

# Data as a Foundation for Sustainable Productivity Growth

CANADIAN FEDERATION OF  
AGRICULTURE







## 1.0 Executive Summary

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The following report delves into the transformative potential of data in the agricultural sector, emphasizing the critical need for a comprehensive policy and legislative framework to harness the benefits of advanced data analytics and precision farming. The report highlights the essential role of both government and industry leaders in establishing clear parameters for data use, data mobilization, and interoperability, alongside fostering public and private investments in connectivity infrastructure and equipment standards.

### **Key Recommendations:**

#### **Pan-Canadian Data Strategy:**

- In concert with producers and value-chain stakeholders, develop a Pan-Canadian Data Strategy that establishes a common policy framework for public and private investment in research, programming, digital skills, outcome-based measurement and reporting to support Canada's productivity and sustainability objectives.

#### **Investment in Rural Connectivity:**

- Close the connectivity gap between urban, rural and remote regions of Canada and ensure sufficient in-field connectivity to enable the range of agtech opportunities emerging for farmers.
- Establish programming to support the integration of connectivity solutions and equipment such as, for example, portable hotspots, satellite technologies, weather monitors, cameras and irrigation controllers.

#### **Standards Development and Interoperability**

- Support industry efforts to develop common principles, guidelines and standards that advance the use of data for farm management, data-informed decision making, as well as regulatory and market-based reporting requirements.
- Make a legislative commitment to supporting farm equipment interoperability.

#### **Capacity Building:**

- Capacity building for farm groups that are best positioned to protect farmers' rights and support greater transparency around data. This should include not only support for data infrastructure and improved governance, but also innovative measurement technologies, education, awareness and new agricultural extension services to support adoption.

The integration of data and advanced analytics promises to significantly enhance the productivity, sustainability, and resilience of Canadian agriculture. Achieving this potential requires concerted efforts from both public and private sectors to establish an enabling policy framework and invest in the necessary infrastructure and standards. By taking a proactive leadership role, these sectors can ensure that agriculture meets global food demand in an environmentally sustainable and economically viable manner.

Immediate action is needed to build a resilient agricultural ecosystem powered by data.

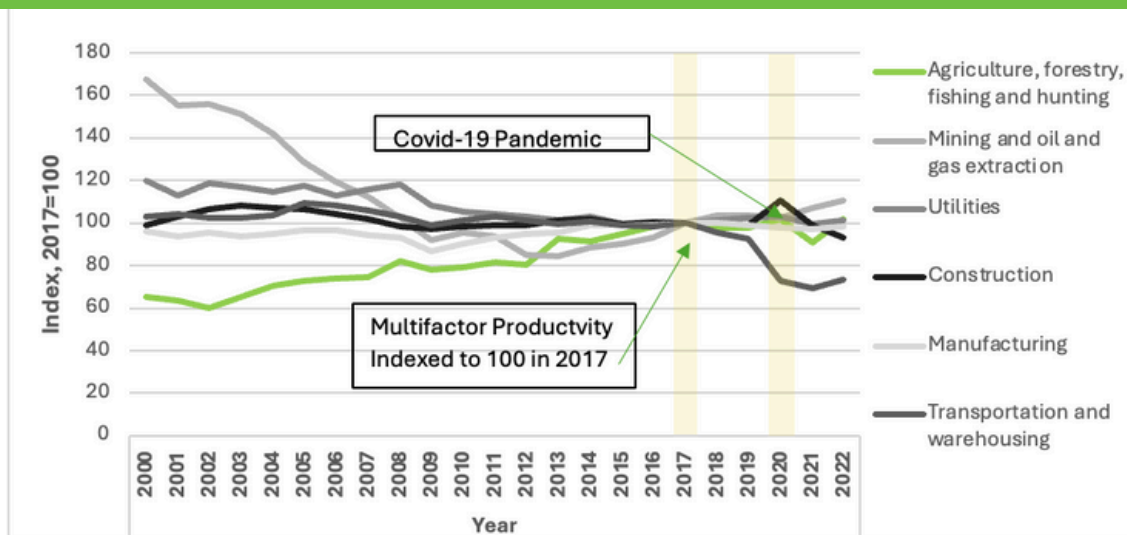


## 2.0 Data and innovation are key to unlocking Canada's productivity

As global demand for agriculture products and concerns around sustainability increase, data-driven approaches to innovation will become an essential aspect of delivering sustainable productivity growth. The following explores the pivotal role of data in supporting on-farm productivity and competitiveness, as well as enhancing sustainable agricultural practices across Canada. Through this lens, it aims to highlight the transformative potential of data in fostering a competitive, resilient, and sustainable agricultural future for Canada and presents a series of recommendations on how to get there.

### 2.1 PRODUCTIVITY GROWTH IS CRITICAL TO MEET THE NEEDS OF THE WORLD'S GROWING POPULATION.

**Figure 1:** Multifactor Productivity by Sector | Agriculture, Forestry, Fishing and Hunting Multifactor Productivity is Rising Compared to Other Sectors and Recovering it's Upward Trend Despite Pandemic Impacts



