosystems: lowlands, characterized by grassland pasture and hazel woodland, and rocky upland mountains featuring high biodiversity natural grasslands (*Figure 10*). Farmers in the Burren employ a system called "winterage," where cattle graze the region's uplands from autumn through spring. Taking advantage of abundant water and sun-warmed limestone surfaces, the cattle thrive through winter months by browsing the landscape. This keeps the lowland hazel woods at bay, and spurs the regeneration of the diverse grasslands the following spring and summer.[51] As a result of this system, the Irish government assesses The Burren hosts "the richest biodiversity of any region in Ireland, containing almost 75 per cent of the island's native flora."[52]

In the 1990s, however, the winterage method and the biodiversity it supports came under threat from government conservation policy, as well as general economic pressure. Regarding the latter, the need for farmers to have off-farm jobs made keeping cattle in upland pastures less practical – the convenience of keeping animals closer to the homestead brought greater ease of management for busy schedules. For the former, the designation of the Burren uplands as areas of biodiverse importance restricted farmers' employment of winterage grazing. Less winter grazing – the critical component in the emergence and perpetuation of the Burren's diverse upland pastures – meant hazel woodlands crept ever higher. The diverse grassland

[51] McIntosh, Matt. "Irish Cattle Producers Return to the Mountain." *The Western Producer*. June 22, 2023.
[52] Ireland's National Inventory of Intangible Cultural Heritage. "Winterage in the Burren," *National Inventory of Intangible Cultural Heritage*.

ecology locals had long understood and protected, and which government policy was ostensibly enacted to ensure, steadily disappeared.

***Figure 10**: Lowland pasture and woodland in contrast with the limestone uplands of The Burren, March 2023. Much of the uplands transform into unique and highly diverse grasslands between spring and autumn. Image credit, Matt McIntosh.*

As the consequences of this production shift grew, farmers and environmental researchers developed a plan to reintroduce the millennia-old winterage system. This began by measuring the impact of grazing, or lack thereof, on the Burren's upland areas, and petitioning the Irish government with data supporting the role of winter grazing in maintaining the region's biodiversity. A simple rewards program – BurrenLIFE – was established with the national government in 2010. Under this program, the condition of a farmer's winterage pasture is given a score from one to ten, with ten being the best, one being a pasture in need of the most ecological remediation. As farmers improve their score, they receive more income.[53]

Aoife Forde, an agricultural adviser and cattle farmer from the region, credits the grassroots scheme for saving the "very unique" blend of Arctic and Mediterranean flora characteristic of Burren uplands.[54] She identifies one particular researcher – Brendan Dunford, ecological researcher, co-founder of BurrenLIFE, and secretary of the affiliated Burrenbeo Trust – as a main driving force behind efforts to produce policy change.

[53] Burren Programme. 2020 Guidelines for Scoring Burren Winterages. Version 1.3. May, 2020.
[54] McIntosh, Matt. "Irish Cattle Producers Return to the Mountain." *The Western Producer*. June 22, 2023.

"The pocket, the head, and the heart," is Dunford's mantra, referring to the need for agri-environmental programs to support what farmers need financially, what makes sense from a production standpoint – and what feels like the right thing to do as a member of a community.[55] In February 2024, Dunford spoke directly to this sentiment, and the impact local involvement in policy making can have on the ecological, social, and economic reliance of rural communities. In short, without local knowledge and reflection of that knowledge in policy, restoration efforts will be significantly hampered.[56]

4.2 Farming the archaeology

A model not dissimilar to the Burren Winterage conservation scheme is found some 130 kilometres north-east in Rathcroghan – an area of rural County Roscommon famed for its livestock farming tradition, as well as historic cultural importance.

Centred on the village of Tulsk, Rathcroghan boasts 240 identified historical monuments, dating from the medieval period to the Neolithic, within an area 6.5 square kilometres (*Figure 11, Figure 12*). The landscape is also the birthplace of many stories and figures of Irish myth, including Queen Medb (Maeve), The Morrigan, The Cattle Raid of Cooley, and Samhain – today known as Halloween.

Beef cattle production has also been a part of the landscape throughout its history, and remains so today. As described by Daniel Curley, archaeologist and manager of the regional museum and historical programming hub, animal agriculture is the reason Rathcroghan's monuments exist in the first place.[57] Their construction, complemented by the livestock-focused sagas of Irish mythology, indicates the importance of farming to the region's ancient peoples.

