

The Standing Committee on Agriculture and Agri-Food at the House of Commons of Canada

Brief on Perception of and Public Trust in the Canadian Agricultural Sector

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Agricultural practices and products have come under increasing scrutiny over the past decade. While the agricultural industry has been consistently providing safe and sustainable food products to consumers, mainstream media and social media provide a barrage of communications contrary to the evidence. As a result, Canadian consumers are experiencing confusion when it comes to the facts of their food. The objectives of this submission are to:

1. provide an overview of Canadian attitudes towards food safety and food systems;
2. present Canadian perspectives and awareness regarding plant breeding;
3. discuss the trust consumers possess regarding food information;
4. document uncertainties Canadians have about food production; and
5. suggest how to improve consumer food production awareness.

Based on this submission, the following three recommendations are offered.

1. Canada needs to better integrate knowledge about agriculture, food production and nutrition at the elementary and high school levels.
2. Canada needs to develop an informed, evidence-based agricultural communication and resource network.
3. Federal and provincial ministries of agriculture need to begin to proactively support Canadian agriculture innovations and successes.

1. Attitudes Towards Food Security

Food has never been safer to consume in human history than it is today. Conversely, modern technologies and communication allow misinformation to be widely accessible, making it difficult for consumers to make heads or tails of the information they receive. As a result of false information, there is a lack of knowledge about food, its production and how it reaches store shelves. Why does this dichotomy exist? Part of the reason is because the food industry is a multi-billion dollar a year industry and competition for space on grocery stores shelves and consumer grocery carts is fierce. This competition for consumers' food dollars leads the food industry to aggressively brand their food products and label to appeal to discerning consumers. The result has been a plethora of food labels such as gluten-free, natural, hormone-free or non-GMO, that are designed to appeal, but frequently confuse, consumers.

In spite of the dichotomy of information publicly available, food is being safely produced for Canadian consumers. In a survey commissioned by Health Canada (The Strategic Council,

2016), 66% of Canadians are confident that the food system is strong and rigorous, protecting consumers from harmful or unsafe food products. In similar consumer survey research, I have undertaken over the past two years as part of my research chair in agri-food innovation, 67% of English speaking Canadians (sample of 500) are moderately or strongly confident in Canada's food safety system.

Contrasting this is the Canadian Centre for Food Integrity's 2018 report that identifies 23% of Canadians believe that Canada's food system is on the wrong track, with 41% unsure of whether the food system is on the right or wrong track (CCFI, 2018). The 2018 report identifies a significant increase in Canadians that are unsure about the direction of Canada's food system as the 2017 report found 14% believed the food system was on the wrong track, with 43% unsure (CCFI, 2017). Between these two reports, there were no major nation-wide food safety failures that would help to explain the increase.

The question then becomes, what explains the contrast in Canadian attitudes about food safety and the food system? With two-thirds of Canadians supportive of the level of food safety in Canada, how is it that 64% are either unsure or believe Canada's food system is not headed in the right direction? This certainly appears to be a substantial contradiction in data. I believe the explanation for this is that at a broad and general level, Canadians possess the knowledge and confidence to state that Canada has a safe food production system, but the more that research questions probe into the details and depths of this knowledge, confidences rapidly decline, hence 40% of Canadians being unsure if the food system is headed in the correct direction.