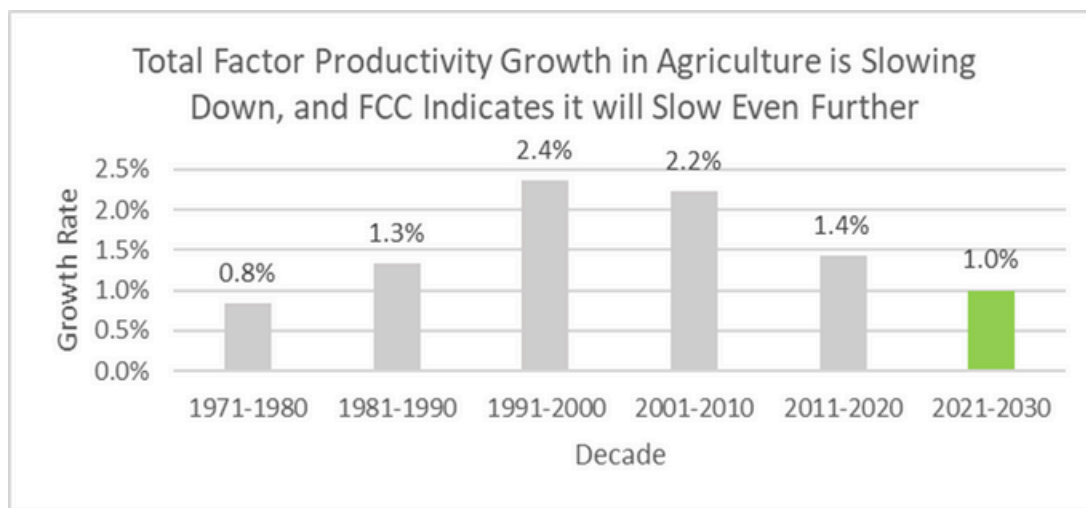
Source: Statistics Canada. Table 36-10-0208-01 Multifactor productivity, value-added, capital input and labour input in the aggregate business sector and major sub-sectors, by industry

The world is experiencing an unprecedented surge in population growth with profound implications for food security and sustainability. As of 2024, the global population has exceeded 8 billion and is expected to climb to 8.5 billion in 2030 and 9.7 billion in 2050. With this, global food consumption is projected to increase by 1.4% per annum over the next decade. Accordingly, the OECD-FAO Agricultural Outlook 2022-2031 points out that in order to meet the world's Zero Hunger target, while at the same time reaching the Paris Agreement targets, global agricultural productivity would need to increase by 28% over that same time period.



However, while Canadian agriculture has historically performed better than other key Canadian sectors in terms of productivity growth, that growth trajectory has stagnated and even reversed in recent years.

**Figure 2: Global Total Factor Productivity Growth of Canada**



Source: USDA, Economic Research Service, data as of September 2023

Farm Credit Canada (FCC) has calculated that average annual Total Factor Productivity (TFP) growth in the agriculture sector has slowed from 2.2% in the decade 2001-2010 to 1.4% from 2011-2020 and is projected to slow even further as we approach 2030.

The continued adoption of innovative technologies is critical to advancing agricultural productivity, as labour constraints are forecasted to increase over time. Both RBC and the Canadian Agricultural Human Resources Council (CAHRC) have reported that upwards of 40% of Canadian farm operators will retire over the next 10 years. Alberta, Newfoundland and Labrador, Nova Scotia, Saskatchewan, British Columbia, and Prince Edward Island are expected to shoulder the largest burden of those retirements. This is on top of the 28,000 jobs that CAHRC estimates went unfilled in the agriculture sector in 2022, costing an estimated \$3.5 billion in lost sales.

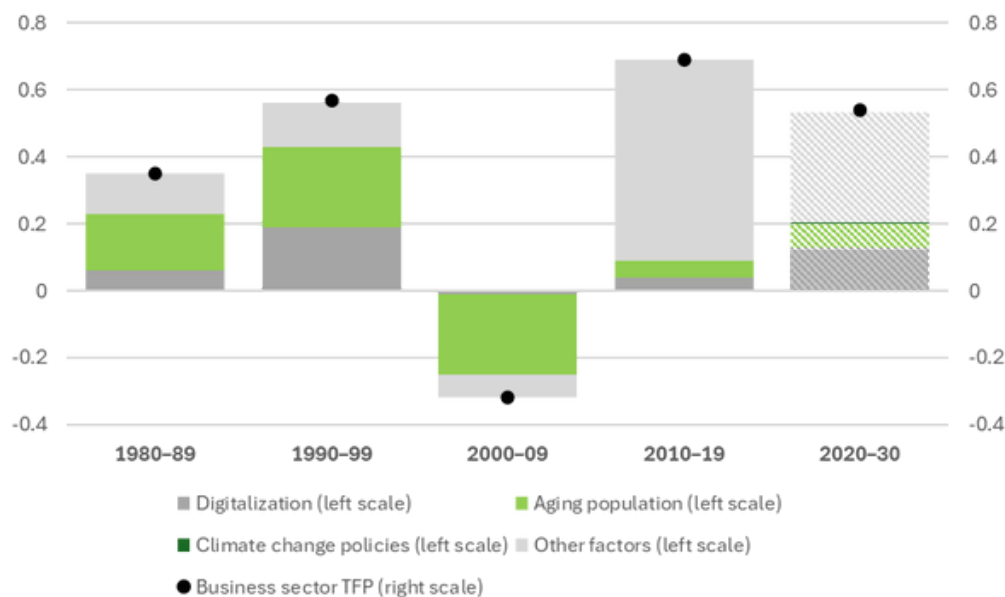
To help address this challenge, RBC recommends accelerating the adoption of autonomous and mechanized solutions that will “promote higher levels of efficiency, increase productivity, limit environmental impact, and promote sustainability.” Enabling further investment in such innovative technologies will be critical to reinvigorate agriculture’s sustainable productivity growth in years to come.



## 2.2 DATA AND INNOVATION PLAY A CRITICAL ROLE IN BOOSTING CANADA'S PRODUCTIVITY POTENTIAL.

The Bank of Canada recently reported that digitalization will continue to support TFP growth in the medium term (see Figure 3). At the farm level, investments in precision agriculture farm machinery and equipment, digitization, and increased reliance on data-driven approaches all have the potential to significantly increase productivity and sustainability objectives. A study conducted by the Association of Equipment Manufacturers (AEM) (2024) cited that farmers currently leveraging precision agriculture technologies have achieved a 4% increase in crop production and a 7% reduction in costly fertilizer use.