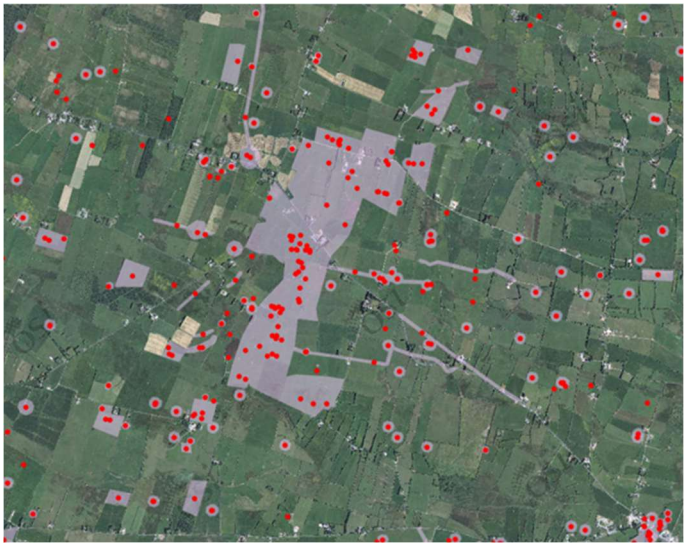

***Figure 11**: Satellite view of the Rathcroghan region, overlayed with markers identifying monuments. Image courtesy of Rathcroghan Visitor Centre*

[55] Dunford, Brendan. "The Pocket, the Head, & the Heart: Farming for the Future in the Burren." *Heritage Radio Network*.

[56] Dunford, Brendan. Interview. February, 2024. Culleen, County Clare, Ireland.

[57] Curley, Daniel. Interview. February, 2024. Tulsk, County Roscommon, Ireland.

***Figure 12**: The Rathcroghan landscape, as seen via UAV. Image courtesy of Rathcroghan Visitor Centre.*

Recent decades have brought sustainability pressures, however. The intensification of agricultural production through heavier machines, heavier animals, and higher stocking densities, as well as more frequent extreme weather events, have increased the damage risk to Rathcroghan's largely earthen monuments. As in the Burren, the Irish government also attempted to protect the monuments from further damage through regulations restricting what Rathcroghan farmers are permitted to do on their land. Now decades old, these restrictions have prevented many farmers from disturbing the soil in any significant way, including through tillage, building construction, fencepost driving, and even tree planting.

With the average farm size below 30 hectares (75 acres), Curley characterizes the farmer's position as one squeezed between the costs of and drive for production, and regulations pressuring them to produce less. A lack of clarity on what farming practices were or were not permitted was commonplace. Families have also encountered succession issues, where construction bans have limited both housing options for the next generation and the possibility of adding farm infrastructure. Thus, well-intended conservation regulations have not stemmed trends in demographic decline and the corresponding loss of connection with a landscape central to Irish cultural heritage.

"I started at the visitor centre in 2013. It quickly became apparent to me there was a lot of disenfranchisement and barriers to progress," says Curley, pointing to his early days as the community's archaeological curator and the animosity to Rathcroghan monuments he encountered within the farming community. Curley soon organized a meeting of farmers and

the local county authority was soon called to "identify gaps between the groups in the room, and how we could go about improving it."

The result was Farming Rathcroghan – a program to help farmers improve the state of monuments on their land through another income stream.

Launched in 2018, the scheme was developed by a coalition of stakeholders from within and outside the local community, including farmers, archaeologists, and other representatives from the environmental and agricultural industries. Like Burren Winterage, it offered a tiered incentive-based structure with payments to farmers who improve the condition of monuments on their land. Participants receive a scorecard assessment and recommendations on remedial action – fencing off specific areas, laying gravel pathways for livestock and field traffic, or installing strategically located and easily movable cattle brushes to reduce scraping, for example. By such means and aided by on-farm extension and workshops on different conservation management techniques, Rathcroghan farmers are, in Curley's words, "farming the archeology."

The first five years (2018-2023) of Farming Rathcroghan saw some 30 farmers participate. According to both Curley and Richie Farrell, manager of the program, significant conservation improvements have been made, and all for a budget of €1.5 million, with a staff of 1.5 (one full-time and one part-time individual). As of this writing, Farming Rathcroghan is now funded by a grant through the European Innovation Partnership. Actions to include more farmers in the program, as well as incorporate tourism and ecological restoration elements, are ongoing.

The immediate inclusion of farmers in the development of Farming Rathcroghan and organizational governance was, for Farrell, critical to its success. During a farm tour in February 2024, Farrell put it thusly:

"If you're creating a board or having an operational group or committee, make sure you have farmers representative on it. Otherwise, it's considered elitist."

Recognition of the pressures faced by farmers in Rathcroghan, broad community engagement, positive financial incentives, and on-farm support are evident when visiting the area. The Farming Rathcroghan model, it may be argued, is one which could be emulated in communities where strategic ecological improvements could also have an outsized impact economically, and socially.

4.3 Localized programming in Ontario

Discussion of grassroots, community-led agri-environmental initiatives should include mention of Ontario's Conservation Authorities and Alternative Land Use Services (see page 9).

