

THE CARROTS AND STICKS OF SUSTAINABLE FARMING IN CANADA

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“If we don’t change our direction, we’re likely to end up where we’re headed.”²

Introduction.....	304
I. Background and Context	308
A. The “Wicked Problem” of Unsustainable Agriculture	308
B. A Brief Overview of Agriculture in Canada	311
1. Federal Governance of Agriculture	313
C. What is Sustainable Agriculture?.....	314
1. Why Sustainable Agriculture?	314
2. Definitions.....	316
II. Analysis of the Canadian Agricultural Policy Framework.....	320
A. Analytical Framework	321
B. Sustainability in the Current Framework: Does the Federal Agricultural Policy Framework Define Sustainable Agriculture and Provide a High-Level Vision and Objectives for Achieving It?	322
1. Federal Sustainable Development Strategy for Agriculture:.....	323
2. Growing Forward 2	325
3. AFC’s Annual Report on Plans and Priorities:	328
C. The Incentive Structure: Does the Policy Framework Include Measures to Encourage Farmers to Shift to Ecologically Supportive Farming Practices, Especially Those that Help Farmers Deal with the Additional Costs Associated with DFS?	330
1. Environmental farm plans (“EFPs”).....	330
2. Reform of Agriculture Support	332
3. Canadian Agricultural Adaptation Program.....	334
III. Strengthening Existing Initiatives and Exploring New Ones.....	336

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2. LUCAS SIMONS, CHANGING THE FOOD GAME – MARKET TRANSFORMATION STRATEGIES FOR SUSTAINABLE AGRICULTURE 58 (2015).

A. Sustainable Development Technology Canada (“SDTC”).....	336
B. Tax Incentives.....	337
1. Canadian Renewable and Conservation Expense (“CRCE”).....	337
2. Scientific Research and Experimental Development Credit (“SR&ED”).....	338
IV. The Way Forward.....	339
A. Redirecting Behaviour Through Tax Incentives.....	339
1. Fertilizer and Pesticide Taxes	340
2. Food Conversion Efficiency Tax	340
3. GHG Emissions.....	341
B. Influencing Farming Practices Through Incentives Aimed at Consumers.....	342
Conclusion	343

INTRODUCTION

Concerns about the way in which we grow, distribute, and consume food around the world have grown in recent years. From the environmental impacts of farming practices (exacerbated by the industrialization of agriculture)³ and greenhouse gas (“GHG”) emissions from agriculture,⁴ to the viability of farming communities and health concerns about concentrated livestock operations,⁵ the issues are numerous, often overlapping, and sometimes underpinned by different values and/or preoccupations. For instance, issues may be framed as ones of ecological integrity, food security and the right to food,⁶ social justice, animal welfare,

3. Agriculture in Canada (and around the world) has become increasingly industrialized. The average size of farms in Canada has almost quadrupled while the number of farms has declined. AGRIC. AND AGRI-FOOD CANADA, AN OVERVIEW OF THE CANADIAN AGRICULTURE AND AGRI-FOOD SYSTEM 12 (2015), http://publications.gc.ca/collections/collection_2014/aac-aafc/A38-1-1-2014-eng.pdf [<https://perma.cc/6HV6-F8FT>]; Ngo Anh-Thu et al., *Bio-Fuels in Canada: Normative Framework, Existing Regulations, and Politics of Intervention*, 4 MCGILL INT’L J. SUSTAINABLE DEV. L & POL’Y 19, 25 (2008).

4. Tiziano Gomiero, *Effects of Agricultural Activities on Biodiversity and Ecosystems: Organic Versus Conventional Farming*, in HANDBOOK ON THE GLOBALIZATION OF AGRICULTURE 77, 78–79 (Guy M. Robinson & Doris A. Carson, eds., 2015).

5. Heather McLeod-Kilmurray, *Commoditizing Non-Human Animals and Their Consumers: Industrial Livestock Production, Animal Welfare, and Ecological Justice*, 32 BULL. SCI. TECH. & SOC’Y 71, 72 (2012); Martin Phillipson & Marie-Ann Bowden, *Environmental Assessment and Agriculture: An Ounce of Prevention Is Worth a Pound of Manure*, 62 SASK. L. REV. 415, 433–34 (1999).

6. Smita Narula, *The Right to Food: Progress and Pitfall*, 2 CAN. FOOD STUD. 41, 45 (2015).

or even concern about the impacts of emerging technologies such as genetically modified organisms (“GMOs”).⁷

Concerns relating to food and farming are intensified when set against the backdrop of expanding global population, which the Food and Agriculture Organization (FAO) estimates will require an increase of 60% in global agricultural production to satisfy food needs⁸ and diets that are increasingly high in both caloric and meat consumption. The issues are also exacerbated by climate change, which is predicted to have serious implications for food security.⁹ The agricultural sector is dependent not only on healthy ecosystems, but also on favorable climate conditions. As such, it is a sector that is highly susceptible to the increased frequency and severity of droughts and extreme precipitation.¹⁰ Agriculture is in turn a major source of methane, an important contributor to climate change.

Regardless of how the issues are framed, there is widespread agreement that the current agricultural food system around the world is unsustainable and in need of a systemic transformation toward sustainable agriculture.¹¹ There is no single widely-accepted definition of sustainable agriculture. It is understood to be based on a system of farming that does not harm the ecological goods and services upon which it is dependent, and which provides healthy food and agricultural goods for all, along with viable livelihoods for farmers and other agricultural workers. As such, it captures many (though certainly not all) of the concerns identified earlier. Ultimately, however it is defined, the concept of sustainable agriculture can function as a filter through which to screen decision-making to facilitate the transition to a more sustainable way of producing food. Perhaps most

7. Yongbo Liu et al., *Current Agricultural Practices Threaten Future Global Food Production*, 28 J AGRIC. & ENVTL. ETHICS 203, 211–12 (2015); McLeod-Kilmurray, *supra* note 5.

8. *World Agriculture Towards 2030/2050* 7, Agric. Dev. Econ. Division, U.N. Food & Agric. Org., ESA Working Paper No. 12-03, 2012, <http://www.fao.org/docrep/016/ap106e/ap106e.pdf> [<https://perma.cc/A6EA-SVME>].

9. See COMM’N ON SUSTAINABLE AGRIC. & CLIMATE CHANGE, *ACHIEVING FOOD SECURITY IN THE FACE OF CLIMATE CHANGE* (2015), <http://cgspace.cgiar.org/rest/bitstreams/15409/retrieve> [<https://perma.cc/396E-DCKQ>] (showing that without a global commitment to GHG emissions from all sectors, no amount of agricultural adaptation will be sufficient to stabilize the climate of the future).

10. CANADIAN AGRI-FOOD POL’Y INST., *ANALYSIS OF EG&S POLICY OPTIONS FOSTERING ADAPTATION OF CANADIAN FARMERS TO CLIMATE CHANGE AND DEVELOPMENT OF A DECISION-MAKING TOOL* iii (2010), http://capi-icpa.ca/pdfs/2011/CAP1_EG&S_English_final.pdf [<https://perma.cc/F393-BP89>].

11. SIMONS, *supra* note 2, at 5; see also Guy M. Robinson, *Canada’s Environmental Farm Plans: Transatlantic Perspectives on Agri-Environmental Schemes*, 172 GEOGRAPHIC J. 206, 206–07 (2006) (noting that agriculture in North America has remained primarily a model of food production, with mitigation of environmental impacts on the side, while the E.U. has seen a shift toward agricultural multi-functionality, rural development, and environmental stewardship); see also *infra* section I.A. (describing unsustainable agriculture as a “wicked problem”).

importantly, it is a doorway into a critical conversation about the future of food and the role of public policy in shaping that future.¹²

This paper evaluates Canada's federal¹³ agricultural policy framework to determine whether it enables sustainable agricultural food production.¹⁴ In particular, this paper assesses whether the current policy framework: (1) creates a high level vision and set of objectives which support sustainable food production; and (2) provides the kind of incentive structure needed by farmers to facilitate the transition to sustainable food production. Specifically, following the work of Iles and Marsh¹⁵ on Diversified Food Systems ("DFS"), this paper considers the extent to which federal agricultural policies: (1) support farmer capacity on ecologically sustainable farming practices; (2) create incentives for conservation on farm lands; (3) pay farmers to provide ecosystem services; and (4) support market access for sustainable farmers. This paper conducts its evaluation through the lens of change theory. This emphasizes the importance of creating a clear set of objectives at the federal level to guide change, rewarding the right behaviors and creating disincentives for undesirable behaviors in eliciting systemic change.¹⁶ This paper also relies upon Lessig's four modalities of regulation to inform the discussion of policy instruments.¹⁷

Based on a review of relevant literature and policies, the paper concludes that the government's central agricultural policy framework fails to establish the enabling vision and incentive structure needed to influence a systemic change in the sector toward sustainable farming. The policy framework is primarily geared toward helping the sector become more competitive, and gaining and maintaining market shares, through innovation, for instance. While there are some policies aimed at supporting environmentally sustainable farming practices (e.g., Environmental Farm Plans), there is no clear definition of sustainable agriculture in the Canadian context, nor are there high-level objectives aimed specifically at supporting a transition to sustainable agricultural food production in this country. As such, it is no surprise that the sector is not moving in that direction, except in small pockets of the country where there are motivated farmers and/or

12. Sam Kalen, *Agriculture, Food, and Environmental Policy*, 26 NAT. RESOURCES & ENV'T 3, 3 (2011).

13. While it is also important to evaluate whether there is a supportive legal and regulatory framework at all relevant levels of government, that is not the focus of this paper.

14. This paper focuses on sustainable farming for food production only.

15. Alastair Iles & Robin Marsh, *Nurturing Diversified Farming Systems in Industrialized Countries: How Public Policy Can Contribute*, 17 ECOLOGY AND SOC'Y 42-43 (2012).

16. SIMONS, *supra* note 2, at 60-61.

17. See *infra* note 29 and accompanying text.

niche markets to access (such as organic foods and/or local food movements).

The paper is structured as follows. Section I provides background and context, including: (a) an introduction to the theoretical framework applied; (b) a brief overview of agriculture in Canada, including its economic role and governance; and (c) a discussion of how sustainable agriculture is defined. This paper identifies DFS as the approach that best describes the normative vision for sustainable food production in Canada, and against which the paper evaluates Canada's agricultural policy framework. Section II includes: (a) a summary of the analytical framework (based on DFS) applied to evaluate the extent to which Canada's federal agricultural policy framework enables sustainable food production; (b) an examination of the extent to which the policy defines sustainable agriculture and identifies a high-level vision and set of objectives for achieving it; and (c) an evaluation of whether the policy framework includes measures to encourage farmers to shift to ecologically supportive farming practices, especially those that help farmers deal with additional costs associated with DFS. In Section III, this paper flags and discusses some examples of existing policies in Canada outside the current agricultural policy framework that could be reformed to support a shift to sustainable agriculture, and also incentive policies that have been used in other jurisdictions and/or analyzed in the literature. These policies could be further considered as potential measures to support the shift to sustainable agriculture in the Canadian context.

Before proceeding, the authors wish to acknowledge that this is a vast topic and there are many aspects of sustainable farming and agriculture that the paper does not cover. First, agriculture is a matter of shared federal and provincial/territorial jurisdiction in Canada, meaning that each sub-national jurisdiction has its own regulations and policies respecting farming. The paper does not cover these in any detail, nor does it address agriculture and food-related actions at the municipal level, but rather focuses on the role of the federal government. The reason for this is not only practical, but also because federal government policy sets the overall tone for agricultural policy in the country and invests considerable resources in agriculture every year. In addition, the central policy studied in this paper reflects provincial priorities and approaches since it is the product of federal-provincial negotiations. Second, while the paper does not focus on particular farming practices, it uses examples from land-based agricultural production. While much of the discussion is relevant to aquaculture, that subject merits its own treatment and is not adequately covered here. Third, while the paper does engage with some of the social aspects of sustainable farming in the first section, it focuses predominantly on the ecological aspects of sustainable farming. This is not to discount the importance of social

sustainability of farming, but rather a deliberate choice to provide a point of focus for the research. Fourth, the international dimension (particularly the nexus between global trade, investment rules, and agricultural policy) is important but not central to this paper's analysis.¹⁸ Finally, this paper focuses on the role of incentives in influencing sustainable farming rather than the broader regulatory framework. The authors justify this choice based on the historical role of agricultural support in the Organisation for Economic Co-operation and Development ("OECD") nations and the critical role of funding in influencing the shape of farming in a given jurisdiction.

I. BACKGROUND AND CONTEXT

A. *The "Wicked Problem" of Unsustainable Agriculture*

Many sustainability challenges have been characterized as "wicked problems" because they defy resolution due to the many interdependencies, uncertainties, circularities, and conflicting stakeholder interests engaged in finding solutions.¹⁹ While climate change, with its fundamental links to energy policy and virtually every part of the economy, may be the quintessential "wicked problem,"²⁰ unsustainable agriculture in our view merits the moniker as well.²¹

Part of what makes agriculture a "wicked problem" is that many of the environmental and social costs of farming are externalized, meaning that farmers (and ultimately the consumers of the food they produce) need not take these costs into account in their decisions.²² The challenge of

18. U.N. ENVIRONMENTAL PROGRAMME, TRADE AND ENVIRONMENT BRIEFINGS: SUSTAINABLE AGRICULTURE 2 (2012), http://www.unep.org/greenconomy/Portals/88/documents/research_products/PolicyBriefs/sustainable_agriculture.pdf [<https://perma.cc/377F-DBMC>].

19. Horst W.J. Rittel & Melvin M. Webber, *Dilemmas in a General Theory of Planning*, 4 POL. SCI. 155, 160 (1973); Kelly Levinet al., *Overcoming the Tragedy of Super Wicked Problems: Constraining Our Future Selves to Ameliorate Global Climate Change*, 45 POL'Y SCIS. 123, 124 (2012).