**Figure 3:** Digitization and Demographic Shifts will Support Total Factor Productivity in the 2020s



Source: Statistics Canada and Bank of Canada calculations, estimates and projections

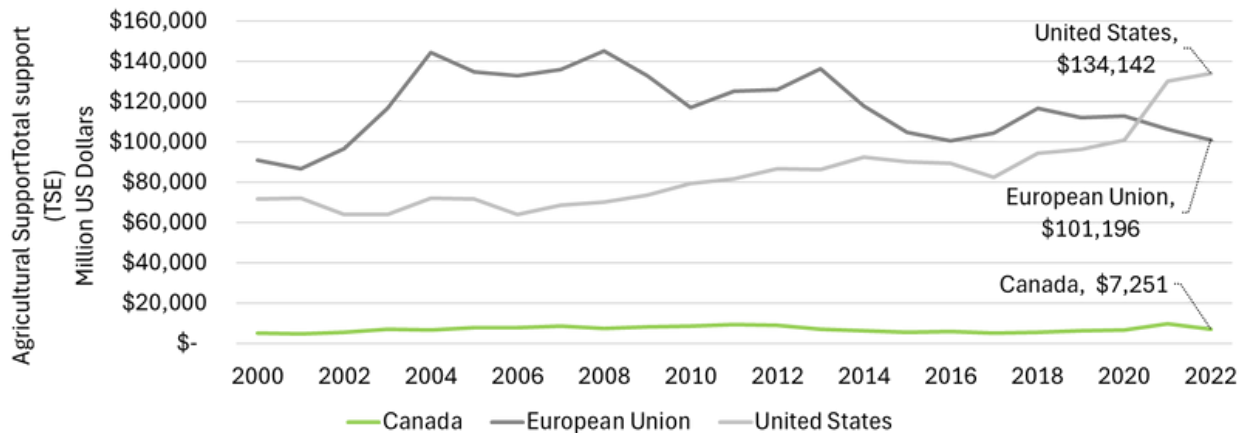




### 2.3 CANADIAN INVESTMENT IN INNOVATION IS LAGGING BEHIND INTERNATIONAL COMPETITORS.

Agricultural support estimates calculated by the Organisation for Economic Co-operation and Development (OECD) provide a common framework for evaluating the size of government support to the agriculture sector by the OECD countries. As a percentage of GDP, Canada invested 0.339% while the United States (U.S.) invested 0.528% (Figure 4) (OECD, 2022).[1]

**Figure 4: OECD Agricultural Support Indicator**



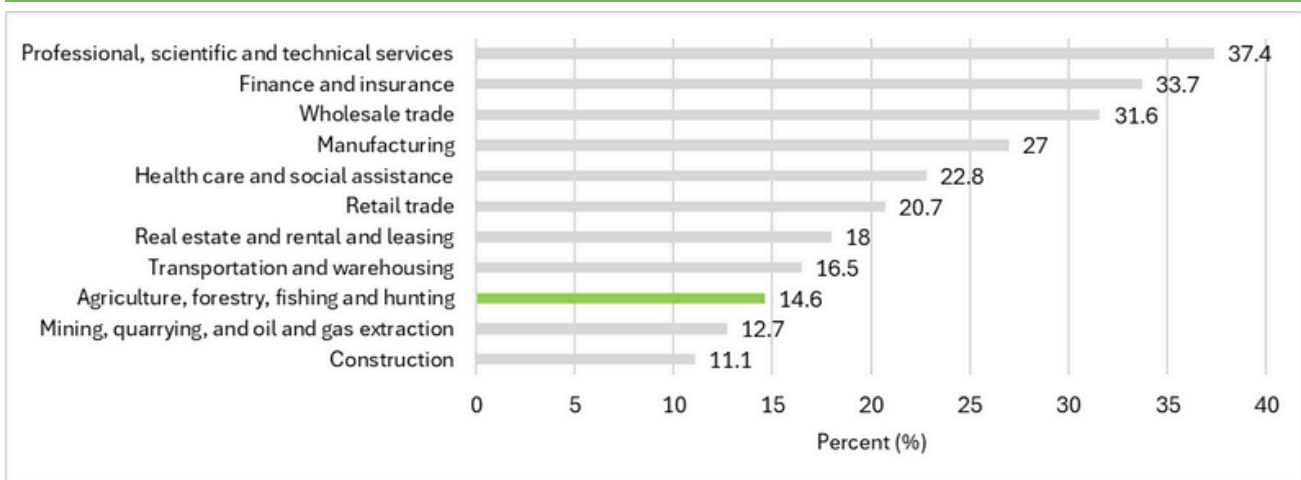
Source: OECD (2024), Agricultural Support (indicator). doi: 10.1787/6ea85c58-en

1 Agricultural support estimates calculated by the Organisation for Economic Co-operation and Development (OECD) provide a common framework for evaluating the size of government support to agriculture by the OECD countries. The Total Support Estimate (TSE) measures "the annual monetary value of all gross transfers from taxpayers and consumers arising from policy measures that support agriculture, net of the associated budgetary receipts, regardless of their objectives and impacts on farm production and income, or consumption of farm products."

In addition, a Report coming out of the Simpson Centre at the University of Calgary points to the fact that public support for agricultural innovation systems has been in decline despite evidence that it offers a high return on investment. For example, expenditures on agricultural innovation in Canada have declined by roughly 70 per cent since 1986 (AIC 2017).

Despite the decline in public spending in agricultural research and development, it still outpaces private-sector investment. According to Statistics Canada, overall business investment in productivity-enhancing assets such as machinery and equipment in the economy was 4% below pre-COVID-19 levels and 22% below peak levels in 2014. Furthermore, spending on research and development was 8% below pre-pandemic levels and 11% below levels reported in 2014. As a result, the agriculture sector is well behind most sectors in terms of investment in digital technologies (see Figure 5).[2]

**Figure 5: Percent of Businesses Planning to Adopt New or Additional Digital Technologies Over the Next 12 Month**



Source: Statistics Canada. Table 33-10-0487-01 Plans to adopt new or additional digital technologies over the next 12 months, first quarter of 2022

2 <https://www150.statcan.gc.ca/n1/en/pub/11-631-x/11-631-x2022004-eng.pdf?st=4n58y3DT>





## 2.4 MAKING BETTER USE OF AVAILABLE FARM DATA IS ESSENTIAL TO UNLOCKING SUSTAINABLE PRODUCTIVITY GROWTH AND SAFEGUARDING THE FUTURE SUCCESS OF CANADIAN AGRICULTURE.