These groups, and others like them, operate on a much wider geographic scale than initiatives such as Farming Rathcroghan or BurrenLIFE. They nonetheless provide an array of ecosystem-improvement solutions and support to landowners contending with widely varying soil types, topography, drainage, growing conditions, and personal motivations. Successful landscape restoration projects supported by Conservation Authorities, Alternative Land Use Services, and others can be found across Ontario, helping to address environmental challenges specific to those communities and individual farms – often with much less bureaucratic paperwork compared to larger-scale initiatives.

A drawback is localized landscape restoration projects tend to be site-specific, in that project areas are often identified as unfit, or at least less-than-ideal, for agricultural use. While compensation for ecosystem services is sometimes an element within programming, Ontario farmers managing land suitable for animal or crop production may not be inclined to engage in alternative income streams. Other initiatives may only include cost-share funding or token levels of income replacement. Under such conditions, participation is often limited to those practitioners already predisposed to conservation and restoration. Lack of awareness of agri-environmental programming can itself limit participation levels – a problem which, arguably, could be partially alleviated with more extension support (see pages 11-16).

Despite these challenges, the presence of locally-driven agri-environmental initiatives can be a boon for practitioners. Ensuring local initiatives have a greater impact is a question of resource allocation and scaling.

Summary:
Making money available for a wide range of environmental initiatives matters – but locally focused initiatives, built on local know-how, with farmer participation and extension support, can be a particularly significant factor in successful ecological improvement.

5.0 BUILDING THE BRAND

Agri-environmental initiatives can also support economic opportunities and social resilience through brand development and tourism.

5.1 Queen Mebd's beef

In Rathcroghan, Curley and Farrell highlight investments in walking trails and infrastructure for landmark identification as a means of engaging non-agricultural audiences. Attracting more people to the area, Curley says, would support local businesses while generating appreciation for the region and its cultural-historical importance – something which could be particularly valuable as Ireland is experiencing a renewed interest in its traditional language, landscape, and mythology.[58] In doing so, awareness of, and public support for, the conservation work of Rathcroghan farmers should increase.

Curley also speculates about the feasibility of developing a brand premium for products from the Rathcroghan area – beef raised on the same landscape the mythical Queen Mebd would have herself enjoyed a morsel of roast, for example.

5.2 Success through rewilding

Walking and biking trails are also a feature at Kattrup Vildnis estate, in Sealand, Denmark.

At Kattrup, owners Iben and Anders Møller decided a shift away from arable crop production to high-nature grazing was a fit for their personal philosophy, and an opportunity to diversify the estate's income sources through tourism. Hiking and biking trails were established across the estate, a restaurant and conference area opened in a historic mill, and fields – particularly those where Anders says they were "tired of all the rocks" – were left to rewild. The couple argue their decision to rewild working farmland "should not be seen as a dismantling of our agriculture, but rather as a development of extensive and climate-friendly agriculture that increases biodiversity and optimizes the amount of soil-bound CO_2."[59] Making it work with agri-tourism is, for them, an additional benefit.[60]

[58] Noisín. "What might a modern Irish revival look like in today's world?" *RTE*. June 3, 2025.
[59] Møller, Iben and Anders. Kattrup Vildnis.
[60] Møller, Iben and Anders. Interview. April, 2025. Kattrup Vildnis, Denmark.

5.3 Remediating Soviet mismanagement

At Veksi Eco-Farm in Latvia's Gauja River valley, Sanita and Ainis Āboliņi have spent years remediating land long abused and neglected during the Soviet collectivized farm period. The area within which the Āboliņš family operates their organic beef business, Vekši Eco-Farm, comprises part of a wider protected landscape where high-biodiversity meadowlands and forests were historically prominent.

As with grazing on Canada's prairie grasslands, pasture-based cattle production is an ideal farming system for supporting the diverse flora and fauna characteristic of the Gauja River Valley ecosystem. Combined with sandy soil, the family's mixed woodland-grassland meadow is also ideally suited to handle the significant seasonal floods characteristic of the area (*Figure 13*).

The family have combined cattle production and landscape remediation with nature-focused projects,[61] in partnership with the Latvian government, to promote both the unique biodiversity of the Gauja river valley, and public appreciation for that biodiversity. Walking trails throughout the valley's park-like appearance are common, including across the Āboliņš farm. The trails include observation platforms highlighting the ecological value of the different forms of grassland meadows, as well as oak groves and the role of livestock in supporting biodiversity along the Gauja River.

***Figure 13**: Sanita Āboliņi on remediated Soviet forest land. Their family now grazes cattle on this mixed woodland-grassland pasture. The yellow tag, some 14 feet up on the tree, denotes the highest flood point they have experienced. Image credit, Matt McIntosh.*

[61] GrassLIFE. "Vekši: an opportunity to create your own beautiful park-like meadow." *GrassLIFE*.