20. *Id.* For a discussion of the "super wicked" problem of climate change (including a description and references to foundational literature on "wicked problems"). See generally Richard Lazarus, *Super Wicked Problems and Climate Change: Restraining the Present to Liberate the Future*, 94 CORNELL L. REV. 1153 (2009); Kelly Levin et al., *Overcoming the Tragedy of Super Wicked Problems: Constraining our Future Selves to Ameliorate Global Climate Change*, 45 POL'Y SCIS. 123 (2012).

21. Henk C. van Latesteijn & Rudy Rabbinge, *Wicked Problems in Sustainable Agriculture and Food Security: The TransForum Experience*, 15 INT'L FOOD & AGRIBUSINESS MGMT. REV. 89 (2012); Domenico Dentoni et al., *Managing Wicked Problems in Agribusiness: The Role of Multi-Stakeholder Engagements in Value Creation*, 15 INT'L FOOD & AGRIBUSINESS MGMT. REV. 1, 2 (2012).

22. Sandra S. Batie, *Wicked Problems and Applied Economics*, 90 AMER. J. AGRIC. ECON. 1176, 1176 (2008).

externalized costs is one of the characteristics of many “wicked” environmental problems. To the extent that society desires a shift toward sustainable farming, those costs must either be internalized by farmers (a serious challenge given the already low average incomes of many farmers), paid by consumers (through prices or taxation, for instance), or incentives must be granted to farmers to encourage them to reduce their ecological footprints. While some might balk at the idea of devoting public resources to such incentives, research shows that doing this generates a number of co-benefits, such as reduced healthcare spending, and is ultimately cost-effective for governments.²³ Incentives to encourage the internalization of environmental costs also serve to counteract other government incentive structures, which work against a shift toward sustainability (such as subsidies not linked to sustainability criteria).

Creating effective policies to treat “wicked problems” is no simple task since there is no single formula and the problems are linked to other issues at different scales (temporal and geographical).²⁴ For instance, agricultural issues are linked to economic development, rural development, labor markets, health and safety, trade and export policies, technology, and more. Compounding factors might include the rapid rate of change (for instance, in technology or markets), the engagement of multiple actors at different levels, and the juxtaposition of short-term economic or political gains over long-term objectives.²⁵ While not the sole or necessarily even the key factor for change, public policy choices play an important role in shifting behavior in a particular direction.²⁶

How to influence behavior, and the role of public policy in doing so, is an age-old question that is increasingly relevant in the context of “wicked problems.” This question generates much debate in the literature from different fields and schools of thought. One of the debates (within law and

23. J.C. BOLLEN ET AL., CO-BENEFITS OF CLIMATE POLICY, NETHERLANDS ENVIRONMENTAL ASSESSMENT AGENCY No. 5001 1 6005, 1, 5, 12, 14–15 (2009).

24. Steve Rayner, *Wicked Problems: Clumsy Solutions*, First Jack Beale Memorial Lecture, University of New South Wales, Sydney, Australia (2006); GWYN PRINS, ET AL., THE HARTWELL PAPER: A NEW DIRECTION FOR CLIMATE POLICY AFTER THE CRASH OF 2009 7–15 (Univ. of Oxford et al. eds., 2010); Don Lenihan, *When the Policy Process Goes Public: Think Tanks in the Age of Complexity*, POL’Y OPTIONS (2011), <http://policyoptions.irpp.org/issues/canada-us-conversations-and-relations/when-the-policy-process-goes-public-think-tanks-in-the-age-of-complexity/> [https://perma.cc/JUP6-2DKF].

25. KELLY LEVIN, PLAYING IT FORWARD: PATH DEPENDENCY, PROGRESSIVE INCREMENTALISM, AND THE “SUPER WICKED” PROBLEM OF CLIMATE CHANGE 1 (2009), https://www.researchgate.net/publication/237442530_Playing_it_forward_Path_dependency_progressive_incrementalism_and_the_Super_Wicked_problem_of_global_climate_change [https://perma.cc/8SFF-AJZH].

26. FRANK R. BAUMGARTNER & BRYAN D. JONES, POSITIVE AND NEGATIVE FEEDBACK IN POLITICS, IN POLICY DYNAMICS 20 (FRANK R. BAUMGARTNER & BRYAN D. JONES EDS. 2002).

economics) focuses on the choice of policy instrument, particularly the relative importance of law versus market-based approaches.²⁷ This has been partly driven by the interest in the notion of externalities. Within this debate, economists from the “Old Chicago School” of thought have critiqued traditional legal instruments, such as “command and control” style laws, as being inefficient as compared to economic instruments, such as taxes or cap-and-trade systems.²⁸ In contrast, Lawrence Lessig posits that behavior is influenced by four types of constraints that together regulate behavior: law, social norms, markets, and architecture.²⁹ Described as the “New Chicago School,” Lessig argues that all four modalities influence behavior, but that law plays a central role not only by regulating behavior directly, but also by regulating the other three modalities.³⁰

Lessig argues that modern regulations are a mix of direct and indirect regulation by law, which implicate the other modalities.³¹ Consider the example of smoking: the law can be used directly to ban certain behaviors (e.g., smoking bans in particular areas), but the law can also regulate the market (e.g., introducing taxes on cigarettes), social norms (e.g., by funding public ad campaigns targeting smoking), and the architecture of cigarettes (e.g., regulating levels of nicotine in cigarettes).³²

Regardless of whether policies are influencing behavior directly, they are central to any process of transformative change because once locked-in, they can, *inter alia*, create path dependencies, administrative bias, and self-reinforcing incentives.³³ Especially in the case of “wicked problems,” social and economic networks develop around particular approaches, entrenching the status quo.³⁴ In addition, policy makers tend to rely upon familiar,

27. See William M. Landes, *The Empirical Side of Law and Economics*, 70 U. CHIC. L. REV. 167, 167 (2003) (describing the importance of economics in law); see also U.N. ENVTL. PROGRAMME, GUIDELINES ON THE USE OF MARKET-BASED INSTRUMENT TO ADDRESS THE PROBLEM OF MARINE LITTER 7 (2009).

28. See, e.g., A. Lans Bovenberg & Lawrence H. Goulder, *Environmental Taxation and Regulation*, in HANDBOOK OF PUBLIC ECONOMICS 1471, 1475–76, 1513, 1524 (Alan J. Auerbach & Martin Feldstein, eds., 2002) (discussing how taxes can be used to achieve the goals of environmental protection).

29. Lawrence Lessig, *The New Chicago School*, 27 J. LEGAL STUD. 661, 662 (1998).

30. *Id.*

31. *Id.* at 667.

32. Cass R. Sunstein, *Social Norms and Social Roles*, 96 COLUM. L. REV. 903 (1996); see Sarah B. Schindler, *Banning Lawns*, 82 GEO. WASH. L. REV. 394, 417 (2014) (applying Lessig’s four modalities of regulation in the context of lawn maintenance).

33. Paul Pierson, *When Effect Becomes Cause: Policy Feedback and Political Change*, 45 WORLD POL. 595, 609–11 (1993) (describing that path dependency refers to the phenomenon that occurs when decisions (by government, for instance) set a system on a particular path, which limits future options); LEVIN, *supra* note 25.

34. Pierson, *supra* note 33.

existing approaches, creating an additional hurdle for more innovative, alternative policies.³⁵

High-level policies such as the Federal-Provincial-Territorial Multilateral Framework Agreement on agriculture known as “Growing Forward 2” (“GF2”) are central in shaping the policy direction for the agricultural sector. The approach taken in GF2 (discussed in detail in section II) was undoubtedly shaped by its predecessor, Growing Forward 1.³⁶ However, each new intergovernmental negotiation and subsequent agreement offers an opportunity to shift the policy framework and influence behavior. The paper returns to this policy and analyzes its role in supporting the transition to sustainable agriculture in Section II. However, the paper first provides an overview of the agricultural sector in Canada.

B. A Brief Overview of Agriculture in Canada

Since colonization,³⁷ agriculture has been an essential element of the Canadian identity, not to mention its economy. Canada used agriculture to attract workers and farmers to lands³⁸ that had yet to be commercially exploited, as a key to Western expansion.³⁹ The interest of the Canadian government in supporting agriculture as a key element of the Canadian economy persists, as evidenced by the market-driven and growth-oriented focus of the current agricultural policies of the federal government. In fact, the goals of competitiveness, efficiency, and growth have been at the heart of Canadian agricultural policy for many decades.⁴⁰ Many have criticized

35. PRINS ET AL., *supra* note 24, at 19–21.

36. Growing Forward: A Federal–Provincial–Territorial Framework Agreement on Agriculture, Agri-Food and Agri-Based Products Policy, 2003 (Can.).

37. Indigenous approaches to sustainability are very informative, but beyond the scope of this particular paper.

38. W.H. MCCONNELL, COMMENTARY ON THE BRITISH NORTH AMERICA ACT 304 (1997).

39. Richard Simeon & Martin Papillon, *Canada*, in 2 A GLOBAL DIALOGUE ON FEDERALISM: DISTRIBUTION OF POWERS AND RESPONSIBILITIES IN FEDERAL COUNTRIES 91, 107–08 (John Kincaid ed., 2006); Parsons observes that agriculture was already commercialized in Europe and “this new commercial agriculture diffused rapidly to the areas of overseas colonization including Canada where most agricultural settlement by Europeans was market-oriented from the start.” Helen E. Parsons, *Regional Trends of Agricultural Restructuring in Canada*, 22 CANADIAN J. REG’L SCI. 343 (1999), <http://cjrs-rcsr.org/archives/22-3/Parson.pdf> [<https://perma.cc/RC5L-WDJT>]. The AAFC website states that “[t]he Department of Agriculture and Agri-Food Canada was created in 1868 – one year after Confederation – because of the importance of agriculture to the economic, social and cultural development of Canada.” 2015-2016 Report on Plans and Priorities, AGRIC. & AGRI-FOOD CAN., <http://www.agr.gc.ca/eng/about-us/planning-and-reporting/reports-on-plans-and-priorities/2015-16-report-on-plans-and-priorities/?id=1422918881954#mm> [<https://perma.cc/RW6V-KHNY>] (last updated Aug. 08, 2015).

40. Simeon & Papillon, *supra* note 39, at 107–08; ARGIC. CAN., CHALLENGE FOR GROWTH: AN AGRI-FOOD STRATEGY FOR CANADA (1981); DAVID SPARLING & SHELLY THOMPSON, THE

this trajectory toward industrialization, arguing that it moves Canadian agriculture in the opposite direction from sustainability.⁴¹

The Canadian agriculture and agri-food system⁴² (“AAFS”) is described by the federal government as “a modern, complex, integrated, competitive supply chain [important] to the Canadian economy.”⁴³ In 2013, the AAFS generated \$106.9 billion, accounting for 6.7% of Canada’s GDP and employing 2.2 million people (providing one in eight jobs in Canada).⁴⁴ The sector’s contribution to GDP has increased every year since 2007 (with the exception of the recessionary 2009).⁴⁵ Canada also has a central role in international agriculture, as the sixth-largest agricultural importer and the fifth-largest agriculture exporter in 2013.⁴⁶ In fact, half of the value of primary agricultural production in Canada is exported.⁴⁷ While Canadian farmers produce a variety of products, grains and oilseeds represented 40% of the value of all farm receipts in 2013.⁴⁸ Indeed, Canada is the largest global producer of flaxseed, canola, pulses, and durum wheat.⁴⁹ In 2011, 41.6% of the farms in Canada were livestock-based farms, as compared to 58.4% which were crop-based.⁵⁰

Agricultural production in Canada is also becoming more concentrated. The number of farms in Canada has decreased over the last few decades, with 280,043 farms in 1991 as compared to 205,730 in 2011.⁵¹ During the same period, the average farm size has increased (from 598 in 1991 to 778

CANADIAN AGRI-FOOD POLICY INSTITUTE, COMPETITIVENESS OF THE CANADIAN AGRI-FOOD SECTOR 4 (2011).

41. DARRIN QUALMAN & FRED TAIT, CANADIAN CTR. FOR POL’Y ALTS., *THE FARM CRISIS, BIGGER FARMS AND THE MYTHS OF ‘COMPETITION’ AND ‘EFFICIENCY’* 7 (2004), https://www.policyalternatives.ca/sites/default/files/uploads/publications/National_Office_Pubs/farm_crisis2004.pdf [<https://perma.cc/CND4-D9YR>].

42. Defined by AAFC as “a complex and integrated supply chain that includes input and service suppliers, primary producers, food and beverage processors, food retailers and wholesalers, and foodservice providers.” AGRIC. AND AGRI-FOOD CAN., *An Overview of the Canadian Agriculture and Agri-Food System 2015*, <http://www.agr.gc.ca/eng/about-us/publications/economic-publications/alphabetical-listing/an-overview-of-the-canadian-agriculture-and-agri-food-system-2015/?id=1428439111783> [<https://perma.cc/9FQ2-RPEX>] (last updated Aug. 8, 2015).

43. *Id.*

44. *Id.*

45. *Id.*

46. *Id.*

47. *Id.*

48. *Id.*

49. *Id.*

50. *Snapshot of Canadian Agriculture*, STATISTICS CAN. (2012), <http://www.statcan.gc.ca/pub/95-640-x/2011001/p1/p1-01-eng.htm#II> [<https://perma.cc/3F7L-NL52>].

51. Similarly, the number of farm operators decreased from 390,875 to 293,925 in 2011. *Id.*

acres in 2011).⁵² This concentration has not led to lower operating costs, as agricultural operating costs increased by 40% over the 2003–2013 period.⁵³

Interestingly, the federal government measures the contribution of AAFS to the Canadian economy “by its share of gross domestic product and employment” plus “government expenditures in support of”⁵⁴ the system. It does not yet take a sustainability approach of measuring the full costs and benefits—economic, environmental and social (and also interlinking costs and benefits)—of this sector of activity. Doing so would likely yield a very different picture of the sector.