Data is crucial for identifying areas for efficiency improvements, enhanced sustainability and driving productivity gains, which in turn enhance profitability. For instance, there is ample evidence that points to financial savings associated with the more efficient use of resources, including costly crop inputs like fertilizer and crop protectants, better livestock monitoring that reduces veterinary bills, as well as more informed marketing decisions, to name a few. According to FCC, “when farmers see profitability by the acre, they can fully understand their cost of production, develop specialized seeding plans, and run scenarios to know how to make the most advantageous decisions. The shareability of records also means quicker, more precise communication with farm partners.”

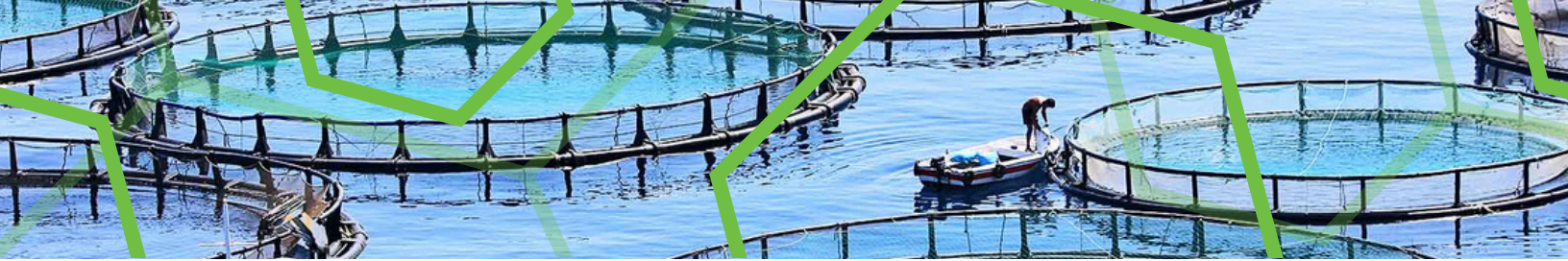
### **Case Study: Linking Data to Improved Risk Management Programs**

A machine learning model, utilizing historical drought data and satellite indicators, accurately predicts Canadian Drought Monitor (CDM) severity ratings. This data-driven approach improves decision-making and drought mitigation which could be further integrated into Canada’s suite of business risk management programs. Governments could leverage existing data tools, like Agriculture and Agri-Food Canada’s (AAFC) Drought Monitor to more systematically and consistently trigger an AgriRecovery assessment.

For example, the Data Requirements for a Transparent Market Report by the Mercantile Consulting Venture Inc. highlights the need for more regular and timely access to sales and export data, essential for producers to make informed marketing decisions, allowing them to judge demand and time their sales effectively —often a decisive factor between profitability and loss for primary producers.

Investments in data, technology and innovation also have significant potential benefits for the Canadian economy. For example, McKinsey & Company have estimated that if connectivity is implemented successfully in agriculture, the industry could tack on \$500 billion in additional value to the global gross domestic product by 2030.

Data can also help Canadian farmers reduce GHG emissions. Based on a study conducted by the Toronto Metropolitan University, digital adoption of technology solutions can have a significant impact on reducing emissions from the agriculture sector. For example, nitrous oxide emissions are mostly produced by excess nitrogen in soil, and technologies that optimize and deliver fertilizer guidance have been found to reduce these emissions by 23%. Additionally, another study from the U.S. Department of Agriculture found that “through a combination of innovations in digital agriculture, crop and microbial genetics and electrification, 71 per cent of reduction in GHG emissions from row crop agriculture is possible within the next 15 years.”



Data is also helping producers tell a better story about sustainability practices. For example, the Dairy Farmers of Canada's [Net Zero By 2050 Report](#) includes a Life Cycle Assessment (LCA) demonstrating that the carbon footprint of milk produced in Canada is among the lowest in the world, at less than half the global average. Another example from the Canadian Aquaculture Industry Alliance shows that [sustainability indexes](#) (e.g., Collier FAIRR Protein Producer Index) position salmon farming as the most environmentally efficient large-scale animal production on the planet with the lowest fresh water use, lowest carbon emissions and smallest environmental footprint. It also shows that Canadian salmon farming companies hold the #1 and #3 positions on this [sustainability index](#). These are just two examples of many areas in which the agriculture sector is leveraging data to report on sustainability initiatives and show consumers that their operations are dedicated to sustainability.

As outlined later in the text, the National Index on Agri-Food Performance has developed a set of sustainability indicators and metrics related to Canada's agriculture and agri-food industries and complements current sector-led efforts.

Better data is also critical to support policy development. Governments and industry are committed to supporting evidence-based policy making which is critical to sustaining our reputation at home and abroad as a trusted and reliable supplier of agricultural and agri-food products.

However, Canada must work to avoid making policy decisions and commitments (domestically and internationally) that are based on incomplete data and information. For instance, Canada's previously announced approach for achieving Canada's fertilizer emissions reduction target of 30 per cent from 2020 levels by 2030, was established without clear data underpinning the pathways to achieve those targets. A [study](#) conducted by R. Gamble and D. Heaney concluded that it would cost upwards of \$3.4 billion to support the implementation of best management practices to reduce fertilizer emissions by just 14.4 metric tonnes, representing 71.4% of the 30% reduction target by 2030.

Without a commonly understood framework to measure the current state of the sector and progress towards a target, including clear and sufficiently resourced pathways to achieve specific targets, such targets are counterproductive, leaving farmers frustrated as they perceive the full burden of these unrealistic targets being placed on their shoulders. Without commonly understood data-driven strategies underpinning these commitments on the international stage, Canada risks long-term reputational damage and does not provide Canadian producers with clear direction or data to drive more informed on-farm decision-making.

### **The Sustainable Agriculture Strategy (SAS)**

With over 6% of Canada's total land area in the hands of Canadian farmers, the sector is a key player in meeting Canada's sustainability and emissions reduction targets.

Canada is in the latter stages of developing the SAS. For it to succeed, the SAS must be grounded in a data-driven path forward, that is supported by both Government and industry.