5.4 Capitalizing on natural wonders

Special mention should be made of Brazil's Mato Grosso do Sul state, where a combination of conserved ecological areas and agricultural offset requirements (see page 17) provides opportunities for farmers to diversify their businesses through eco-tourism.

Government representatives and other delegates speaking during the 2024 Contemporary Scholars' Conference repeatedly highlighted wider efforts to build the region as an eco-tourism and agribusiness hub. Sites visited as part of the conference demonstrated how individual businesses, and the State more generally, leverage the region's ecology for its brand – and by consequence, additional income streams.

Overall, case studies such as Rathcroghan, Kattrup Vildnis, and Vekši Eco-Farm all involve livestock and may not be wholly applicable to landscapes such as Ontario's Essex County, where arable crop production dominates. Conversely, examples of ecotourism and agritourism initiatives from heavily cultivated Mato Grosso du Sul may be more applicable. Regardless, all serve as a reminder that ecological restoration can have secondary beneficial effects – economic, in the form of tourism and brand building, and social, by fostering landscape appreciation in the wider public. The latter point may, perhaps, be of particular relevance given the rate of farmland loss being experienced in Ontario.

***Figure 14**: A farm business deriving additional income streams from a conference centre, walking trails, and guided river tours in western Mato Grosso du Sul, Brazil. Image credit, Matt McIntosh.*

Summary:

Agri-environmental schemes can be leveraged for branding purposes, supporting individual farmers as well as wider rural communities. This simultaneously contributes to environmental, economic, and social sustainability.

6.0 CAUTIONARY TALES

Long-term funding is a perennial issue for agri-environmental initiatives, with cases such as H2Ohio, Sustainable Farming Incentives, and Burren Winterage highlighting the risks of ever-changing political whims. While this is a constant challenge, there are elements of agri-environmental programming that can help ensure success – or failure, if ignored.

A critical element is farmer engagement. Conversely, a lack of engagement often coincides with initiatives ill-suited to achieve stated goals, or otherwise unattractive to enough farmers for it to achieve desired impacts. The inclusion of rigorous science – that is, having a sound scientific understanding of the drivers behind environmental problems and solutions – is also necessary for success.

Changes to the Burren winterage program post 2022, as well as Ireland's Native Forestry scheme, highlight what can happen when a lack of engagement with people on the ground combine with a loss of strategic vision. Disillusionment with Canadian agri-environmental initiatives – partially resulting from a narrow focus on carbon – also identifies risks associated with loss of political faith among farmers and the organizations representing them.

6.1 Altering the Burren model

The BurrenLIFE model brought 13 years of success, and has been widely held as an example to be copied in other ecological restoration programs across Europe. However, both Aoife Forde and Brendan Dunford expressed frustration with changes made to the winterage program in 2023. Rooted partially in the intricacies of Europe's Common Agricultural Policy, an *Irish Times* article from December 2022, details why many are upset, and why Dunford eventually resigned from a leadership position in BurrenLIFE:

"After 13 years in operation, the programme is to change from January 1st. Farmers will have to transfer to the Agri-Climate Rural Environment Scheme, known as Acres Burren Aran CP, covering a territory from the Aran Islands to east Galway. It is feared that this will also lead to a reduction in incentives for conservation measures, with the average payment dropping from €9,000 to €7,000.

Dr. Dunford said the programme's results-based payments and significant local support, backed by 'a lot of ambition,' ensured its environmental success, whereas the new scheme risks eroding its simple, fair and effective elements.

'It is not about the money,' he said. 'It shows farmers can deliver for the environment if they are supported.'"[62]

By imposing a different payment system and incorporating a wider area beyond the relevance of Burren uplands pasture restoration, Dunford and others argued the Irish state was weakening what has been a highly effective, farmer-backed local initiative in favour of lesser ecological gains generally, and greater socio-economic pressure in the Burren.[63] As Michael Davoren of the Irish Farmers' Association expressed in another *Irish Times* article, a lack of farmer consultation and cooperation regarding the updated scheme has caused serious friction:

"It took 20 years to build that trust up, and it's been taken away in a year-and-a-half…Farmers in the Burren will never again trust the Department of Agriculture to deliver anything."[64]

During interviews conducted in February 2024, both Forde and Dunford confirmed frustrations with the new system continue.[65]

6.2 Encouraging native forestry

Ireland's Native Woodland Conservation Scheme identifies how good intentions and significant capital could have a suboptimal impact due to inadequate support structures, a failure to build relationships, and a lack of attention to ecological facts.[66]

Once covering much of the island, Atlantic rainforest is now almost non-existent in Ireland. The Native Woodland Scheme supports the restoration, conservation and enhancement of native woodlands by providing grants, as well as annual ecosystem services payments for maintenance of such woodland. Since farmers own the vast majority of land in Ireland, they are naturally the prime targets for such a scheme.