1. Federal Governance of Agriculture

Federal responsibility for agriculture is located in the department of Agriculture and Agri-food,⁵⁵ and governed by numerous policies, acts and regulations,⁵⁶ and linked institutions, such as the Canadian Food Inspection Agency,⁵⁷ the Canadian Dairy Commission,⁵⁸ and the Canadian Wheat

52. *Id.*

53. AGRIC. & AGRI-FOOD CAN., *supra* note 42.

54. These government expenditures include investment in research, costs of inspection and program payments. For example, the federal government invested approximately \$602 million in AAFS research and development in 2012–13. *Id.*

55. Department of Agriculture and Agri-Food Act, R.S.C. 1985, c A-9.

56. *See, e.g.*, Agricultural Products Marketing Act, R.S.C. 1985, c A-6 (providing for the marketing of agricultural products in interprovincial and export trade); Animal Pedigree Act, R.S.C. 1985, c 8 (4th Supp.) (respecting animal pedigree associations); Canada Grain Act, R.S.C. 1985, c G-10 (respecting grain); Canadian Agricultural Loans Act, R.S.C. 1985, c 25 (3rd Supp.) (increasing the availability of loans for the purpose of the establishment, improvement, and development of farms and the processing, distribution, or marketing of the products of farming by cooperative associations); Experimental Farm Stations Act, R.S.C. 1985, c E-16 (respecting experimental farm stations); Farm Debt Mediation Act, S.C. 1997, c 21 (Can.) (providing for mediation between insolvent farmers and their creditors); Farm Income Protection Act, S.C. 1991, c 22 (Can.) (authorizing agreements between the government of Canada and the provinces to provide for protection for the income of producers of agricultural products and to enable the government of Canada to take additional measures for that purpose); Farm Improvement Loans Act, R.S.C. 1985, c F-3 (encouraging the provision of intermediate term and short term credit to farmers for the improvement and development of farms and for the improvement and living conditions thereon); Marketing Freedom for Grain Farmers Act, S.C. 2011, c 25 (Can.) (reorganizing the Canadian Wheat Board and making consequential and related amendments to certain Acts); Prairie Farm Rehabilitation Act, R.S.C. 1985, c P-17 (providing for the rehabilitation of drought and soil drifting areas in the Provinces of Manitoba, Saskatchewan, and Alberta); Agricultural Growth Act Bill C-18 (arising from the Growing forward policies 1 and 2, amending certain Acts relating to agriculture and agri-food).

57. Canadian Food Inspection Agency Act S.C. 1997, c. 6, (which is responsible for another suite of legislation); Agriculture and Agri-Food Administrative Monetary Penalties Act, S.C. 1995, c. 40; Canada Agricultural Products Act, R.S.C. 1985, c. 20 (4th Supp.); Consumer Packaging and Labelling Act, R.S.C. 1985, c. C-38; Feeds Act, R.S.C. 1985, c. F-9; Fertilizers Act, R.S.C. 1985, c. F-10; Fish Inspection Act, R.S.C. 1985, c. F-12; Food and Drugs Act, R.S.C. 1985, c. F-27; Health of Animals Act, S.C. 1990, c. 21; Meat Inspection Act, R.S.C. 1985, c. 25 (1st Supp.); Pest Control Products Act, S.C. 2002, c. 28; Plant Breeders' Rights Act, S.C. 1990, c. 20; Plant Protection Act, S.C. 1990, c. 22; Safe Food for Canadians Act, S.C. 2012, c. 24; Seeds Act, R.S.C. 1985, c. S-8.

Board, among others.⁵⁹ A plethora of similar institutions exist at the provincial and territorial level, and there are also relevant actors at the municipal level.⁶⁰ There has been criticism that this dispersal of responsibility among so many institutions and jurisdictions, and the related challenge of effective coordination among so many players, presents a significant challenge to a sustainable food policy in Canada.⁶¹

Included among the various tasks assigned to these federal AAFS institutions is the regulation and governance of genetically modified (“GM”) organisms, a key element in agriculture domestically and controversial in terms of exporting Canadian agricultural products abroad. The federal government strongly supports and actively advocates in favor of GM crops,⁶² as clearly demonstrated in the WTO dispute between the U.S. and the E.U., in which Canada and Argentina support the U.S. stance in favor of GMOs.⁶³ The role of GM crops in sustainable agriculture remains subject to debate.

C. What Is Sustainable Agriculture?

1. Why Sustainable Agriculture?

The impetus to define and create policy in favor of sustainable agriculture comes, of course, from the fact that conventional agriculture has become unsustainable. For instance, farming practices can have significant environmental impacts, creating a major source of water pollution⁶⁴ and

58. Canadian Dairy Commission Act, R.S.C. 1985, c C-15.

59. Canadian Wheat Board (Interim Operations) Act, S.C. 2011, c 25, S-14 (Can.); *see also* the Canada Agricultural Review Tribunal (created by Canada Agricultural Act 1983); the Canadian Grain Commission (created by Canada Grain Act, R.S.C. 1985, c G-10), the Farm Products Council of Canada (created by Farm Products Agencies Act, R.S.C. 1985, c F-4) and Farm Credit Canada (created by Farm Credit Canada Act, S.C. 1993, c 14 (Can.)).

60. ROD MCRAE & KENDAL DONAHUE, MUNICIPAL FOOD POLICY ENTREPRENEURS: A PRELIMINARY ANALYSIS OF HOW CANADIAN CITIES AND REGIONAL DISTRICTS ARE INVOLVED IN FOOD SYSTEM CHANGE 2 (2013), <http://tfpc.to/wordpress/wp-content/uploads/2013/05/Report-May30-FINAL.pdf> [<https://perma.cc/R3TT-GPRU>].

61. Rod McRae, *A Joined-Up Food Policy for Canada*, 6 J. HUNGER & ENVTL. NUTRITION 424, 429 (2011).

62. Heather McLeod-Kilmurray, *An Ecofeminist Legal Critique of Canadian Environmental Law: The Case Study of Genetically Modified Foods*, 26 WINDSOR REV. LEGAL & SOC. ISSUES 129, 152 (2008).

63. *Dispute Settlement: Dispute DS291, European Communities – Measures Affecting the Approval and Marketing of Biotech Products*, WORLD TRADE ORG., https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds291_e.htm [<https://perma.cc/U7HM-8FQU>] (last visited Mar. 3, 2016).

64. Agriculture is the most important single contributor to water pollution in the United States. Christopher B Connard, *Sustaining Agriculture: An Examination of Current Legislation*

contributing to soil erosion, reduced soil quality, biodiversity loss through habitat fragmentation and degradation, and emissions of GHGs.⁶⁵ Sustainable farming practices aim to reduce these impacts by taking steps such as reducing the use of pesticides, herbicides and/or fertilizers, limiting soil erosion and water runoff, and improving soil quality, among other things.⁶⁶

In recent decades, agriculture has become increasingly industrialized and globalized. Indeed, Weis states that

[a]gricultural systems in the [U.S.] and Canada are the most industrialized in the world. Defining characteristics of this system of industrial agriculture include massive machinery, heavy use of inputs, the predominance of monocultures, large populations of intensively reared livestock, exceptionally high levels of per farmer productivity, the disarticulation of agriculture from local communities, the control of agricultural inputs and outputs by large transnational corporations (TNCs), and the illusion of diversity in supermarkets and other retail outlets.⁶⁷

Parsons notes that this agricultural industrialization or agricultural restructuring began in Canada (and other countries) after the Second World War.⁶⁸ She observes that the increasingly global nature of the food system has involved an increase in agribusinesses, which are international in scale, and this has led to specialization and intensiveness of agriculture, which forces out small farmers and increases concentration in these large businesses.⁶⁹ For example, in 1991, there were 55.1% fewer farms in Canada than in 1951, and 79.3% fewer farm people, while the average farm size in the three prairie provinces, for example, grew 93% in that same period.⁷⁰ “With the restructuring of the post-war period, agriculture has

Promoting Sustainable Agriculture as an Alternative to Conventional Farming Practices, 13 PENN. ST. ENVTL. L. REV. 125, 125 (2004).

65. See generally J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 *ECOLOGY L.Q.* 263 (2000) (arguing that environmental law has given farmers the license to create substantial environmental harms).

66. See Nathaniel D. Mueller et al., *Closing Yield Gaps Through Nutrient and Water Management*, 490 *NATURE* 254, 254–55 (2012) (suggesting that reducing nutrient overuse offers a significant opportunity to reduce the environmental impact of agriculture while still slowing some increase in production).

67. Tony Weis, *Breadbasket Contradictions: The Unstable Bounty of Industrial Agriculture in the US and Canada*, in *FOOD SECURITY, NUTRITION AND SUSTAINABILITY* 27 (Geoffrey Lawrence et al. eds., 2010).

68. Parsons, *supra* note 39, at 343.

69. *Id.* at 343–44.

70. *Id.* at 350–51.

changed from a way of life and a part of the community to a large-scale, specialized, intensive business undertaking.”⁷¹

The emphasis of industrial agriculture is on increasing yield at lower cost on less land, translating into larger operations, less crop diversity and greater use of chemical inputs and GM varieties.⁷² As such, the environmental impact of industrial agriculture is significant, and includes water pollution, destruction of biodiversity, soil degradation, human health impacts via toxic exposures to pesticides and herbicides, and increased disease outbreaks.⁷³ These environmental impacts take an economic toll. One study estimates that pesticide use in the U.S. caused up to \$10 billion of damage to humans and ecosystems.⁷⁴ Socially, industrialized monocultures have made it difficult for small family farms to remain competitive.⁷⁵ Weis argues that agrisubsidies have played an important role in increasing concentration of farm power⁷⁶ and the resulting changes toward unsustainable practices.

2. Definitions

What, then, is sustainable agriculture? There is no single, simple definition, and care must be taken to appreciate its many nuances and not to romanticize the concept. Any definition of “sustainable agriculture” will depend on the scope of the definition and the kinds of practices that are determined to be sustainable. For instance, regarding practices, some argue that local food production is more sustainable because it supports local farming communities and reduces GHGs and other impacts of transporting food over long distances. Others argue that conventionally produced local produce is often less sustainable than organically farmed produce from

71. BRONWEN WILLIAMS, IS CANADA ‘FOOD SECURE’? THE GLOBALIZATION, INDUSTRIALIZATION AND CORPORATIZATION OF THE CANADIAN FOOD SYSTEM, <http://www5.agr.gc.ca/resources/prod/doc/pol/consult/miss/pdf/i92.pdf> [https://perma.cc/EG4H-JQ2D] (last visited Mar. 3, 2016); Parsons, *supra* note 39, at 354–55.

72. See Heather McLeod-Kilmurray, *Vegetarianism and Food Governance: Sustainability and Ecological Justice*, in GLOBALIZATION AND ECOLOGICAL INTEGRITY IN SCIENCE AND INTERNATIONAL LAW 57 (Laura Westra et al. eds., 2011).

73. Industrial agriculture has led to an eight-fold increase in nitrogen use, a three-fold increase in phosphorus use, and an eleven-fold increase in the production of pesticides. David Tilman et al., *Forecasting Agriculturally Driven Global Environmental Change*, 292 SCI. 281, 284–85 (2001).

74. David Pimentel, *Environmental and Economic Costs of the Application of Pesticides Primarily in the United States*, 7 ENV’T., DEV. & SUSTAINABILITY 229 (2005).

75. ERIC HOLT-GIMÉNEZ, CAMPESINO A CAMPESINO: VOICES FROM LATIN AMERICA’S FARMER TO FARMER MOVEMENT FOR SUSTAINABLE AGRICULTURE (2006); see also Weis, *supra* note 67, at 33 (“Only 2 percent of economically active people in the US and Canada are now employed in agriculture.”).

76. Weis, *supra* note 67, at 33.

further afield.⁷⁷ With respect to scope, “sustainable agriculture” can be defined to include both food production (on-farm practices) and harvesting, which includes wild food harvesting, production of fiber (e.g., timber or cotton), and bioenergy crops.⁷⁸ It can also extend to the processing and distribution of food and other agriculture products.⁷⁹ The scope of sustainable agriculture could even extend to consumption practices, thereby linking to issues of waste, nutrition, and human health.⁸⁰

There has been much written about the conceptualization of sustainable agriculture that reflects diverse views and approaches. Jason Czarnezki gathers several defined terms that are useful in conceptualizing what can be meant by sustainable agriculture and food production, with each term offering a different point of focus.⁸¹ “Civic agriculture,” for instance, “embodies a commitment to developing and strengthening an economically, environmentally, and socially sustainable system of agriculture and food production that relies on local resources and serves local markets and consumers.”⁸² An “alternative food system” refers to a system that incorporates organic foods, eco-labeled foods, direct marketing, fair trade, local foods, farmers markets, and buying clubs.⁸³ A third is “new agriculture,” which aims to keep families on farms, create new farms, implement initiatives to make environmentally friendly farms more profitable, create jobs, and support local foods and local food systems.⁸⁴ Each of these concepts emphasizes a different element of sustainable agriculture, yet the common thread is that sustainable agriculture is aimed at ensuring that agricultural practices are environmentally, socially, and economically sustainable.

There is no explicit federal definition of “sustainable agriculture” in Canada. None of the legislation administered by Agriculture and Agri-Food Canada (“AAFC”) refers to or offers a definition of “sustainable agriculture.” Perhaps this is not surprising, given that (as will be shown in Section II) AAFC’s dominant focus is on income stabilization and

77. Branden Born & Mark Purcell, *Avoiding the Local Trap: Scale and Food Systems in Planning Research*, 26 J. PLAN. EDUC. & RES. 195, 204 (2006).

78. *What We Do*, FOOD SECURE CAN., <http://foodsecurecanada.org/who-we-are/what-we-do> [https://perma.cc/XY6-BY2Y] (last visited Mar. 3, 2016).