If not, Canada's flagship agri-environmental policy framework will not get the necessary buy-in from the sector and will not drive meaningful actions to meet Canada's sustainability and climate targets.

The inability to communicate how data is informing policy undermines Canada's reputation at home and abroad and creates uncertainty around the climate for investment.



**The challenge going forward is not only generating data but assessing that data for suitability and comparability against global standards and benchmarks.**

It is evident that not all sub-sectors have access to the same quality of data and there are dozens of domestic and global benchmarks and standards being used to assess the sustainability performance of the agri-food sector. While some benchmarks are commodity specific, others are for entire sectors and for country-wide application. The challenge going forward for producers and governments is not only generating sufficiently high-quality data but using that data to create economic advantages in the global market.



## 3.0 Canadian industry and farmers have an important role to play

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### 3.1 CANADIAN FARMERS HAVE A LONG HISTORY OF INNOVATION AND ARE MORE CONNECTED AND TECHNOLOGY-ENABLED THAN EVER BEFORE.

Farmers across Canada have a long history of innovation from no-till and conservation tillage, to advancements in biotechnology, precision agriculture, the adoption of alternative energy sources and the integration of self-driving farm equipment such as the [DOT Power Platform](#).

This is evidenced by the fact that many programs supporting adoption of new innovations and agri-environmental practices, [such as the On-farm Climate Action Fund](#), are routinely over-subscribed – indicating that farmers see the value in participating in these programs and adapting farm management towards more productive, environmentally beneficial and innovative practices. As noted in the Auditor General’s recent [Report](#), as of January 2024, funding disbursed under the On-Farm Climate Action Fund program had resulted in 4,338 producers adopting beneficial management practices; and 1.3 million hectares of land benefitting from improved management.

Canadians are also more connected to the internet than ever before. The Auditor General of Canada’s [Report](#) on Connectivity in Rural and Remote Areas noted that, as of 2021, 90.9 per cent of households had access to minimum connection speeds across Canada. However, that number drops to only 59.5 percent of rural Canadians when it comes to having access to high-speed coverage. Over a third of survey respondents in a recent Information and Communications Technology Council (ICTC) [study](#) identified a lack of high-speed internet as a barrier to adoption of technology.

Lessons learned from a U.S. [Connectivity Needs Working Group](#) identified several objectives that are relevant in a Canadian agricultural context, including that farm data must be accessible to the farm manager at every location on the farmed properties to support better and more timely decision making and that interoperability between different information systems and models of equipment (e.g., planters and sensors) is critical.

#### Case Study: Linking Data to Better Biosecurity

[Farm Health Protect](#) is a digital tool offered by Farm Health Guardian that is currently being used on about 600 swine properties in Canada. The tool records farm visits through GPS beacons attached to farm vehicles and property that are used for ‘geofencing.’ The system then records and flags every time the boundaries are crossed by a system vehicle or device. Farm Health Protect can also establish geographical control zones in the event of a disease outbreak by sending alerts and reference maps to producers which could have tremendous benefits in the event of an African Swine Fever outbreak.



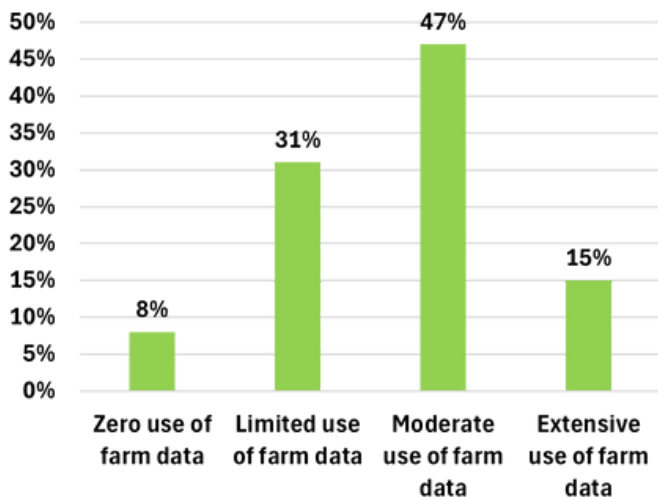
### 3.2 FARMS ARE CURRENTLY GENERATING SIGNIFICANT LEVELS OF DATA, MOST OF WHICH IS NOT BEING USED TO ITS FULL POTENTIAL.

Many farms began systematically collecting data in the mid-1990s with the advent of yield monitors, which captured yield and grain moisture data as combines moved across fields. Today, farmers are increasingly making use of farm data which has expanded to include a variety of sources: planters and seeders, sprayers, plant health imagery from satellites and drones, livestock data from barn management systems, weather data from service providers and connected weather stations, connected soil and crop canopy sensors, equipment performance data, financial data, and more. This increased reliance on data is illustrated in Figure 6, from a survey conducted in 2022 by RealAgristudies partnered with Farm Credit Canada identifying rates of on-farm data use.

A World Bank Report, also points to the fact that in 2014, 190,000 data points were being produced per farm, on a daily basis, and expects that number to grow to around 4.1 million data points daily by 2050. The Canadian Agri-Food Data Initiative, a project led by EMILI and based in Manitoba, points to an increasing use of digital tools in Canadian agriculture over the past two decades, a trend which is only expected to accelerate at home and around the globe.

**Figure 6:** Survey Identifying Rates of On-Farm Data Use

Which of the following best describes the extent to which you use data from your farm to manage production?