As detailed by Ray Ó Foghlú – ecologist, agriculture and forestry extension specialist, and 2021 Nuffield Ireland scholar – one of the prime regions where the scheme could make a significant difference are the vast tracks of rugged uplands (hills and mountains) of western Ireland.

[62] O'Sullivan, Kevin. "Burren Environmental Farming-Scheme Changes Spark Resignations by Co-Founders." *The Irish Times*. November 25, 2022.
[63] O'Sullivan, Kevin. "Burren Environmental Farming-Scheme Changes Spark Resignations by Co-Founders." *The Irish Times*. November 25, 2022.
[64] McSweeney, Ella. "When It Comes to Nature Restoration Plans, EU States Will Look to the Burren Programme. We Should Do the Same." *The Irish Times*. June 29, 2024.
[65] Dunford, Brendan and Aoide Ford. Interview. February, 2024. County Clare, Ireland.
[66] Ó Foghlú, Ray. "Current Forestry Policy Is Hostile to Native Woodland Creation in the Uplands." *Irish Farmers' Journal*. January 19, 2024.

Farmers in these now treeless landscapes largely raise mountain sheep – an animal which brings poor financial returns. Native agroforestry could thus support local communities by providing an alternative (and better) income source, while restoring forests in a landscape where they once flourished. As of 2024, however, the Native Forestry Scheme doesn't cover sites higher than 120 metres in elevation, nor those with more than a quarter of the proposed applicant area comprised of exposed rock, or any place near the sea. Much of western Ireland is thus ineligible.

***Figure 15**: Atlantic rainforest, County Clare, Ireland. Landscapes like this are now very rare. Image credit, Matt McIntosh.*

The problem is the Woodland Scheme, specifically intended to achieve environmental goals, is designed with production capacity at its core. Despite the fact that native woodland would flourish in the western uplands, eligibility is restricted to areas where trees would flourish even more – in fields with good soil, much of which is currently being used as cropland or high-value pasture, and by consequence is unlikely to be transferred to forestry.[67]

[67] Ó Foghlú, Ray. "Forestry Policy 'Hostile to Native Woodland Creation in Uplands.'" *Irish Farmers' Journal.* January 19, 2024.

Ó Foghlú also reiterated there appeared to be minimal – if any – consultation with the farm sector, nor ecology experts, in the development of the Native Woodland Scheme. It had seemingly appeared whole-cloth from bureaucratic spreadsheets. This is in contrast to Denmark's nature restoration efforts, which, while quite complex, has included farmers in the establishment of policy, as well as subsequent actions on the ground.

***Figure 16**: Coastal uplands are, as of this writing, not eligible for Ireland's Native Forestry scheme - despite the fact that they offer a prime area for native forestation. Image taken at Cloghane, north Dingle Peninsula, April 2025. Image credit, Matt McIntosh.*

In May 2025, Ó Foghlú indicated some progress had been made. A new ministry official had been appointed in the intervening period. From his observations, the official seems keen on enabling more farmers to engage in the country's forestry scheme by, among other methods, considering the permissibility of lands previously excluded (coastal uplands, for example). However, while a positive development, Ó Foghlú says Irish forestry is "still in the doldrums."

What has changed is the proportion of farmers interested in forestry now gravitate to native rather than commercial plantings – something he believes is interesting in its own right. Hometree – the nursery and environmental services organization for which Ó Foghlú works – has also been awarded project funding to measure the potential of native woodland creation in Ireland's western uplands. Thus, while Ireland's Native Woodland Scheme may continue to be highly flawed in application – and plagued by a lack of engagement in its initial construction – Ó Foghlú says recent developments indicate an "acknowledgement of the need for change."[68]

[68] Ó Foghlú, Ray. "Peatlands, Trees and the Space for Nuance." *Irish Farmers' Journal*. May 21, 2025.
Ó Foghlú, Ray. Interview. May, 2025. Wheatley, Ontario, Canada.

6.3 Emphasizing carbon

Returning to Canada, an overemphasis on carbon in agri-environmental policy provides another cautionary tale.

Recent years saw Canada's federal government place great emphasis on climate research in agriculture, and projects focused on the mitigation of greenhouse gases in particular. In practice, this led to the exclusion of funding for agriculture research projects that did not have an explicit focus on greenhouse gas reduction, even if those projects did address climate in another manner.

The impact on crop breeding programs offers an example.