79. *Id.*

80. There is a related discussion about the definition of a sustainable food policy, which we explore in related research. FEIBAUER ET AL., SUSTAINABLE FOOD CONSUMPTION AND PRODUCTION IN A RESOURCE-CONSTRAINED WORLD, 3RD SCAR FORESIGHT EXERCISE 1, 9–10 (2011).

81. Jason J. Czarnezki, *Food, Law & the Environment: Informational and Structural Changes for a Sustainable Food System*, 31 UTAH ENVTL. L. REV. 263, 265–66, 282–83 (2011).

82. THE FIGHT OVER FOOD: PRODUCERS, CONSUMERS, AND ACTIVISTS CHALLENGE THE GLOBAL FOOD SYSTEM 5–6 (Wynne Wright & Gerad Middendorf eds., 2008).

83. Czarnezki, *supra* note 81, at 265.

84. *Id.* at 265–66.

competitiveness. As discussed below, the majority of the department's resources are allocated to business risk management programs and commercialization projects.⁸⁵

In contrast, "sustainable agriculture" is defined in legislation in the U.S. "Sustainable agriculture" means an integrated system of plant and animal production practices having a site-specific application that will over the long-term:

- satisfy human food and fiber needs;
- enhance environmental quality and the natural resource base upon which the agriculture economy depends;
- make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;
- sustain the economic viability of farm operations; and
- enhance the quality of life for farmers and society as a whole.⁸⁶

While the definition remains high-level and aspirational, it includes the environmental, social, and economic elements of sustainability.⁸⁷

85. In the 2011-2012 fiscal year, business risk management programs cost \$1.412 billion, an estimated 36% of total federal government expenditures in the sector. Research and inspection programs were estimated to be 20% of total expenditures. Programs directly focused on environmental sustainability received \$84 million or 3.4% of departmental spending. AGRIC & AGRI-FOOD CAN., 2011-2012 DEPARTMENTAL PERFORMANCE REPORT (Aug. 11, 2015); AGRICULTURE AND AGRI-FOOD CAN., AN OVERVIEW OF THE CANADIAN AGRICULTURE AND AGRI-FOOD SYSTEM 155 (2013), <http://www.agr.gc.ca/eng/about-us/publications/economic-publications/alphabetical-listing/an-overview-of-the-canadian-agriculture-and-agri-food-system-2015/?id=1428439111783> [<https://perma.cc/5FSN-ZTR9>].

86. *Sustainable Agriculture*, U.S. DEP'T OF AGRIC., <http://nifa.usda.gov/topic/sustainable-agriculture> [<https://perma.cc/K7AM-NSX9>] (last visited Mar. 3, 2016). According to USDA, sustainable agriculture "was addressed by Congress in the 1990 'Farm Bill' [Food, Agriculture, Conservation, and Trade Act of 1990 (FACTA), Public Law 101-624, Title XVI, Subtitle A, Section 1603 (Government Printing Office, Washington, DC, 1990)]." Mary Gold, *Sustainable Agriculture: Definitions and Terms*, U.S. DEP'T OF AGRIC., NAT'L ARGIC. LIBRARY (Aug. 2007), <http://afsic.nal.usda.gov/sustainable-agriculture-definitions-and-terms-1> [<https://perma.cc/P534-5KUA>].

87. Many other jurisdictions, organizations and scholars have defined "sustainable agriculture": *see, e.g.*, PARLIAMENTARY COMM'R FOR THE ENV'T, GROWING FOR GOOD: INTENSIVE FARMING, SUSTAINABILITY AND NEW ZEALAND'S ENVIRONMENT 26 (2004), <http://www.pce.parliament.nz/media/pdfs/Growing-for-Good.pdf> [<https://perma.cc/A298-NNEV>]; AUSTL. DEP'T OF AGRIC. & FOOD, REPORT CARD ON SUSTAINABLE NATURAL RESOURCE USE IN AGRICULTURE: STATUS AND TREND IN THE AGRICULTURAL AREAS OF THE SOUTH-WEST OF WESTERN AUSTRALIA (2013) <https://www.agric.wa.gov.au/sites/gateway/files/Summary.pdf> [<https://perma.cc/QJT7-FDEE>]; EUROPEAN COMM'N, SUSTAINABLE AGRICULTURE FOR THE FUTURE WE WANT 2-3 (2012) http://ec.europa.eu/agriculture/events/2012/rio-side-event/brochure_en.pdf [<https://perma.cc/D9W9-EBET>]; SOLON L. BARRACLOUGH, MEANINGS OF SUSTAINABLE AGRICULTURE: SOME ISSUES FOR THE SOUTH 9 (2000); Stephen R. Gliessman, *Agroecology and Agroecosystems*, in THE EARTHSCAN READER IN SUSTAINABLE AGRICULTURE 104, 105-06 (Jules Pretty ed., 2005).

John Ikerd offers a similar tripartite definition of “sustainable agriculture” and adds that “these three dimensions of sustainability are inseparable, and thus, are equally critical to long run sustainability.”⁸⁸ While this three-pronged approach is arguably the most common way in which “sustainability”⁸⁹ is described, others take a different view. Klaus Bosselmann and others have eloquently argued that sustainability organizes hierarchically, with ecological integrity at the heart of sustainability.⁹⁰ The argument is that ecological integrity underpins economic activity and social well-being, and as such we should avoid balancing exercises between economic, social, and environmental goals.⁹¹ Rather, economic and social well-being are the output of a healthy biosphere and priority should be accorded to maintaining the biosphere.⁹² In the context of sustainable agriculture, this would entail a focus on maintaining healthy soils, water cycles, and biodiversity on agricultural lands, which would in turn support a vibrant agricultural economy and rural livelihoods.

While we accept that there is no consensus within the literature on how “sustainability” should be defined and implemented (this is a much larger discussion than permitted by the scope of this paper), and that there is merit in considering ecological, social, and economic dimensions of sustainability in an integrated fashion, we agree with Bosselmann and others that ecological integrity is not only an essential element of sustainability, but a pre-condition. In the context of agriculture, an emphasis on ecological integrity is warranted in order to ensure the long-term social and economic viability of farming.

Focusing on the ecological component of sustainable agriculture means inquiring into production that maintains—ideally even enhances—the quality of the land, air, and water.⁹³ Such practices conserve, protect and regenerate resources so that they are resilient to unpredictable climate and other conditions.⁹⁴ Some of the key on-farm practices that are widely

88. John Ikerd, *Understanding and Managing the Multi-Dimensions of Sustainable Agriculture*, U. MO. (1996), <http://web.missouri.edu/ikerdj/papers/NC-MULTD.htm> [<https://perma.cc/JJV7-GT64>].

89. For more on sustainability theory, see JOHN C. DERNBACH, *ACTING AS IF TOMORROW MATTERS: ACCELERATING THE TRANSITION TO SUSTAINABILITY* (2012) and Bill Hopwood et al., *Sustainable Development: Mapping Different Approaches*, 13 *SUST. DEV.* 38 (2005), among many others.

90. KLAUS BOSSELMANN, *THE PRINCIPLE OF SUSTAINABILITY: TRANSFORMING LAW AND GOVERNANCE* (2008).

91. *Id.* at 75.

92. *Id.* at 75–76.

93. *What Is Sustainable Agriculture?*, U.C. DAVIS AGRIC. SUSTAINABILITY INST., <http://asi.ucdavis.edu/programs/sarep/about/what-is-sustainable-agriculture> [<https://perma.cc/6QT8-ZGDM>] (last visited Feb. 8, 2016).

94. Connard, *supra* note 64, at 136.

considered to contribute to maintaining ecological integrity in crop farming include rotating crops and using cover crops, applying integrated pest management, modifying tillage practices, using riparian buffer zones, improving efficiency of water use for irrigation, rotational grazing, effective nutrient management, and improved soil fertility.⁹⁵

The emphasis on ecological integrity in sustainable farming is reflected in the approach of DFS, described by Kremen et al. as “a systems-based alternative to modern industrial agriculture designed according to agroecological principles.”⁹⁶ DFS emphasizes “local production, local and agroecological knowledge and whole systems approaches” in order to reduce environmental impacts and decrease the social costs associated with industrial agriculture.⁹⁷ While DFS shares many of the features of sustainable agriculture, it emphasizes farming practices that support functional biodiversity across spatial and temporal scales.⁹⁸ As such, DFS supplies the necessary ecosystem properties needed to provide critical inputs to agriculture (such as the ecosystem services of nutrient cycling and pollination).⁹⁹

We find the concept of DFS (with its emphasis on whole systems and the ecological conditions required to support farming over the long-term) to be most closely aligned with Bosselmann’s approach. Thus, we used it as the lens through which to analyze the Canadian agricultural policy framework. While the social and economic elements of sustainable agriculture are also vital, and highly interrelated with ecological aspects, in this paper we have evaluated the extent to which the Canadian policy framework encourages ecological integrity in farming practices. We recognize this is only a first step, and encourage future research on defining an effective policy framework for transitioning to ecological, social, and economically sustainable farming practices. For ease of writing, we have continued to use the terms “sustainable agriculture” and “sustainable farming practices” in this paper.

II. ANALYSIS OF THE CANADIAN AGRICULTURAL POLICY FRAMEWORK

95. *Id.* (citing James S. Carpenter, *Farm Chemicals, Soil Erosion, and Sustainable Agriculture*, 13 STAN. ENVTL. L.J. 190 (1994)).

96. Claire Kremen et al., *Diversified Farming Systems: An Agroecological, Systems-based Alternative to Modern Industrial Agriculture*, 17 ECOLOGY & SOC’Y 44 (2012).

97. *Id.* at 44–45.

98. *Id.*

99. *Id.* at 48 (explaining how DFS differs not only from sustainable agriculture, but also eco-agriculture and organic agriculture).

As noted earlier, overarching government policy has an enormous influence on the shape and face of agriculture in Canada. A transition to sustainable agriculture first and foremost requires a clear policy objective in support of sustainable agriculture and a set of policies aimed at facilitating the transition. For instance, while some farmers employ sustainable farming techniques, they need to be supported in order to remain competitive with industrial agricultural producers.¹⁰⁰ Because many of the social (including environmental) costs of conventional farming are externalized, farmers who voluntarily internalize those costs may not be able to remain competitive.¹⁰¹ While some of these farmers may be able to access niche markets, such as those for organic produce or locally-produced goods, the returns may still be insufficient. The result is an uneven playing field that disadvantages the early movers and those who are reducing social costs. In addition, conventional farmers need incentives and interim support to shift their practices.¹⁰² This points to the need for a policy framework that encourages the internalization of social costs, and/or rewards behaviors that are aligned with sustainable farming.

In this section, we examine the key policies governing agriculture nationally to determine whether they establish a vision and set of objectives needed to support a transformation to sustainable farming. We then consider some of these policies to determine whether they create the incentives needed to enable farmers to change their practices to be more sustainable. We develop our analytical framework based upon a review of the literature identifying key public policy drivers needed to support a transition to DFS.

A. Analytical Framework

In order to analyze whether the agricultural policy framework supports a transition to sustainable agriculture, we will first examine how the framework understands sustainable agriculture, and then examine the high level vision it creates. Next, we will consider the extent to which current federal agricultural policies in Canada support a transition to sustainable agriculture. In order to frame our discussion, we draw upon the work of Iles and Marsh, who identify four sets of policies that could support a large-scale transition from industrial agriculture to DFS.¹⁰³ These include:

100. *Id.* at 52.

101. *See id.* at 49 (explaining that if most farmers are externalizing costs, those who do not will have a hard time competing).

102. *Id.*

103. Iles and Marsh, *supra* note 15.

(1) increasing farmer knowledge capacity for DFS through investments in the public agricultural research and extension system, encouraging peer-to-peer training and farmer experimentation, and recruiting new farmers to sustainable agriculture as part of green job policies; (2) creating incentives for biodiversity conservation on agricultural lands; (3) paying farmers for the provision of ecosystem services on their lands and at a landscape level; and (4) connecting sustainable farmers with diverse markets, such as by supporting the infrastructure needed for small and mid-size producers to access markets.¹⁰⁴

In the following section, we will consider the extent to which current federal agricultural policies in Canada measure up to these four policy objectives. Specifically, we will consider the extent to which they (1) support farmer capacity on ecologically sustainable farming practices; (2) create incentives for conservation on farm lands; (3) pay farmers to provide ecosystem services; and (4) support market access for sustainable farmers. These are not the only viable goals for supporting sustainable agriculture, but they represent some of the key types of initiatives needed to support farmers in a transition to DFS.

B. Sustainability in the Current Framework: Does the Federal Agricultural Policy Framework Define Sustainable Agriculture and Provide a High-Level Vision and Objectives for Achieving It?

There are three main policy instruments that govern the Canadian government's obligations on sustainable agriculture. The first is the Federal Sustainable Development Act ("FDSA"), which applies to all parts of the federal government.¹⁰⁵ The second is the overarching agricultural policy framework negotiated with the provinces and the territories, GF2.¹⁰⁶ The third is AAFC's annual report on Plans and Priorities, which details the Department's spending priorities as guided by GF2 and the Departmental Sustainable Development Strategy ("DSDS").¹⁰⁷ We examine each in turn to determine the extent to which each establishes a high-level vision and set of objectives for sustainable agriculture in Canada.

104. *Id.*

105. Federal Sustainable Development Act, S.C. 2008, c 33 (Can.) [hereinafter FSDA].

106. *Growing Forward 2*, AGRIC. & AGRI-FOOD CAN., <http://www.agr.gc.ca/eng/about-us/key-departmental-initiatives/growing-forward-2/?id=1294780620963> [https://perma.cc/2X9W-2YVL] (last updated July 27, 2015).