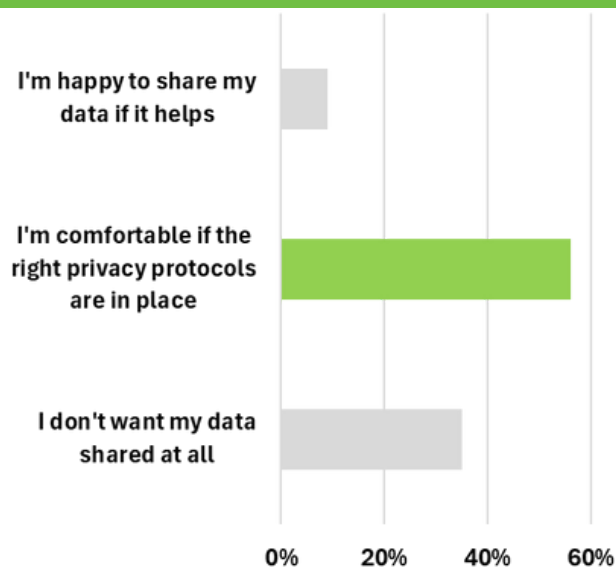


Source: RealAgristudies

Governments around the world recognize this challenge and are responding with significant investments to improve connectivity in the agriculture sector. For example, the U.S. Precision Agriculture Satellite Connectivity Act of 2018 requires the Federal Communications Commission to establish the Task Force for Reviewing the Connectivity and Technology Needs of Precision Agriculture in the U.S. to recommend changes that will promote optimum profitability, sustainability, and environmental protection. Furthermore, the Government of Australia's On Farm Connectivity Program is providing \$30 million over 2 years from 2023-24 to 2024-25 to enable primary producers in agriculture, forestry and/or fisheries to take advantage of connected machinery and sensor technology. Through this initiative, farmers can submit a claim for a rebate of up to AUD \$30,000 for the purchase of eligible connectivity solutions and equipment (e.g., Low Power Wide Area Networks (LPWAN), portable hotspots, weather monitors and cameras and irrigation controllers).

However, according to a recently published U.S. Government Accountability Office [Report](#), there are several challenges associated with the full utilization and adoption of precision agriculture technology, including the costs associated with purchasing this equipment, farm data ownership concerns, as well as the fact that farmers remain uncertain about how farm data is being collected and managed.

**Figure 7:** How comfortable are you with sharing of your data around fertilizer use?



Source: Ontario Federation of Agriculture (OFA)

When it comes to farm data ownership and trust, Canadian farmers have indicated that their comfort level with sharing farm data was related to their trust level with the agtech company, which was also related to questions of data security and privacy. For example, a recent survey of Ontario Federation of Agriculture (OFA) members (Figure 7) indicated that roughly 65 per cent of farmers are willing to share their data on fertilizer use if the right privacy protocols are in place.

Recent surveys from [RealAgristudies](#) and [Farm Credit Canada \(FCC\)](#) are showing some improvements in this area over the last few years. For instance, those surveys found that 66 per cent of respondents feel the companies that handle their data are doing a good or excellent job, a 31 per cent increase from four years ago. However, there is still significant potential to fully demonstrate the value of on-farm data and ensure policy and industry data-mobilization practices are enabling build trust among farmers when it comes to how their data is being used.

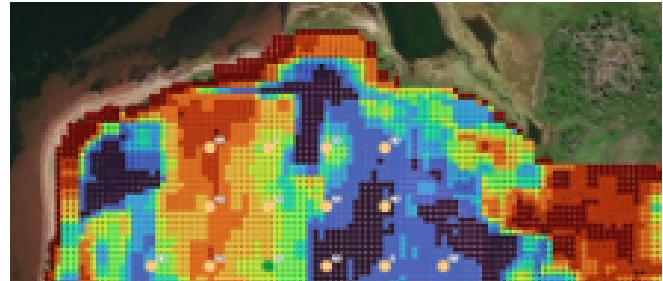


### 3.3 FARM AND INDUSTRY GROUPS HAVE A KEY ROLE TO PLAY IN BUILDING TRUST AND LEVERAGING DATA TO THE BENEFIT OF FARMERS.

The Prince Edward Island Federation of Agriculture (PEIFA) is currently in the process of building a prototype for farmers to help ensure they store and maintain data, as opposed to having external service providers do it for them. In so doing, PEI farmers' data is owned and maintained directly by the PEIFA. As a result, decisions about who has access to the data can be made through an existing governance structure, a democratically elected farmer board of directors.

The PEIFA is using open-source hardware to build a secure network with their member farms so that it is not connected to the broader internet. This allows them to draw a direct link from sensors in the field into the tractor where data is communicated securely from the field and then back directly to the servers. This in turn is providing feedback to producers through, for example, high-resolution nitrogen mapping (see Figure 8) and has secondary benefits of facilitating better access to programs like the federal offset protocols and carbon market opportunities that have a net positive impact of farmers' bottom line. This simple and relatively affordable setup allows farmers to collect data securely and then get inputs that generate value to run a more productive and profitable farm.

**Figure 8:** Collecting Data Through High-Resolution Nitrogen Mapping



Yet another example of where data is being leveraged to drive both on-farm profitability as well as sustainability is through FCC's AgExpert Field which gathers data from the field to inform crop history rotation and crop input trends, tracking input and operating costs and automatically populating data into sustainability forms. With over 22,500 customers, AgExpert operates on over 6 million acres of Canadian farmland. To help reassure their clients that their data is secure and to promote transparency, FCC is one of 40 companies in North America, including the Canadian Federation of Agriculture, that has signed onto the Ag Data Transparent (ADT) initiative and met the threshold to become ADT certified. The certification is based upon a set of Core Principles for the transparent use of ag data that are widely accepted by the North American agricultural industry.



Source: AG DATA TRANSPARENT

Finally, the Canadian Centre for Agri-Food Benchmarking was launched in 2024 to advance a globally novel tool, the National Index on Agri-Food Performance. The Index was published as a pilot in 2023 and presents a holistic view of the sector’s sustainability including 20 indicators and well over 130 metrics of sustainability. The initiative is being driven by an unprecedented public-private coalition numbering 150 partners to showcase the sector’s sustainability credentials in the domestic and global marketplace. The Index is not prescriptive, but it is designed to align a very diverse food system on how sustainability ought to be measured, complementing sector efforts.