Improving disease tolerance in crops can provide better food and production security as climatic changes alter disease pressures. In the case of pulse crops specifically, varietal improvement also supports the wider incorporation of nitrogen-fixing pulses in crop rotations. As detailed by Mario Tentua, professor of soil science at the University of Manitoba, the most effective means of slashing carbon emissions from crop farming in western Canada would be boosting the proliferation of pulse crops through breeding varieties more resistant to Aphanomyces, and other problem diseases.[69] Ed White, author of the 2024 *Western Producer* article in which Tenuta makes the argument, elaborates:

"According to farm organization and research leaders who have repeatedly made this point when talking with Agriculture Canada research officials, crop development doesn't fit the definition for climate change-related research, so it can't access money for which that is a requirement." [70]

Though a specific example of how a narrow focus on carbon impacts innovation, this state of affairs is again indicative of a broader issue – a lack of trust, on the part of the agricultural community, that federal representatives understand the diverse array of pressures facing farmers, and how they are being enabled or hampered in addressing environmental problems like greenhouse gas emissions. Funding restrictions for research projects come on top of a long-standing aversion to carbon-heavy policies (frequently taxation) on farm, home, and general consumer fossil fuel products. Carbon taxation itself was and continues to be a talking point for politicians recognizing – and capitalizing – on the unpopularity of such policies across wide swaths of the Canadian electorate.

In the winter of 2024, Canadian pulse, oilseed, and grain groups also walked away from advisory participation in the Sustainable Agricultural Strategy, citing a lack of measures practical, science-based, market driven, and beneficial for the entire sector, as well as the

[69] White, Ed. "New Focus Called Gov't Blind Spot." *The Western Producer*. April 23, 2024.
[70] White, Ed. "New Focus Called Gov't Blind Spot." *The Western Producer*. April 23, 2024.

environment. As reported in *Western Producer*, the aforementioned commodity organizations stated:

"Together, we have consistently voiced that there is a lack of industry alignment regarding the targets and actions proposed in [Canada's Sustainable Agriculture Strategy]. As a result, we have collectively decided to step back from the advisory committee, as the strategy's direction does not fully represent the interests of our members."[71]

The statement reflects clear dissatisfaction with the then federal government's laser-focus on carbon and carbon emission reductions. With a change of government in 2025, others within Canada's agriculture sector have expressed hope of renewed emphasis on agri-environmental schemes which emphasize farmers and ranchers as agents of positive change, rather than sources of the problem.[72]

Summary:
Narrow-thinking (tunnel vision) and lack of farmer engagement in program planning unnecessarily hobbles agri-environmental schemes. Inflaming animosity can make future schemes yet harder to sell.

[71] Briere, Karen. "Farm groups back away from sustainable ag strategy." *The Western Producer*. December 16, 2024.
[72] Grignon, Jonah. "Carney's New Green Agenda." *Farmtario*. June 11, 2025.

7.0 CONCLUSION

There is no shortage of barriers to the conservation and restoration of ecologically and culturally significant spaces in agricultural landscapes. However, common themes garnered from case studies identified in this report – as well as others not detailed – indicate a number of factors that can, with enough investment and creativity, improve the likelihood of achieving success in agri-environmental initiatives.

7.1 Establish strategic vision

Identifying the problem(s) in a given area and developing a strategic vision for the future is a critical step, whether restoration initiatives stem from local grassroots efforts or higher echelons of public and private policy.

Strategic visions should not be narrowly focused on achieving singular objectives. They should be developed with significant practitioner consultation, and the recognition that improving sustainability and resiliency often requires addressing environmental, social, and economic factors simultaneously. Carbon emission reduction, for example, is a singular objective, not a strategic vision in itself. Fostering sustainable communities, conversely, is a strategic vision within which carbon emission reduction could play a part.

Such an approach, when coupled with effective practitioner inclusion and other factors can:

- Improve rural sustainability through alternative income streams.
- Contribute to ecological improvement as well as the production of food and agricultural commodities.
- Meet metrics identified as important by both public and private entities emphasizing environmental improvement.
- Support regional branding and tourism.
- Strengthen a community's sense of place, thus driving support for conservation and restoration.

7.2 Compensate for risk – as well as ecological services

Money is always an important factor. It is not, however, the sole driver of an initiative's success or failure.

Environmental initiatives can bring additional risks to farm businesses, including opportunity costs, and by placing operators in a more vulnerable financial position should the initiative adversely affect existing income streams (if not cease to exist entirely in rapidly-changing policy environments). Ensuring compensation rates for ecological goods and services provide sufficient income to significantly reduce or eliminate additionally incurred risks is critical.

Ensuring practitioners receive compensation in a timely fashion supports cash flow, and the psychological association of ecological goods and services with reward. Finally, striving for longevity in alternative income streams helps solidify remediation gains by supporting practitioner confidence in the initiative, as well as cash flow, and community acceptance.

Put another way, making sure a program isn't scrapped or radically altered in a few short years supports business planning and cultural acceptance that ecological goods and services can comprise part of an agricultural enterprise. The latter point should not be underestimated, particularly as the need for production intensification and expansion has been the primary message directed at farming communities for many decades. Cultural values do not change overnight.