107. AGRIC. & AGRI-FOOD CANADA, 2015-2016 REPORT ON PLANS AND PRIORITIES (2015), <http://www.agr.gc.ca/eng/about-us/planning-and-reporting/reports-on-plans-and-priorities/2015-16-report-on-plans-and-priorities/?id=1422918881954> [https://perma.cc/QKE5-AZ44].

1. Federal Sustainable Development Strategy for Agriculture

Under FSDA, the federal government is required to produce a Federal Sustainable Development Strategy (“FSDS”).¹⁰⁸ The FSDA then requires government ministries, including AAFC, to prepare and table in the House of Commons a sustainable development strategy “containing objectives and plans for the department or agency that complies with and contributes to the FSDS, appropriate to the department or agency’s mandate.”¹⁰⁹ Each Minister is required to update and table their FSDS in the House of Commons at least once every three years.¹¹⁰

The FSDA defines “sustainability” as “the capacity of a thing, action, activity, or process to be maintained indefinitely” and defines “sustainable development” as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”¹¹¹ Within that broad definition, the FSDS identified four key priority environmental themes:

- (i.) Addressing Climate Change and Air Quality;
- (ii.) Maintaining Water Quality and Availability;
- (iii.) Protecting Nature and Canadians; and
- (iv.) Shrinking the Environmental Footprint—Beginning with Government.¹¹²

The most recent DSDS tabled by AAFC identifies sustainability and innovation as core features of the agricultural sector.¹¹³ The Departmental Strategy is organized around the same four themes as the Federal Strategy. For instance, AAFC has identified a water quality goal (protecting and

108. The most recent federal strategy is dated 2013–2016. ENV’T CAN., PLANNING FOR A SUSTAINABLE FUTURE: A FEDERAL SUSTAINABLE DEVELOPMENT STRATEGY FOR CANADA 2013-2016 (2013), http://www.ec.gc.ca/dd-sd/A22718BA-0107-4B32-BE17-A438616C4F7A/1339_FSDS2013-2016_e_v10.pdf [https://perma.cc/EM7C-FGRK].

109. FSDA, *supra* note 105, at s. 11(1).

110. *Id.* at s. 11(2).

111. *Id.* at s. 2.

112. *Planning for a Sustainable Future: A Federal Sustainable Development Strategy for Canada*, ENV’T & CLIMATE CHANGE CAN., <https://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=16AF9508-1#s> [https://perma.cc/47Y2-G2VH] (last updated June 28, 2013).

113. AGRIC. & AGRI-FOOD CAN., 2014-2015 DEPARTMENTAL PERFORMANCE REPORT, <http://www.agr.gc.ca/eng/about-us/planning-and-reporting/departmental-performance-reports/2014-15-departmental-performance-report/departmental-sustainable-development-strategy?id=1441218450222> [https://perma.cc/V478-AESB] (last updated Jan. 25, 2016). The mission statement of Agriculture and Agri-Foods Canada is “to provide leadership in the growth and development of a competitive, innovative and sustainable Canadian agriculture and agri-food sector.” *What We Do*, *supra* note 78.

enhancing water) with a specific metric.¹¹⁴ Regarding biodiversity, the DSDS specifies a goal of using biological resources efficiently, specifically with respect to encouraging wildlife habitat and environmental farm planning on agricultural land.¹¹⁵

AAFC then develops an implementation strategy to assist in achieving these goals.¹¹⁶ The first theme of the implementation strategy includes enhancing knowledge. Specific targets with relevance to sustainable agriculture include conducting research to increase knowledge of climate change relative to agriculture, research on the effects of agricultural production on air, and reporting on the collective environmental and economic impacts of the adoption of sustainable agriculture practices by Canadian farmers.¹¹⁷ It also includes increasing the adoption of sustainable agriculture practices by increasing the number of farms involved in the GF2 programs.¹¹⁸

The second theme of the implementation strategy is enabling capacity. With respect to sustainable agriculture, this target includes: (1) supporting Canada's participation in multilateral fora outside the UNFCCC and ensuring that Canada's international climate change objectives are advanced in international meetings; and (2) providing cost-shared funding to assist farmers in assessing priority environmental risks, planning effective mitigation, and increasing the adoption of sustainable agricultural practices at farm and landscape levels.¹¹⁹

Evaluating AAFC's DSDS against the criteria identified above, we find that it contributes primarily to the first of the four goals, namely supporting farmer capacity. For instance, the targets relating to research and enabling capacity both contribute to supporting farmers' ability to reduce their ecological footprints and adapt to climate change. However, while there is much to commend in the AAFC's DSDS, including the goals of "developing resilience to a changing climate, and maintaining ecosystem

114. For example, they have a goal of achieving a value between eighty-one to one hundred on each of the Water Quality and Soil Quality Agri-Environmental Performance Metrics by March 31, 2030. 2014–2015 DEPARTMENTAL PERFORMANCE REPORT, *supra* note 113.

115. The target for Goal 5 is to have agricultural working landscapes provide a stable or improved level of biodiversity and habitat capacity by 2020. *Id.*

116. *Id.*

117. *Id.*

118. *Id.*

119. The third theme of the implementation strategy is leading by example, which includes implementing the Federal Contaminated Sites Action Plan and completing remediation and risk management activities at high priority federal contaminated sites. *Id.*; *Federal Contaminated Sites Action Plan*, FED. CONTAMINATED SITES PORTAL, GOV'T OF CAN., <http://www.federalcontaminatedsites.gc.ca/default.asp?lang=En&n=BAC292EB-1> [https://perma.cc/6D8Z-S7YD] (last updated Feb. 25, 2014).

health,” the strategy’s vision clearly demonstrates a focus on economic success:

The Department’s commitment to sustainable development flows from its mandate of helping the agriculture, agri-food and agri-based products industries compete in domestic and international markets, deriving economic returns to the sector and the Canadian economy as a whole. Sustainable management of natural resources is a core requirement for an economically successful agricultural sector.¹²⁰

In order to truly achieve sustainable agriculture in Canada, it is important for sustainability to be the driver, rather than simply another means of achieving economic growth.

2. Growing Forward 2

While the AAFC’s Sustainable Development Strategy is important in terms of understanding the vision and goals of the Ministry, GF2 is the key policy framework for Canada’s agricultural and agri-food sector as a whole.¹²¹ Officially launched on April 1, 2013, as a second phase of Growing Forward, it is an agreement setting out a \$3 billion investment by federal, provincial, and territorial governments, created in consultation with industry, and spread over five years (2013–2018).¹²² GF2 consists of three federally funded programs: the AgriInnovation Program,¹²³ the AgriMarketing Program,¹²⁴ and the AgriCompetitiveness Program.¹²⁵ GF2

120. *Departmental Sustainable Development Strategy: Supplementary to Agriculture and Agri-Food Canada’s 2014-2015 Report on Plans and Priorities*, AGRIC. & AGRI-FOOD CAN., <http://www.agr.gc.ca/eng/about-us/planning-and-reporting/sustainable-development/departmental-sustainable-development-strategy/?id=1391206220338> [https://perma.cc/95BR-Y3BF] (last updated Aug. 5, 2015).

121. AGRIC. & AGRI-FOOD CAN., GROWING FORWARD 2: A FEDERAL-PROVINCIAL-TERRITORIAL FRAMEWORK AGREEMENT ON AGRICULTURE, AGRI-FOOD AND AGRI-BASED PRODUCTS POLICY (Mar. 28, 2013), http://www5.agr.gc.ca/resources/prod/doc/apf/pdf/GFFA_e.pdf [https://perma.cc/Y459-5F57] [hereinafter the GF2 AGREEMENT].

122. *Growing Forward 2*, *supra* note 106.

123. “The program is designed to accelerate the pace of innovation by supporting research and development activities in agri-innovations and facilitating the demonstration, commercialization and/or adoption of innovative products, technologies, processes, practices and services.” *AgriInnovation Program*, AGRIC. & AGRI-FOOD CAN., <http://www.agr.gc.ca/eng/?id=1354301302625> [https://perma.cc/A92L-4FQH] (last Mar. 13, 2015).

124. “The AgriMarketing Program helps farmers and food processors compete in markets at home and abroad. It supports the agriculture industry by creating and maintaining access to markets and taking advantage of market opportunities.” *AgriMarketing Program*, AGRIC. & AGRI-FOOD CAN.,

also includes cost-shared Business Risk Management (“BRM”) programs: AgriInvest, AgriStability, AgriInsurance, AgriRecovery, and AgriRisk.

Sustainability and adaptability of the agriculture and agri-food sector is one of two broad outcomes agreed upon:

The intent [of the framework] is to achieve a profitable, sustainable, competitive and innovative agriculture, agri-food and agri-products industry that is market-responsive, and that anticipates and adapts to changing circumstances and is a major contributor to the well-being of Canadians.¹²⁶

The second outcome is competitiveness in domestic and international markets. The policy identifies innovation and infrastructure (physical, institutional, and human resource) as the two key drivers for achieving its objectives.

Although the words “sustainable” and “sustainability” are used throughout the GF2 framework, neither term is defined. When employed, the terms seem to be used in the broad sense of persisting over time. For example, the policy objective of “Adaptability and Sustainability for the sector” is a sector that maintains and improves its productive capacity by:

- making effective use of appropriate skills and knowledge;
- managing human, natural, and financial resources;
- attracting young farmers and new investors to the sector;
- anticipating and adapting to changing external circumstances;
- managing risks effectively;
- contributing to key food policy objectives such as health or food safety; and
- recognizing and responding to society's demands.¹²⁷

<http://www.agr.gc.ca/eng/?id=1357941192614> [<https://perma.cc/B4RB-XC6V>] (last updated May 1, 2014).

125. This is a program “comprising a combination of government initiatives and contribution funding for industry-led projects. The AgriCompetitiveness Program will make directed investments that will help the sector adapt to rapidly changing and emerging global and domestic opportunities and issues, respond to market trends and enhance business and entrepreneurial capacity.” *AgriCompetitiveness Program, AGRIC. & AGRI-FOOD CAN.*, <http://www.agr.gc.ca/eng/?id=1359338007173> [<https://perma.cc/RS5B-VWNE>] (last updated Feb. 14, 2014).

126. GF2 AGREEMENT, *supra* note 121, ¶ 3.

127. *Id.* ¶ 5-5.3.2.

The National Farmers Union (“NFU”) has critiqued GF2 through “the lenses of food sovereignty and fair trade.”¹²⁸ It argues that GF2 is “a powerful policy instrument that will increase the market power of global agribusiness corporations, help the few largest-scale farms expand, and increasingly marginalize the majority small and medium-sized family farms.”¹²⁹ NFU argues that the focus on competitiveness favors large corporations, which in fact reduces competition and concentrates power in very few corporate hands.¹³⁰ It argues that GF2 connects with regulatory reform in Canada and free trade agreements such as the Comprehensive Economic and Free Trade Agreement with the E.U. (“CETA”) and the Trans-Pacific Partnership (“TPP”), resulting in entrenching multinational corporate interests within the rules and laws that govern agriculture in Canada.¹³¹ NFU argues that this not only runs directly counter to environmental sustainability goals in agriculture, but creates a system which also results in economic and social injustice in Canada and internationally.¹³²

More specifically, for example, NFU highlights that the GF2’s AgriInnovation plan seems to support high-end technologies such as “biotechnology, computer/satellite controlled machinery, herbicides, fungicides, veterinary drugs, etc.,” which the large industrial agriculture corporations require, rather than focusing “on solving the practical agronomic problems of farmers, or helping inventive farmers share their knowledge, ideas and processes with other farmers . . . [e.g.,] improving crop rotations, harnessing synergistic relationships among plants, insects and micro-organisms, new ways of organizing work, more effective decision-making tools, and the like.”¹³³ The GF2 also focuses on the increased linking between public funding and public research institutions with private corporations, affecting the direction of research and development in agriculture. NFU proposes as an alternative that the federal government turn its support to organizations such as the International Assessment of Agricultural Knowledge, Science and Technology for Development (“IAASTD”), whose “multi-thematic approach . . . embraces nutritional security, livelihoods, human health and environmental

128. NAT’L FARMERS UNION, GROWING FORWARD 2: ACCELERATING GLOBALISATION, STALLING FOOD SOVEREIGNTY, IMPLICATIONS OF THE GF2 STRATEGIC INITIATIVES SUITE 2 (2013) <http://www.nfu.ca/sites/www.nfu.ca/files/Growing%20Forward%202%20%E2%80%93%20Accelerating%20Globalization,%20Stalling%20Food%20Sovereignty.pdf> [https://perma.cc/6UD8-L78T].

129. *Id.* at 1.

130. *Id.* at 3.

131. *Id.* at 4–5.

132. *Id.* at 5.

133. *Id.* at 7.

sustainability; integration of local and institutional knowledge; and assessment of policies and institutional arrangements, as well as knowledge, science and technology.”¹³⁴

While the NFU clearly has a particular perspective, this contrasting approach highlights some of the policy choices and the priorities competing with the goals of sustainability in Canadian agriculture. Indeed, while sustainability is mentioned in the objectives and within different sections of GF2, the emphasis is on developing a robust industry rather than promoting sustainable agriculture.¹³⁵ This priority is reflected in the policy’s byline: “Positioning Canada’s Agriculture and AgriFood Sector for Growth and Prosperity.” Further, the objectives defined for this outcome make no mention of environmental management, but emphasize maintaining productive capacity, managing risks, and contributing to key food policy objectives such as health or food safety.¹³⁶ While funding through AgriInnovation may result in innovations that enhance environmental sustainability, this is not its main objective. While AgriMarketing and AgriCompetitiveness may enhancing market access, it is not designed to target the goal of enhance market access for sustainable farmers. However, these funding mechanisms could be redesigned with the goal of environmental sustainability in mind, and applications to the programs could be evaluated with environmental sustainability criteria. As it currently stands, however, GF2 does not satisfy the goals for achieving the DFS outlined above.