Enabling such alignment presents a major competitiveness opportunity. Outcome-based measurement and reporting is fundamental to step-up transparency and build greater societal trust in the Canadian agriculture and food brand. As data improves, the Index can become a means to inform policy, research, innovation, and data priorities. By better aggregating data from the sector, the Index can serve as a great example of how on-farm and broader sector data can be rolled into a resource that benefits producers and the food system as a whole. As well, the Centre presents a leading collaborative platform to engage with players, here and abroad, which is key to address evolving data issues, measurement and value-driving applications going forward.

**Figure 9:** Canadian Centre for Agri-Food Benchmarking



Source: [www.agrifoodindex.ca](http://www.agrifoodindex.ca)



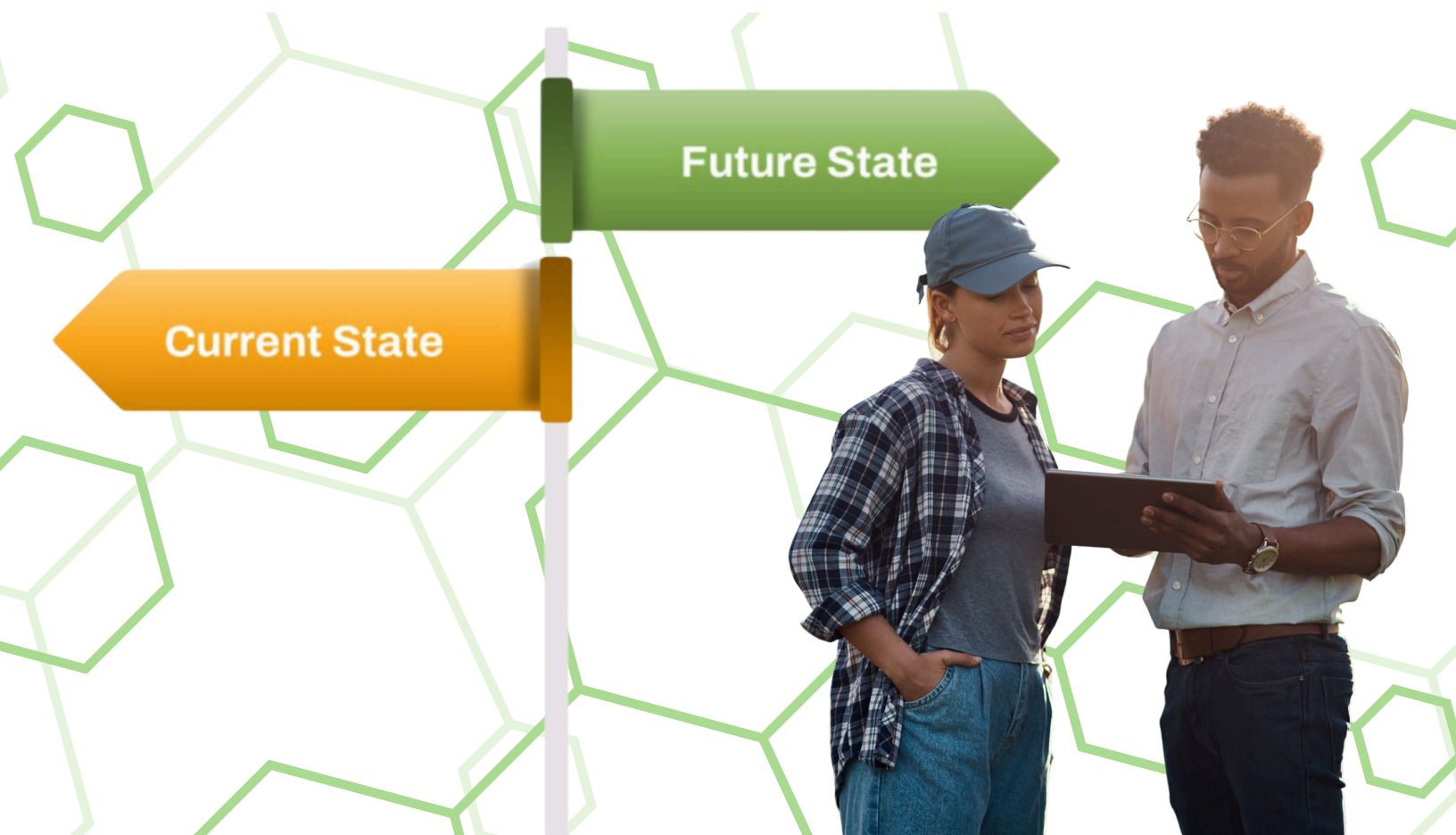
## 4.0 Further support is needed at all levels to meet the sector’s full potential

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### 4.1 CREATING A PAN-CANADIAN DATA STRATEGY AND BOOSTING INCENTIVES FOR PRIVATE SECTOR INVESTMENT IN DATA AND INNOVATION.

The Standing Senate Committee on Banking, Commerce and the Economy recommended that Canada develop a national data strategy and data governance legislative framework to provide clear rules regarding the use, mobilization and storage of data, protect against privacy concerns and promote data literacy.

The Committee also recommended that the Government of Canada, in collaboration with relevant standards organizations, support the development of digital standards. This is consistent with a recommendation in the Auditor General’s 5th Report for the development of a data strategy to address data and measurement challenges at the farm, regional, and national levels in order to ensure that AAFC can “meaningfully contribute to Canada’s 2030 and 2050 climate change targets.” Such a strategy has the potential not only to contribute to measurement and reporting of climate change targets, but must strive to do more by supporting innovation, research and enhanced farm-level decision making. To realize this potential, the recommendations outlined throughout this section must be incorporated to ensure a successful strategy.



Recognizing the critical role that data and innovation play in supporting the sector as a driver of economic growth, food security and sustainability objectives, we recommend that this Strategy lay out the vision, objectives and articulate the strategic focus areas and initiatives that will set a foundation for programming and investment, and establish Canada as a leader in promoting agricultural data and innovation. Those strategic focus areas could include, for example:

1. Increasing funding and coordination of data-oriented research and development
2. Increasing public and private investment in data, technology and innovation
3. Supporting digital skills, outreach and extension to drive adoption of digital solutions
4. Establishing common standards and approaches to data measurement and reporting
5. Creating a data governance framework inclusive of legislative tools, standards, and/or industry codes of practice to provide clear rules regarding the use, ownership and storage and interoperability of data, including the protection of data privacy and promotion of cybersecurity.