7.3 Extension support – a keystone

Sufficiently funding agri-environmental schemes can be challenging. In other instances, significant reservoirs of cash are available. Whether that money reaches practitioners in the field, however, is another matter.

A lack of extension support – people on the ground to help enable participation, execution, follow-up, and adjustment – can significantly hamper the flow of financial support to practitioners, if not hinder participation rates outright. Indeed, the need for more extension professionals to help farmers navigate bureaucracy, implement change, adapt in real-time, and provide feedback for agri-environmental initiatives was identified as a challenge in nearly every case study informing this report. Where greater extension investments have been made, all stakeholders have found benefit. Investment in extension capacity is thus one of the best means of improving the effectiveness of, and participation in, agricultural programming.

7.4 Grassroots knowledge delivers

National and intra-national agri-environmental schemes matter – but so do local efforts, targeting local issues with simple, practical structures, and community-built solutions.

Grassroots initiatives begin with problem recognition. Through subsequent dialogue with relevant stakeholders on the best means of addressing the problem in question, common ground is found, and program structures determined. From there, it's a matter of finding the money to fund the initiative. While fundraising and application writing are by no means easy processes, significant capital for environmental improvement – whether from public or private sources – does exist. Local efforts can, in this way, provide more tangible means of achieving area-specific conservation goals with less bureaucracy and greater local expertise. Additional opportunities, such as leveraging initiative success to support branding for tourism or product marketing, are also possible.

7.5 Balancing rigidity and flexibility

The rewarding of results, rather than actions, is one means of ensuring committed funds drive success. More broadly – and perhaps counterintuitively – structural simplicity also helps.

Complexity in programming application, delivery, and verification is sometimes highlighted as necessary to reduce opportunities for abuse – that is, practitioners accepting compensation without delivering the desired results. Unfortunately, attempts to prevent potential wrongdoing can inadvertently deter participation more broadly. Conversely, the more straightforward and clear an initiative is in the application, payment, and other processes, the pool of interested practitioners grows. Simplicity in verification also reduces opportunities for practitioners to participate without delivering. The capacity of extension professionals can be increased, too, through greater bureaucratic efficiency, as well as ease of application and verification.

7.6 Implications for Southern Ontario

There is no single fix for Ontario's ecological challenges. The agri-environmental initiatives highlighted in this report can, however, provide a selection of different models and methodologies which can help inform new and existing schemes. They also highlight how ecological, social, and economic gains can be achieved simultaneously, and fostered by both grassroots efforts and higher levels of governance. With so many things beyond the immediate control of farmers and ranchers, the latter point is particularly important in reiterating positive local change can be realized with the right approach, and mentality.

8.0 RECOMMENDATIONS FOR BETTER CONSERVATION & RESTORATION INITIATIVES

Given the summaries above, and details prior provided, recommendations for more effective conservation and restoration initiatives are as follows:

- First establish a strategic vision accounting for elements of economic, environmental, and social resiliency – then worry about individual metrics and methods to achieve it.
- Engage practitioners at the earliest possible opportunity, and ensure they comprise the cornerstone of the initiative throughout.
- Devolve design and implementation, when practical.
- Avoid rigid participation and assessment requirements. Err on the side of flexibility.
- Strive for simplicity whenever possible. Where there are barriers to making the initiative more straightforward, invest more resources to reduce said barriers.
- Ensure compensation levels reflect the value of the task, and potential risks incurred by practitioners in their pursuit of program goals.
- Deliver compensation in a timely manner. Ideally, as close to the work required, or the assessment of result, as possible.
- Consider extension capacity, and the investment required for adequate extension, from the outset. This should not be an afterthought.
- Strive for longevity. Employ creativity to reduce short-termism and protect the investments made by all stakeholders.

The overarching question that should be asked in the development and implementation of conservation or restoration initiatives: Are we empowering farmers to make positive change? If the answer is not a clear "yes," the initiative will likely fail to reach its full potential. More scrutiny is thus required.

9.0 GLOSSARY

Agri-environmental initiative:
Any program or effort, regardless of scale and origin, intended to support conservation or restoration in agricultural settings. The term is employed to reference both environmental and cultural projects. Environmental initiative, scheme, program, and other similar terms should be considered interchangeable.

Burren Winterage:
A unique farming practice in the Burren region of County Clare, Ireland, where cattle overwinter on limestone uplands. Grazing contributes to the rejuvenation of a highly diverse array of flora unique to the region.

Carolinian zone:
The area in Ontario found south of the (rough) line between Grand Bend and the Greater Toronto Area. This land is known by some First Nations as Waawayaatanong, which means "Round Lake," in reference to territory around Lake St. Clair. It's one of the most biodiverse regions in Canada.