3. AFC’s Annual Report on Plans and Priorities:

Like other federal government departments, AAFC produces an annual Report on Plans and Priorities (“RPP”), which outlines the department’s goals.¹³⁷ The 2015-2016 AAFC RPP begins by introducing the Department’s goal, which is to place agriculture, agri-food, and agri-based product industries in a position to realize their full potential by seizing new opportunities in the growing domestic and global marketplace.¹³⁸ The RPP also lists two main Strategic Outcomes drawn from GF2: (1) achieving a competitive and market-oriented agriculture; and (2) developing an

134. *Id.* at 10.

135. *Growing Forward 2: Section 1.1.1 and 4*, AGRIC. & AGRI-FOOD CAN., <http://www.agr.gc.ca/eng/about-us/key-departmental-initiatives/growing-forward-2/?id=1294780620963> [<https://perma.cc/5M9F-PS9V>] (last updated July 27, 2015).

136. *Id.*

137. AGRIC. & AGRI-FOOD CAN., 2015-2016 REPORT ON PLANS AND PRIORITIES 4 (2015), http://www.agr.gc.ca/resources/prod/doc/pdf/rpp-rpp_2015-16_eng.pdf [<https://perma.cc/Z6P6-UX8E>].

138. *Id.*

innovative and sustainable agriculture.¹³⁹ Both have a number of programs and sub-programs tied to those elaborated in GF2.

While there is some emphasis on sustainable agriculture in the RPP, it is not a major point of focus. Strategic Outcome 1, for which the majority of the funding is allocated, is focused on “sustainable” marketing and business management (sustainable farming practices are not part of Outcome 1).¹⁴⁰ Sustainable agriculture is addressed in Strategic Outcome 2 under the Science, Innovation, Adoption and Sustainability Program.¹⁴¹ The emphasis of this program is on four “cross-cutting” strategic objectives: increasing agricultural productivity; improving environmental sustainability; enhancing attributes for food and non-food uses; and addressing threats to the agriculture and agri-food value chain.¹⁴² It seems significant that the Science, Innovation, Adoption and Sustainability Program in its entirety has a budget of \$538 million for the 2015-2016 year, as compared to the \$1.3 billion allocated to the Business Risk Management Program under Strategic Outcome 1.¹⁴³

Research Accelerating Innovation is a sub-program of the Science, Innovation, Adoption and Sustainability Program. It has the objectives of: understanding the key environmental sustainability challenges facing Canadian farmers; encouraging the transformation of scientific knowledge into agricultural practices that improve the environmental sustainability and profitability of farming operations; and supporting scientific measurement and analysis of the environmental sustainability performance of the agricultural sector that will facilitate competitiveness.¹⁴⁴ The allocated 2015-2016 budget for this sub-program is \$96 million.¹⁴⁵

In sum, the emphasis of AAFC’s policy framework (captured within the combination of GF2, the DSDS, and the RPP) appears to be on maintaining and enhancing the competitiveness of the sector to ensure it is “sustainable” in the long-term. There are indicators that remaining profitable and competitive will require proper management of resources and addressing key environmental issues. There are also a number of programs that support environmental practices (described in more detail in the next section). However, there is no high-level vision of sustainable agriculture nor goal put in place to guide agricultural producers in this direction. As such, it is

139. *Id.* at 5–6.

140. *Id.*

141. *Id.* at 43.

142. *Id.* at 44.

143. *Id.* at 11.

144. *Id.* at 47.

145. *Id.*

expected that the sector will continue on its current track of industrialized agriculture with an emphasis on productivity and market access.

C. The Incentive Structure: Does the Policy Framework Include Measures to Encourage Farmers to Shift to Ecologically Supportive Farming Practices, Especially Those that Help Farmers Deal with the Additional Costs Associated with DFS?

The government should revise existing policies to ensure that those creating barriers to sustainable agriculture are eliminated and a new (or updated) set of policies to encourage sustainable agriculture are implemented. At the very least, the policy framework should not create an uneven playing field between sustainable and conventional or industrial agriculture.

In this section, we examine two of the programs supported by the Canadian federal government under GF2, which have the potential to support sustainable agriculture: Environmental Farm Plans (“EFPs”) and Agricultural subsidies. We also examine a third program, the Canadian Agricultural Adaptation Program (“CAAP”), which while funded outside of GF2, has important potential to support a transition to sustainable agriculture. Our analysis shows that EFPs are a positive initiative, but have the potential to be much more transformative with some reforms. The CAAP also has the potential to support a transition to sustainable agriculture, if the funding is appropriately targeted. Currently, the subsidies programs do not support a transition to sustainable agriculture, but have great potential to do so if modified.

1. Environmental Farm Plans

EFPs have been a feature of Canadian agricultural policy since the early 1990s.¹⁴⁶ An EFP is essentially a voluntary planning tool that helps farmers identify areas in which they can improve environmental performance, and which may unlock some financial support.¹⁴⁷ Although there are variations among different EFP programs, in general farmers begin by conducting voluntary and confidential self-assessments (an audit of sorts), which allow them to identify potential environmental issues in their operations and to

146. *Canada-Ontario Environmental Farm Plan*, ONT. MINISTRY OF AGRIC. FOOD & RURAL AFFAIRS, <http://www.omafr.gov.on.ca/english/environment/efp/efp.htm> [https://perma.cc/4GMJ-UNYA] (last updated Jan. 4, 2016).

147. *Environmental Farm Plan*, MAN., AGRIC., FOOD & RURAL DEV., <http://www.gov.mb.ca/agriculture/environment/environmental-farm-plan/> [https://perma.cc/Y6DV-VSYP] (last visited Mar. 3, 2016).

develop action plans to address these issues.¹⁴⁸ Facilitators, drawn from local farming organizations, may invite farmers to participate in workshops.¹⁴⁹ Environmental cost-sharing programs are then sometimes available to assist farmers in implementing their projects.¹⁵⁰ In earlier years, the federal government established national guidelines to guide the direction of environmental farm plans. Under GF2, this practice was eliminated and provinces have since been left to establish their own priorities and guidelines for EFPs.¹⁵¹

Programs such as EFPs have the potential to create change in farming practices in a number of ways. Not only do farmers gain access to tools and organizations that can build their capacity for mitigating environmental impacts, but their participation may lead to some financial reward. In addition, implementing the changes identified in EFPs may enable farmers to seek certification, such as organic certification or comply with national or international standards that are well respected in the industry and by consumers.

While the potential for EFPs to enable change is significant, research suggests that they have yet transform Canadian farming practices.¹⁵² One of the challenges is that the participation rates are not very high and there is considerable variation in terms of participation by farm type and location.¹⁵³ This is partly because the EFP is very much a bottom-up style of policy, which is one of the features most appreciated by participants who are wary of top-down policies. However this has not translated into high levels of participation.

In addition, the amount of financial incentives offered is insufficient. In the first six years of the Ontario EFP, for example, farmers implementing an EFP received an average of CAD \$1,279.¹⁵⁴ Yet, the government estimates that the farmers spent an additional CAD \$5 to \$6 on environmental actions taken under the EFP for every dollar received under the scheme.¹⁵⁵

The EFP tool has the potential to be strengthened, both by modifying worksheets to guide farmers toward specific practices, such as those aligned with DFS, and by strengthening its capacity-building elements (whether

148. *Id.*

149. *Id.*

150. *Canada-Ontario Environmental Farm Plan, supra* note 146.

151. *Id.*

152. Robinson, *supra* note 11, at 210.

153. *Id.* at 209. For instance, in the first decade of Ontario's EFP, only 20% of farmers attended the initial workshop, and 38% of these proceeded no further. *Id.*

154. *Id.* at 210.

155. *Id.*

through extension services which offer capacity-building to farmers, or other avenues). In addition, the financial incentives offered under the EFPs should be at least equal to the additional investments farmers are making to transition to sustainable farming. This would level the playing field between conventional and sustainable farmers, and help the latter remain competitive.

In our view, EFPs are an important tool that deepen the farmers' understanding of their environmental impacts, and create opportunities for them to reduce their ecological footprints while also creating opportunities for accessing markets where sustainability has become a precondition. This paper recommends two key changes. First, the federal government could return to establishing national principles for sustainable agriculture to guide the direction of EFPs. The federal government's withdrawal from the establishment of national principles is a lost opportunity to provide high-level guidance on key priorities for sustainable agriculture (aligned, for instance, with AAFC's Sustainable Development Strategy) and to encourage specific practices aligned with DFS through targeted funding and capacity-building. Second, the amount of funding farmers receive for creating an action plan based on an EFP should be considerably increased to offset the costs of farmers internalizing environmental costs, ensuring those farmers can remain competitive.

2. Reform of Agriculture Support

The Canadian government's support of the agricultural sector is not currently tailored to encourage sustainability, which means this support is likely contributing to the over-use and/or over-exploitation of agricultural resources.¹⁵⁶ Canada's key agricultural subsidies fall into three categories: AgriInvest (crop insurance); AgriStability (income insurance); and AgriRecovery (which covers major disasters). These subsidy programs have been criticized as being unstrategic.¹⁵⁷ It is also clear that these income-related subsidies do little or nothing to encourage sustainable agricultural practices. While they are important for supporting farmers' income, they are unlikely to be helpful in facilitating a transition to sustainable agriculture.

156. Ann Voure'h, *Encouraging Environmental Sustainable Growth in Canada*, in SERIES: OECD ECONOMICS DEPARTMENT WORKING PAPERS NO 290 7-8 (2001).

157. Paul Mayne, *Researcher Calls for Rethink on Farm Subsidies*, W. NEWS (Oct. 11, 2012), <http://news.westernu.ca/2012/10/researcher-calls-for-rethink-on-farm-subsidies/> [https://perma.cc/B94E-JWA7].

One of the goals of GF2 was to “reduce government farm income support,” thereby reducing farming subsidies, focusing instead on innovation and competitiveness.¹⁵⁸ However, AgriStability continues to be a program aimed primarily at protecting producers from large declines in farm income. Under the program, farmers receive payment when their income drops by more than thirty percent below their historical reference margin.¹⁵⁹ This is less support than farmers received under Growing Forward 1.¹⁶⁰ To support a transition to sustainable agriculture, policy-makers could limit income support (or offer a higher proportion of such support) to farmers who are making investments to reduce their environmental footprints. Relatedly, subsidies aimed at innovation could be geared toward initiatives that promote environmental sustainability.

AgriInvest is essentially a savings program for agricultural producers, which allows them to deposit up to 1.5% of their Allowable Net Sales (“ANS”) each year into an AgriInvest account and receive a matching government contribution.¹⁶¹ While producers can deposit up to 100% of their ANS annually (to an annual maximum of \$1,500,000), the government matches up to the first 1.5% or up to \$22,500 a year.¹⁶² While encouraging savings is commendable, the government could target these funds to offer greater support to farmers meeting certain pre-determined sustainability objectives.

AgriRecovery is a framework intended to help producers recover from natural disasters.¹⁶³ The AAFC website suggests AgriRecovery funds were

158. Barry Wilson, *Manitoba Farmers Want More Research Support, Fewer Farm Subsidies*, W. PRODUCER (Dec. 27, 2012), <http://www.producer.com/2012/12/manitoba-farmers-want-more-research-support-fewer-farm-subsidies/> [https://perma.cc/K967-S7SC].

159. *Growing Forward 2: AgriStability Program Guidelines*, AGRIC. & AGRIFOOD CAN., <http://www.agr.gc.ca/eng/?id=1366309611983> [https://perma.cc/5K8D-FFQF] (last updated Sept. 24, 2013).

160. Karen Briere, *AgriStability Goes from ‘Great to Good,’* W. PRODUCER (2015), <http://www.producer.com/2015/08/agristability-goes-from-great-to-good/> [https://perma.cc/B66Z-FR6G]; Steve Funk, *Growing Forward 2: Interpreting Changes in AgriStability and AgriInvest*, W. PRODUCER (2013), <http://www.producer.com/2013/01/growing-forward-2-interpreting-changes-in-agristability-and-agriinvest/> [https://perma.cc/RTP4-7LDV].

161. *AgriInvest*, AGRIC. & AGRIFOOD CAN., <http://www.agr.gc.ca/eng/?id=1291828779399> [https://perma.cc/5B6L-JBXV] (last updated June 10, 2015).

162. *Fact Sheet: Growing Forward 2: AgriStability and AgriInvest*, AGRIC. & AGRIFOOD CAN., <http://www.agr.gc.ca/eng/?id=1360758667650> [https://perma.cc/FU5V-SBR6] (last updated Feb. 13, 2013); AGRIC. & AGRIFOOD CAN., 2014-2015 REPORT ON PLANS AND PRIORITIES 19 (2015), http://www.agr.gc.ca/resources/prod/doc/pdf/rpp-rpp_2014-15_eng.pdf [https://perma.cc/R3W2-M9EL].

163. *A Guide to AgriRecovery*, AGRIC. AND AGRIFOOD CANADA, <http://www5.agr.gc.ca/eng/?id=1398968999929> [https://perma.cc/VS9E-DQTA] (last updated May 22, 2014). Costs of AgriRecovery initiatives are shared 60%/40% with the federal and provincial or territorial government, respectively. The maximum federal share of the funding under any one initiative is \$20 million dollars, and the maximum federal funding available for all initiatives is \$125 million per

used to help British Columbia poultry farmers deal with an avian flu outbreak and strawberry producers affected by a plant virus in Nova Scotia.¹⁶⁴ One could expect the fund to be helpful in cases of climate-related weather events such as droughts, wildfires, and floods. Because sustainable farming practices will often be more resistant to weather-extremes,¹⁶⁵ recovery funds could be conditional upon farmers demonstrating that they have taken measures to reduce their ecological footprints, including GHG emissions, and rendering their crops more resistant, such as by using native species in complimentary plantings.