Further, by developing it in consultation with farmers and ensuring that data is accessible to producers to inform farm-level decisions, the Strategy would become a necessary first step in advancing Canada's data objectives and help address ongoing friction on policy directions by grounding policy discussions in a common data framework.

**Recommendation 1:** In concert with producers and value-chain stakeholders, develop a Pan-Canadian Data Strategy that establishes a common policy framework for public and private investment in research, programming, digital skills and outcome-based measurement and reporting to support Canada's agricultural productivity and sustainability objectives.





## 4.2 CANADA NEEDS TO EXPAND RURAL CONNECTIVITY BEYOND THE FARM-GATE AND INTO THE FIELD.

Precision agriculture equipment has demonstrated its ability to increase yields and enhance sustainability. However, the high return on investment in costly machinery is meaningless if this equipment in the field, greenhouse or barn is not supported through adequate connectivity.

Further work is clearly needed to close the connectivity gap between urban and rural Canada and ensure sufficient in-field connectivity to enable the range of agtech opportunities emerging for farmers. By enhancing coverage, farm gate and in-field connectivity, farmers would be better positioned to benefit from instantaneous and automated data transfers, making their job easier and more efficient. This will require investment in connectivity solutions and equipment similar to those covered under Australia’s Better Connectivity for Rural and Regional Australia Plan.

In addition, as discussed above, farms are already generating significant levels of data, much of which is not being used to its full potential due to, among other factors, proprietary data platforms and interoperability<sup>[3]</sup> constraints. As noted in a recent Canada West Foundation [Policy Brief](#), while data-driven agriculture promises benefits, “without regulatory intervention, there is no guarantee that agricultural technologies will be developed and distributed to promote interoperability.” The concern is that we are seeing a “proliferation of non-interoperable agricultural technologies [which] poses serious risks for Canadian food security, innovation and the export-driven Canadian economy.”

The Government of Canada recently introduced [Bill C-72](#) the Connected Care for Canadians Act, which will see federal, provincial, and territorial governments working together through the implementation of a Pan-Canadian Interoperability Roadmap with common interoperability and data standards in healthcare. The legislation would require all IT companies providing digital health services in Canada to adopt common standards and allow for protected and secure information exchange across various systems.

If we can do it to safeguard the health of Canadians, surely, we can do it to safeguard our food security. Private Members [Bill C-294](#), An Act to Amend the Copyright Act (Interoperability) is certainly a step in the right direction along with Budget 2024’s [commitment](#) to launch consultations on interoperability, so that farmers can use their equipment in the way that is best for their farm.

**Recommendation 2:** Close the connectivity gap between urban, rural and remote regions of Canada and ensure sufficient in-field connectivity to enable the range of agtech opportunities emerging for farmers.

**Recommendation 3:** Establish programming to support the integration of connectivity solutions and equipment such as, for example, portable hotspots, satellite technology, weather monitors, cameras and irrigation controllers.

<sup>3</sup> [Interoperability](#)—the ability of data or tools from non-cooperating resources to integrate or work together with minimal effort.

### 4.3 SUPPORT FOR INDUSTRY STANDARDS AND CAPACITY BUILDING IS NEEDED TO EMPOWER FARMERS AND ENSURE THEY REALIZE THE BENEFITS FROM THEIR ON-FARM DATA.

Trust plays a critical role when it comes to farm data mobilization and ownership. Building on successful models, like the platform being implemented at the PEIFA, it is recommended that governments support interested provincial, territorial and national farm organizations to advance the development and implementation of new farmer-led data-mobilization platforms, associated technologies, and initiatives to support extension/education efforts that support data-driven decision-making where those groups have identified a need and/or clear value proposition. With already established, farmer-led, governance structures in place, these organizations are uniquely positioned to ensure farmers can control access to their data and, first and foremost, support farmers in making better informed decisions for their farms. To make this happen, these organizations need access to new grant and/or program funding targeted to capacity building, outreach and education as well as for the purchase of new equipment and hardware to develop these new data-mobilization platforms.

To fully take advantage of the data being collected at the farm level, and across the value chain it will be important to develop common principles, guidelines and standards that support the use of data for farm management, data-informed decision making, as well as regulatory and sustainability reporting requirements.

To that end, EMILI and the Canadian Standards Association (CSA) Group are working on a multi-faceted project to address both the knowledge and standardization gaps regarding agricultural data governance. This project aims to develop tools and training material that can address questions related to agricultural data ownership, data privacy, and will explore the potential for a unified set of principles or a code of practice to help strengthen data governance practices across the Canadian agriculture and food system.

**Recommendation 4:** Support industry efforts to develop common principles, guidelines and standards that support the use of data for farm management, data-informed decision making, as well as regulatory and sustainability reporting requirements.

**Recommendation 5:** Make a legislative commitment to supporting farm equipment interoperability.

**Recommendation 6:** Capacity building for farm groups that are best positioned to protect farmers' rights and support greater transparency around data. This should include not only support for data infrastructure and improved governance, but also innovative measurement technologies, education, awareness and new agricultural extension services to support adoption.



## 5.0 Conclusion & next steps

The transformative potential of data in agriculture cannot be overstated. The integration of advanced data analytics and precision farming techniques promises to significantly enhance productivity, sustainability, and resilience in the Canadian agricultural sector.

However, realizing this potential requires concerted efforts from both government and industry leaders to establish the necessary legislative, policy and funding frameworks that will support the use of farm data in a way that benefits farmers. This will also facilitate the necessary private and public investments in connectivity infrastructure, standards, training and capacity building within the sector.

By taking a proactive leadership role, both public and private sectors can ensure a future where agriculture not only meets the growing global food demand but does so in a way that is environmentally sustainable and economically viable. The time to act is now, to build a resilient agricultural ecosystem powered by data.

**Figure 10:** Pan-Canadian Data Strategy for Canadian Agriculture