Cyanobacteria:
Microscopic, plant-like organisms that occur naturally in water bodies. Also known as blue-green algae, some varieties can produce cyanotoxins harmful to humans and animals.

Ecological goods and services:
The performance of environmental management work important for both people and ecology.

Extension:
Services enabling farmers, ranchers, and other landowners to participate and succeed in conservation or restoration initiatives through agronomic, ecological, land-use planning, bureaucratic, and other forms of expertise.

European Union Common Agriculture Policy:
The common all-encompassing agriculture policy for all European Union member states. It is managed and funded at the European level from the resources of the bloc's budget.

European Union Nature Restoration Law:
A legally binding framework designed to restore degraded ecosystems across the European Union. It sets targets for restoring at least 20 per cent of land and sea areas by 2030, and all ecosystems in need of restoration by 2050.

Native Woodland Conservation Scheme:
Ireland's national initiative supporting the restoration, conservation and enhancement of native woodlands by providing grants, as well as annual ecosystem services payments for maintenance of such woodland.

Multifunctionality:
The capacity for landscapes to accomplish multiple goods simultaneously.

Practitioner:
Those tasked with making change on the ground. Referring to farmers and ranchers, generally. Practitioner, farmer, rancher, and other related terms should be considered interchangeable.

Prospect Theory:
A theory of behavioral economics pertaining to judgment and decision making (Daniel Kahneman and Amos Tversky, 1979). It describes how individuals assess the potential for gains or losses, weighing potential losses higher.

Species at Risk:
Wildlife species classified as extirpated, endangered, threatened, or of special concern.

Sustainable Farming Incentives:
Policies promoting nature-supporting farming, and other methods to improve biodiversity and ecological sustainability, in the United Kingdom.

Tribalism:
The strong identification and loyalty individuals feel towards their in-group, often based on shared characteristics like ethnicity, culture, or political affiliation.

Tripartite Agreement:
Legislation aimed on restoring the Denmark's natural landscape, including 140,000 hectares of woodland and wetland, by 2030.

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11.0 APPENDICES

This section highlights subjects discussed during site visits and interviews conducted as part of this Nuffield study, though not mentioned in the main report body. Like the main report, this addendum is by no means exhaustive.

Aaron Nerbas – Manitoba, Canada

- Leveraging high-diversity pastures for their beef business (product branding and animal health).
- Social consideration of doing things differently.

Sean Smith – Manitoba, Canada

- Identifying ecological improvement opportunities that make good business sense for their dairy and crop business.
- Finding the right partners to pay for ecological projects.

Moy Hall – Inverness, United Kingdom

- The need for diversified income streams for large estates (cropping, forestry, hunting).
- Impact of Species of Special Interest designation on estate operations.
- Navigating environmental policy environments.

Jock Gibson – Moray, United Kingdom

- Working with the public to provide products they want, not just what farmers want to produce.
- Environmental works a critical element of maintaining social license.

Matthew Griffin – Peebles, United Kingdom

- Value of regenerative practices in estate management.
- Pursuing full profitability (no subsidies) with regenerative practices.
- Mental health in farm country, and facing social pressure for doing things differently.

University of Ohio's Stone Lab – Ohio, United States of America

- The diversity of threats facing Lake Erie and local watercourses.
- Emerging issue (e.g. potentially new invasive species).
- Complexity of H2Ohio programming.

Robbie Byrne, Louth, Ireland

- "Connecting the dots" – really looking at the root causes for issues, and working to address those core issues.
- Building soil health, and letting nature grow where possible.
- Not having all the answers to new challenges, but needing to try new things in order to find answers.

Tommy Bolan – Dublin, Ireland.

- Development of sustainable, pasture-based livestock systems – and specifically, the economic and ecological value of multi-specie swards.
- The role of pastures in meeting environmental targets.
- Engrained cultural behaviours, and their impact on achieving environmental and economic gains.

Martin Crowe and Gearoid Maher – Limerick, Ireland

- Value of naturalizing non-productive areas, improving diversity in hedgerows and pastures.
- Optimization mentality, and how children can change one's perspective.
- The burden of excessive bureaucracy (paperwork) faced by farmers and advisers.

Patrick McCormick and Cathal McCarthy – Tipperary, Ireland

- "Multiple-personality policy" – contradictions faced by the Irish dairy sector over last decade.
- Pressure from non-governmental organizations.
- Significant animosity for government, and anger at those attempting to engage government, from some within the dairy sector.

Mark McCarthy – Tartu, Estonia

- Nitrogen pollution in freshwater systems.
- Effectiveness (or ineffectiveness) of pollution-reduction actions and policies.
- The complexities of pollution sources stemming from agriculture.

Viesturs Lārmanis, Valka, Latvia

- Agriculture's contribution to biodiversity when production systems fit the environment in which farmers operate.
- The difficulty of making biodiversity profitable.

12.0 FIGURES