3. Canadian Agricultural Adaptation Program

Government can have a significant influence on the shape of a sector through the provision of grants. This subsection highlights the CAAP, which is funded under GF2. Section III discusses another program (“SDTC”) funded outside of GF2. CAAP is a federal program that provides funding “for industry-led projects that help the agriculture, agri-food, and agri-based products sector to adapt and remain competitive.”¹⁶⁶ The first iteration of CAAP provided \$163 million of federal government funding over five years, ending in 2014. It was renewed at \$50.3 million for a further five year term (2014–2019).¹⁶⁷

CAAP’s objective is to help the agriculture-, agri-food-, and agri-based-products sector seize opportunities, respond to new and/or emerging issues,

year. When the maximum annual funding is attained, Agriculture and Agri-Food Canada can request Cabinet and Treasury Board to allocate additional funds. Under the AgriRecovery process, the provincial or territorial government requests an assessment of the disaster by the federal government. The federal government determines whether to provide support under AgriRecovery based on this assessment. Producers affected by the disaster may be compensated up to 70% of their costs.

164. *Governments Help Poultry Industry Recover from Impact of Avian Influenza*, AGRIC. & AGRI-FOOD CAN. (May 8, 2015), <http://news.gc.ca/web/article-en.do?nid=972799> [<https://perma.cc/YD5S-A3V4>]. Under the Canada-British Columbia Avian Influenza Assistance Initiative, the government made \$1.58 million in funding available to support farmers impacted by the outbreak. *Id.*

165. *See generally* Pete Smith & J.E. Olesen, *Synergies Between the Mitigation of, and Adaptation to, Climate Change in Agriculture*, 148 J. AGRIC. SCI. 543 (2010); REYES TIRADO & JANET COTTER, GREENPEACE, *ECOLOGICAL FARMING: DROUGHT-RESISTANT AGRICULTURE* (2010), http://www.greenpeace.org/international/Global/international/publications/agriculture/2010/Drought_Resistant_Agriculture.pdf [<https://perma.cc/Q99K-4MWF>].

166. *Canadian Agricultural Adaptation Program*, AGRIC. & AGRI-FOOD CAN., <http://www.agr.gc.ca/eng/?id=1396016168338> [<https://perma.cc/2XEC-HVEM>] (last updated June 23, 2014).

167. *Id.*; *The Green Source Funding Database*, ENV’T & CLIMATE CHANGE CAN., <http://www.ec.gc.ca/financement-funding/default.asp?lang=En&n=768DAFB1-1> [<https://perma.cc/2JHX-VF8L>] (last updated Jan 22, 2016). The application deadline was in 2010 and projects have ended by October 2013.

and pathfind or pilot solutions to new or ongoing issues.¹⁶⁸ While the program identifies sector adaptation as a goal, there is no mention of climate change or other sustainability issues in the current round of CAAP funding.

Projects targeting agricultural sustainability were funded under the first round of CAAP funding. For instance, Biofour, Inc., was granted \$126,422 for a project entitled “Testing of green technology for reducing greenhouse gas emissions and recovery of energy from biomass and agricultural and agri-food residual materials (CAAP052).”¹⁶⁹ To date, under the 2014–2019 round, three grants have been awarded. The first was in the amount of \$950,000 to the Canadian International Grains Institute to investigate advancing pulse flour processing and applications.¹⁷⁰ The second was \$3,000,000 to the Dairy Farmers of Ontario for research on a range of dairy institutions.¹⁷¹ The third was \$1,500,000 to the PEI Potato Board to develop and implement a strategy to address the foreign material detection issue.¹⁷² None of the projects in the second round of funding have a sustainability component. A simple change in the policy requiring applicants to identify how their project will contribute to sustainable farming practices before funding will be provided, combined with clear evaluation criteria and an appropriate monitoring mechanism, which would be a powerful way to shift the incentive structure in the direction of sustainable agriculture.

Overall, therefore, programs such as Environmental Farm Plans, CAAP and various financial supports under the GF2 Business Risk Management plan have made some positive contributions toward environmental

168. *Id.*

169. *Approved National CAAP Projects*, AGRIC. & AGRI-FOOD CAN., <http://www.agr.gc.ca/eng/?id=1307113589948> [<https://perma.cc/7P85-X2HK>] (last updated Dec. 18, 2013). The project is described as follows: “Testing a boiler-incinerator that burns biomasses other than those coming from forest products in order to determine the efficiency and profitability of the Biofour for agricultural and agri-food use.” *Id.*

170. *Disclosure of Grant and Contribution Awards over \$25,000: 2014-2015 – Fourth Quarter: Canadian International Grains Institute*, AGRIC. & AGRI-FOOD CAN., <http://www.agr.gc.ca/eng/about-us/planning-and-reporting/proactive-disclosure/disclosure-of-grant-and-contribution-awards-over-25000/disclosure-of-grant-and-contribution-awards-over-25000-2014-2015-fourth-quarter/disclosure-of-grant-and-contribution-awards-over-25000-2014-2015-fourth-quarter/?id=1432676573776> [<https://perma.cc/J9N5-5B6W>] (last updated June 1, 2015).

171. *Disclosure of Grant and Contribution Awards over \$25,000: 2014-2015 – Fourth Quarter: Dairy Farmers Ontario*, AGRIC. & AGRI-FOOD CAN., <http://www.agr.gc.ca/eng/about-us/planning-and-reporting/proactive-disclosure/disclosure-of-grant-and-contribution-awards-over-25000/disclosure-of-grant-and-contribution-awards-over-25000-2014-2015-fourth-quarter/disclosure-of-grant-and-contribution-awards-over-25000-2014-2015-fourth-quarter/?id=1432676578577> [<https://perma.cc/7YWK-QT7F>] (last updated June 1, 2015).

172. E-Mail from CAAP / PCAA (AAFC/AAC), to author (Sept. 21, 2015, 3:30 PM) (on file with the Vermont Journal of Environmental Law).

sustainability. However, they could significantly increase this potential with some focused changes in how they operate.

III. STRENGTHENING EXISTING INITIATIVES AND EXPLORING NEW ONES

In addition to the DSDS, GF2, and other policies specifically targeted at the agriculture and agri-food sector, there are federal policies and tools aimed at a wider range of sectors but that have a significant impact on agriculture and can affect its environmental sustainability.

A. Sustainable Development Technology Canada (“SDTC”)

Sustainable Development Technology Canada (“SDTC”) is a federal government program that funds Canadian cleantech projects, with the aim of creating “jobs, growth, and export opportunities” for Canadian companies and providing “economic, environmental, and health benefits” for Canadians.¹⁷³ SDTC’s main objective is to help bring innovative cleantech projects to market.¹⁷⁴ With a budget of \$915 million, allocated by the Government of Canada,¹⁷⁵ the Sustainable Development Tech Fund has four priorities, one of which is “next generation technologies,” which has a focus on energy conversion technologies, sustainable agriculture and food security, and biodiversity protection and enhancement.¹⁷⁶ This priority has clear relevance for sustainable agriculture. In fact, SDTC states it will assist in the development of technology that reduces water use, increases crop yield, and improves the ability of agricultural crops to resist drought.¹⁷⁷

Since its inception in 2001, SDTC has provided over \$40 million in funding to some twenty projects in the agricultural sector.¹⁷⁸ One such

173. *About Us: About SDTC*, SUSTAINABLE DEV. TECH. CAN., <https://www.sdte.ca/en/about-sdte/about-us> [<https://perma.cc/3RSY-QZYN>] (last visited Feb. 6, 2016).

174. *Funds*, SUSTAINABLE DEV. TECH. CAN., <https://www.sdte.ca/en/about-sdte/funds> [<https://perma.cc/N576-QHCV>] (last visited Feb. 6, 2106).

175. *Id.*

176. *See SD Tech Fund: Priority Areas*, SUSTAINABLE DEV. TECH. CAN., <https://www.sdte.ca/en/apply/sd-tech/sd-tech-fund-priority-areas> [<https://perma.cc/N576-QHCV>] (last visited Feb. 6, 2016) (providing the three remaining Sustainable Development Tech Fund priorities: (1) responsible natural resource development (focused on improving the “exploration, development, and value-added processing of unconventional oil and gas, metals and minerals”); (2) northern and remote community utility systems focused on the development of renewable energy technology for remote Arctic communities; and (3) energy efficiency for industry and communities (focused on resource efficiency in industrial processes and on heavy-duty vehicle transportation)).

177. *Id.*

178. *Projects*, SUSTAINABLE DEV. TECH. CAN., <https://www.sdte.ca/en/portfolio/projects> (last visited Feb. 6, 2016) (search Economic Sector field for “Agriculture”).

project, which is still ongoing and receiving \$4.9 million in funding from SDTC, is focused on an “area-wide demonstration of automated and integrated pest management system.”¹⁷⁹ The largest completed agricultural project, which received \$3.6 million in funding and was completed in 2006, was for a “floating solid wall containment system” run by the Middle Bay Sustainable Aquaculture Institute.¹⁸⁰

While we have not found any research evaluating the effectiveness of SDTC funding in meeting its objectives, several of the projects supported by SDTC could be considered supportive of sustainable agriculture.¹⁸¹ If the federal government had an overarching objective relating to sustainable agriculture, defined as practice aligned with DFS, and wanted to encourage a faster transition, it could: (a) encourage SDTC to make funding conditional upon meeting criteria for sustainable farming; and (b) broaden the funding envelope for such projects.

B. Tax Incentives

The federal government provides many different kinds of financial incentives through tax measures. While none are targeted specifically at promoting sustainable agriculture, some are specific to agriculture and others have the potential to influence the direction of agriculture in the country. We discuss three programs here, with an analysis of their relationship to sustainable agriculture, and make proposals on how they could be used to support a transition to sustainable agriculture.

1. Canadian Renewable and Conservation Expense (“CRCE”)

The Canadian Renewable & Conservation Expense (“CRCE”) is a tax deduction for investments in capital equipment for renewable energy.¹⁸² In

179. *Area-wide Demonstration of Automated and Integrated Pest Management System*, SUSTAINABLE DEV. TECH. CAN., <https://www.sdte.ca/en/portfolio/projects/area-wide-demonstration-automated-and-integrated-pest-management-system> [<https://perma.cc/KK3D-J7AF>] (last visited Feb. 6, 2016).

180. *Id.*

181. These include: Development & Demonstration of Neem-based Biopesticide; Optimizing Nutrient Flows; Low Temperature Anaerobic Digestion and Co-Generation System for Hog Manure Management; Indoor Urban Farm; Namgis Land-Based Atlantic Salmon Recirculating Aquaculture System Pilot Project; and Bio-Glycol Pre-Commercial Plant. *Projects*, *supra* note 178. (keyword search for “Sustainable Agriculture”).

182. See Greg P. Shannon, *Canadian Renewable & Conservation Expense (“CRCE”) “Green” Energy Tax Incentives*, MILLER THOMSON (Jan. 31, 2015), <http://www.millerthomson.com/en/publications/articles/candanian-renewable-conservation-expense> [<https://perma.cc/FE7P-2UH3>] (explaining that the incentives allow accelerated capital cost allowance

2013, the category of assets included in Class 43.2 of depreciable assets was extended to include equipment used to produce electricity from agricultural waste.¹⁸³ The rationale was to encourage the development of technologies that may reduce GHG emissions and assist the government in meeting its FSDS targets.¹⁸⁴ While this tax incentive will contribute positively to GHG reductions from the agricultural sector, similar measures could be used to encourage sustainable farming practices. For instance, sustainable farming practices may require capital investments for new equipment. Tax rules could be modified to allow accelerated depreciation of capital equipment required for sustainable farming practices. Because those initial investments may be significant, and many farmers are struggling financially, such tax measures can reduce this barrier to shifting to more sustainable farming practices.

2. Scientific Research and Experimental Development Credit (“SR&ED”)

Another tax credit that has the potential to be modified to better support the transition to sustainable agriculture is the “scientific research and experimental development” (“SR&ED”) tax credit. This credit supports basic and applied research aimed at advancing scientific knowledge, including experimental design.¹⁸⁵ As it currently exists, the SR&ED credit could be used by applicants seeking support for research relating to sustainable farming practices. Once again, however, the federal government could more explicitly encourage a shift to sustainable farming practices by establishing criteria requiring proponents to demonstrate how their research will contribute to sustainable agriculture.

In sum, our analysis shows that the current Canadian agricultural policy framework, captured within GF2, the DSDS, and RPP, does not support sustainable agriculture in that it fails to set out a high-level vision for sustainability and the policies created under it are insufficient to encourage the transition to sustainable farming practices. In fact, the policy creates obstacles to embracing sustainable farming practices by encouraging the industrialization and corporatization of agriculture, with an emphasis on

(“CCA”) under Schedule II to the Income Tax Regulations (the “Regulations”) for renewable energy equipment).

183. *Id.*

184. *Id.*; see also Shannon, *supra* note 182 (showing that there are next generation energy projects which may decrease GHG emissions, such as wind, solar, run-of-river, cogeneration, and biofuels).

185. *Claiming SR&ED Tax Incentives: What Work Qualifies for SR&ED Tax Incentives*, CAN. REVENUE AGENCY, <http://www.cra-arc.gc.ca/txcrdt/sred-rsde/clmng/clmngsrd-eng.html#N102A5> [<https://perma.cc/MPT8-AZ99>] (last updated July 9, 2015).

yield.¹⁸⁶ Agricultural supports aimed at growing the sector have encouraged specialization and intensification with the result that certain crops, such as corn, wheat, canola, and soy, and industrially-produced meat, have come to dominate—and indeed swamp—the market.¹⁸⁷ Whether at a large or small scale, producers who are attempting to internalize environmental costs are doing so at a competitive disadvantage. Without deliberate supports to build capacity, incentivize conservation and provision of ecosystem services, and facilitate market access for sustainable agricultural goods, the Canadian agricultural sector will not be environmentally sustainable.

IV. THE WAY FORWARD

As noted earlier, overarching government policy has an enormous influence on the shape and face of agriculture in Canada. A transition to sustainable agriculture requires a clear vision and concomitant policy objectives in support of sustainable agriculture. Policies that create barriers to sustainable agriculture should be phased out and a new (or updated) set of policies to encourage sustainable agriculture should be put in place. At minimum, the policy framework should create a level playing field between sustainable and conventional (including industrialized/GMO) agriculture. We have already discussed some existing programs, such as Environmental Farm Plans and CAAP, which could be strengthened and/or modified to include sustainability criteria in order to ensure they shift behavior in the direction of sustainability. In this section, we highlight and discuss three additional areas for reform. First, we discuss the current state of agricultural subsidies and note how these could be redirected to encourage sustainable farming. Second, we identify some examples of other tax incentives which could be used to encourage the transition. Third, we discuss some measures targeting consumers, since the market demands of consumers are key to stimulating changes by producers. This is not a systemic or comprehensive review of possible measures, but rather a set of illustrative examples inspired by experience in other jurisdictions and/or explored in the literature.

A. Redirecting Behavior Through Tax Incentives

186. Iles & March, *supra* note 15, at 43.

187. *Id.*; Weis, *supra* note 67, at 33.

Captured in the simple adage of “tax bads, not goods,” taxation is widely understood to be an important tool for shifting behavior. Behavior modification will vary depending on the particular goods and services involved but can be affected through the reduction of existing taxes and/or the addition of new tax burdens. The following are a few examples of how tax measures have been used to shift behavior in the agricultural sector in different jurisdictions.

1. Fertilizer and Pesticide Taxes

Adding or increasing taxes on fertilizers or pesticides is one way to discourage their use because the taxes add costs to those inputs. Such taxes have been used, to date, primarily in Europe. Research on the effectiveness of fertilizer and pesticide taxes is mixed. Research on the Norwegian pesticide and fertilizer taxes showed that they had little impact on fertilizer and pesticide use.¹⁸⁸ In contrast, the experience in Austria, Denmark, and Sweden has been more positive, with research suggesting that the taxes have been effective in reducing the use of pesticides and fertilizers.¹⁸⁹

2. Food Conversion Efficiency Tax

Canadians are familiar with tobacco taxes used to raise the costs of smoking and thereby discourage the behavior.¹⁹⁰ Economist Robert Goodland has proposed the use of a “food conversion efficiency tax” to shift consumption toward animal protein foods with lower ecological

188. DAVID PEARCE & PHOEBE KOUNDOURI, FERTILIZER AND PESTICIDE TAXES FOR CONTROLLING NON-POINT AGRICULTURAL POLLUTION 2–3 (2003).

189. *Id.*; Carsten Daugbjerg, *Power and Policy Design: A Comparison of Green Taxation in Scandinavian Agriculture*, 21 SCANDINAVIAN POL. STUD. 253, 259–78 (1998); Susana Mourato et al., *Evaluating Health and Environmental Impacts of Pesticide Use: Implications for the Design of Ecolabels and Pesticide Taxes*, 34 ENVTL. SCI. & TECH. 1456 (2000) (explaining that a case could be made for a substantial pesticide tax); Carsten Daugbjerg & Anders Branth Pedersen, *New Policy Ideas and Old Policy Networks: Implementing Green Taxation in Scandinavia*, 24 J. PUB. POL. 219, 225–26, 228 (2004); Carsten Daugbjerg & G.T. Svendsen, *Designing Green Taxes in a Political Context: From Optimal to Feasible Environmental Regulation*, 12 ENVTL. POL. 76 (2003); Patrik Söderholm & Anna Christiernsson, *Policy Effectiveness and Acceptance in the Taxation of Environmentally Damaging Chemical Compounds*, 11 ENVTL. SCI. & POL’Y 240 (2008) (showing that the use of pesticide taxes in Austria and Sweden effectively reduced the use of pesticides and fertilizers); Chang Woon Nam et al., *Taxation of Fertilizers, Pesticides and Energy Use for Agricultural Production in Selected EU Countries*, 17 EUR. ENV’T 267, 271–73 (2007); See Lene Holm Pederson, *Ideas Are Transformed as They Transfer: A Comparative Study of Eco-taxation in Scandinavia*, 14 J. EUR. PUB. POL’Y 59, 64–66 (2007) (discussing the implementation of nitrogen and carbon dioxide taxes in Scandinavia).

190. Pearl Bader et al., *Effects of Tobacco Taxation and Pricing on Smoking Behavior in High Risk Populations: A Knowledge Synthesis*, 8 INT’L J. ENVTL. RES. PUB. HEALTH 4118, 4118 (2011).

footprints.¹⁹¹ Regarding GHG emissions, the livestock sector is by far the single largest anthropogenic land user and is responsible for nine percent of anthropogenic CO₂ emissions.¹⁹² The impact of methane on climate change is much greater than CO₂, and there have been suggestions that the amount of methane emitted may be greater than previous estimates.¹⁹³ Within the agricultural sector, livestock is responsible for almost eighty percent of all emissions.¹⁹⁴ Many have recommended policies that would discourage consumption of meat, including an environmental tax on meat and a diversion of subsidies from livestock production to organic, plant-based agriculture.¹⁹⁵

Under Goodland's proposed food conversion efficiency tax, a government would apply the highest taxes to the least efficient producers (e.g., pork and beef), moderate taxes on more efficient producers (e.g., poultry, eggs, and dairy), and the lowest taxes for the most efficient converters (e.g., ocean fish).¹⁹⁶ Grains for human food would be exempt from taxes, and non-food, non-fiber agriculture (e.g., tobacco and alcohol grains) would be highly taxed.¹⁹⁷ This type of a sliding scale of taxes for agricultural products could be used not only for conversion efficiency, but also for other factors, such as GHG emissions and ecological and biodiversity impacts.¹⁹⁸

3. GHG Emissions

191. See Robert Goodland, *Environmental Sustainability in Agriculture: Diet Matters*, 23 *ECOLOGICAL ECON.* 189, 196 (1997) (examining government policy alternatives for protecting the environment, such as alternatives to taxes and compare those alternatives with taxes).

192. HENNING STEINFLED ET AL., *FOOD & ARGIC. ORG., LIVESTOCK'S LONG SHADOW: ENVIRONMENTAL ISSUES AND OPTIONS* 271 (2006), <ftp://ftp.fao.org/docrep/fao/010/a0701e/a0701e.pdf>.

193. Krishna Ramanujan, *Methane's Impacts on Climate Change May Be Twice Previous Estimates*, *GODDARD NEWS* (July 7, 2005), <http://www.nasa.gov/vision/earth/lookingatearth/methane.html> [<https://perma.cc/9QUB-TSUW>].

194. *Id.*

195. KIAN TAVAKKOLI & LULU JIANG, *MITIGATING CLIMATE CHANGE THROUGH FOOD POLICY: THE LIVESTOCK CONNECTION AND SOLUTION* 4 (2009).

196. Goodland, *supra* note 191, at 198.

197. *Id.*

198. See, e.g., Stefan Wirsenius, *Greenhouse Gas Taxes on Animal Food Products: Rationale, Tax Scheme and Climate Mitigation Effects*, 108 *CLIMATIC CHANGE* 159 (2011); Norman Myers, *New Consumers: The Influence of Affluence on the Environment*, 100 *PROC. NAT'L ACAD. SCS. U.S.* 4963 (2003); Tara Garnett, *Live-Stock Related Greenhouse Gas Emissions: Impacts and Options for Policy Makers*, 12 *ENVTL. SCI. & POL'Y* 491 (2009); LINDEN CROCKER, *ETHICS OF CONSUMPTION: THE GOOD LIFE, JUSTICE, AND GLOBAL STEWARDSHIP* (1998); LAURA WEISS, *THE BUSINESS OF CONSUMPTION: ENVIRONMENTAL ETHICS AND THE GLOBAL ECONOMY* (1998).

In Canada in 2005, agriculture was responsible for twelve percent of the country's GHG emissions.¹⁹⁹ Research has shown that the GHG emissions per unit of produce are less in organic farming than conventional farming.²⁰⁰ In fact, one study suggests that global adoption of organic agriculture has the potential to sequester up to the equivalent of thirty-two percent of all human-caused GHG emissions.²⁰¹ As such, tax incentives (in the form of credits for organic farming or additional taxes for non-organic farming, for instance) could be used to encourage a transition to organic farming.

Organic farming is not, of course, the only way to reduce GHG emissions from agriculture. Scherr & Sthapit suggest five strategies which can be used to reduce and sequester terrestrial GHG emissions from agriculture, forestry, and other land uses, including the enrichment of soil carbon, farming with perennials, climate-friendly livestock production, protecting natural habitat, and restoring degraded watersheds and rangelands.²⁰² Tax incentives could be used to encourage these behaviors in the same way they can be used to impact other behavioral choices—by raising taxes on undesirable behaviors and lowering taxes or offering credits for desirable behaviors.

B. Influencing Farming Practices Through Incentives Aimed at Consumers

A powerful way to influence the practices of farm producers is by altering the decisions of consumers. There are many consumer behaviors that could be encouraged in order to increase agricultural sustainability. These might include, for example, choosing foods grown in season in the country of origin, reducing food waste, increasing consumption of fruit and vegetables and reducing consumption of red meat, and growing one's own food. It might also mean enacting laws that support consumers' right to know about the economic, environmental, and social impacts of the production and distribution of their food. Some jurisdictions, for instance,

199. ENV'T CAN., 17 (2014), https://ec.gc.ca/ges-ghg/E0533893-A985-4640-B3A2-008D8083D17D/ETR_E%202014.pdf [<https://perma.cc/W95A-JH8J>].

200. U.N. FOOD & AGRIC. ORG., ORGANIC AGRICULTURE AND CLIMATE CHANGE MITIGATION: A REPORT OF THE ROUND TABLE ON ORGANIC AGRICULTURE AND CLIMATE CHANGE 61 (2011), <http://www.fao.org/docrep/015/i2537e/i2537e00.pdf> [<https://perma.cc/X3FQ-WKHT>].

201. INT'L FED'N OF ORGANIC AGRIC. MOVEMENTS, THE CONTRIBUTION OF ORGANIC AGRICULTURE TO CLIMATE CHANGE MITIGATION (2009) http://www.ifoam-eu.org/sites/default/files/page/files/ifoam_ifoameu_climate_change_mitigation_dossier_2009.pdf [<https://perma.cc/MZ4F-GJGF>].

202. SARA J SCHERR & SAJAL STHAPIT, MITIGATING CLIMATE CHANGE THROUGH FOOD AND LAND USE 5 (2009), <http://www.worldwatch.org/system/files/179%20Land%20Use.pdf> [<https://perma.cc/QP5H-K2P6>].

have discussed the use of “fat taxes” and other similar initiatives aimed at consumers’ food choices.²⁰³

It is also worth noting that food choices are largely “determined by what is available, accessible and affordable”²⁰⁴; thus, an important point of influence is the supermarket.²⁰⁵ Research has shown that providing information about environmental impacts to consumers is not enough in itself, because “price, quality and offers are top choice criteria.”²⁰⁶ Perhaps, not surprisingly, health issues have more traction with supermarket consumers than environmental concerns.²⁰⁷ As such, incentives would need to be carefully designed to ensure that they are targeting the desired behavioral change.

One final note is that demand for food is not, in general, very elastic because we all need food to subsist. However, research has shown that there is some variation in elasticity among foods, with some foods (such as soft drinks and juice) being more elastic.²⁰⁸ This means that policies that change price signals on these foods could be most effective in changing behavior, especially relative to less elastic goods such as dairy, grains, and meat.

CONCLUSION

Canada’s federal agricultural policy framework is not currently designed to, and therefore has not yet succeeded in, providing the vision and incentives required to achieve environmentally sustainable agriculture. The DSDS, GF2, and the Annual Report on Plans and Priorities are all primarily aimed at competitiveness, innovation, and growth of the industry. There are some promising tools that could be improved to enhance the move to sustainable farming, such as EFPs, CAAP, and the GF2 Business Risk Management plan tools. The policy framework outside the agricultural sector could also help by making better use of things such as SDTC and incentives for producers and consumers such as through tax policy.

203. Martin Caraher & Gill Cowburn, *Taxing Food: Implications for Public Health Nutrition*, 88 PUB. HEALTH NUTRITION 1242 (2005).

204. DEFRA CTR. OF EXPERTISE ON INFLUENCING BEHAVIOUR, THE SUSTAINABLE LIFESTYLES FRAMEWORK (2011) [hereinafter DEFRA], <http://webarchive.nationalarchives.gov.uk/20130123162956/http://archive.defra.gov.uk/environment/economy/documents/sustainable-life-framework.pdf> [https://perma.cc/X78E-CYPG].

205. See *Healthy Food Financing Funds*, HEALTHY FOOD ACCESS, <http://www.healthyfoodaccess.org/funding/healthy-food-financing-funds> [https://perma.cc/8PPP-K6VT] (last visited Feb. 6, 2016) (explaining the expansion of availability of nutritious food).

206. DEFRA, *supra* note 204.

207. *Id.*

208. Tatiana Andreyeva et al., *The Impact of Food Prices on Consumption: A Systematic Review of Research on the Price Elasticity of Demand for Food*, 100 AM. J. PUB. HEALTH 216, 219 (2010) (reviewing 160 studies on food elasticity and identifies those most responsive to price changes).

Agriculture is a big part of Canada's past, present, and future. It is a way of living for many families, the source of our sustenance, and a significant part of the economy. The Canadian government has been very influential in shaping the direction of agriculture and this will continue for the foreseeable future. This means we have important choices to make because the types of carrots dangled and sticks wielded in the form of government policies will determine the future of agricultural production. Governments can choose to actively support a transition to sustainable agriculture, or they can let global market forces make that choice for us and strengthen the current trend of large, highly industrialized farming, which is unsustainable. We need to be cognizant of the fact that this is a political choice and one that will have long-term consequences for people and the planet.