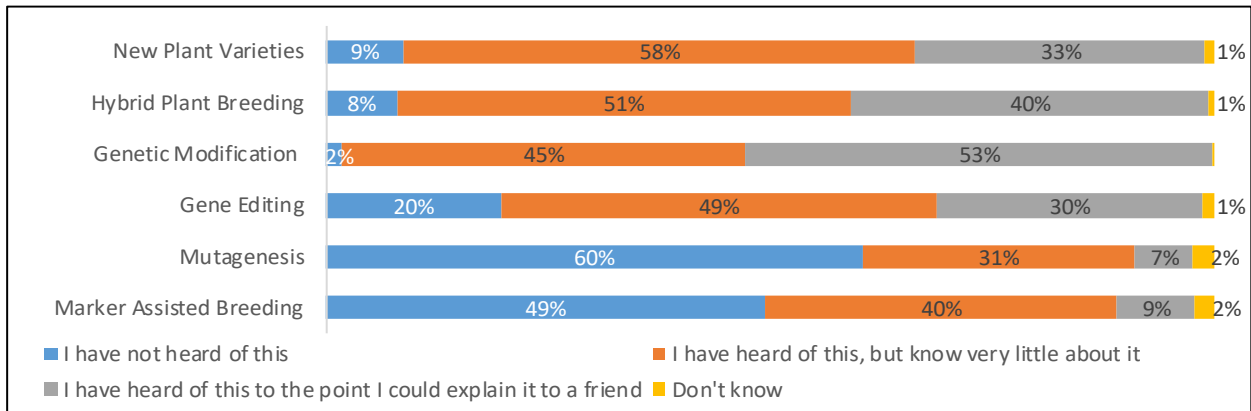
2. Perceptions of Plant Breeding

As a means of validating Canadians' lack of basic information about Canada's food system, I have undertaken research that explores this issue through a series of surveys over the past two years. These surveys have asked Canadians about various plant breeding technologies, finding that 69% are slightly, or not at all, familiar with plant breeding (McFadden and Smyth, 2018). Probing further, the surveys asked about their specific knowledge on methods of plant breeding. Ninety-one percent of Canadians have either never heard of mutagenesis or possess very little awareness (Figure 1). Mutagenesis plant breeding technologies originated in the 1930s and have over 80 years of global application to the development of new field crop and vegetable varieties. Mutagenic breeding exposes plant seeds to chemicals or radiation, which are then grown to determine what genetic changes have occurred. Mutagenesis is commonly referred to as conventional plant breeding.

Similarly, hybrid breeding whose use dates back to the 1950s, is not well recognized, with 59% indicating they know little or nothing about it. The use of hybrid breeding in flower varieties, especially roses and fruit trees, dates back even further. The most significant takeaway message from Figure 1 is that 67% of Canadians know very little about the basic term 'new plant varieties'. The only breeding method to have over 50% awareness is genetic modification.

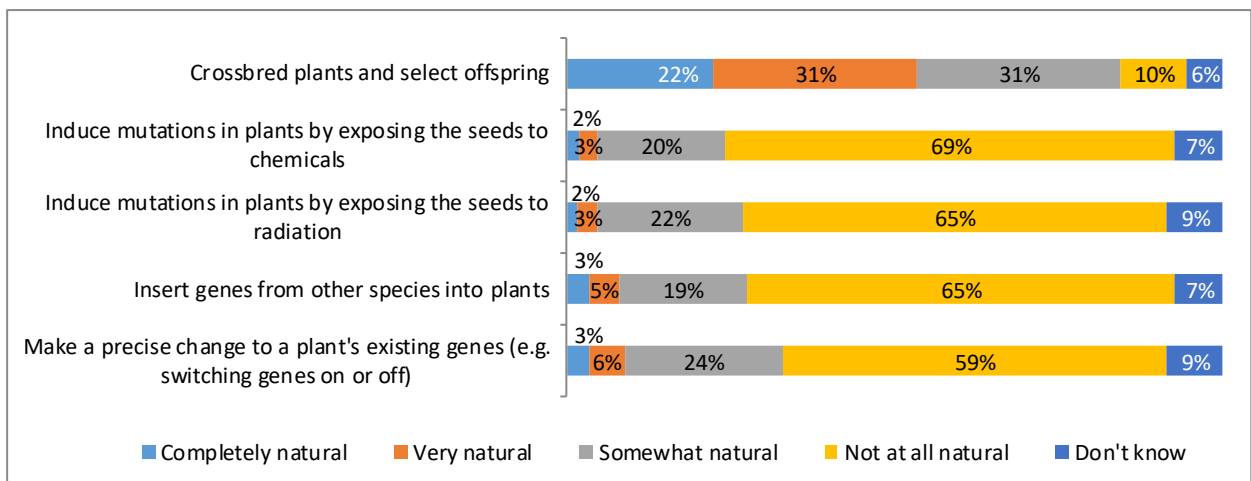
Canadians possess little to no awareness of how crop, fruit and vegetable varieties are developed, contributing to their uncertainty about the direction Canada's food system is headed. In large part, this is due to the fact that scientific publications about plant breeding are virtually inaccessible to the public as scientific journals charge an article access fee. The voice of the public sector and academic scientists are also virtually non-existent as most individuals simply want to conduct their research and frequently avoid media or public communications. The result is a large void in the provision of trust information for those individuals seeking it, that has to a large degree, been filled by those opposed to modern agriculture.

Figure 1: Plant breeding technology awareness



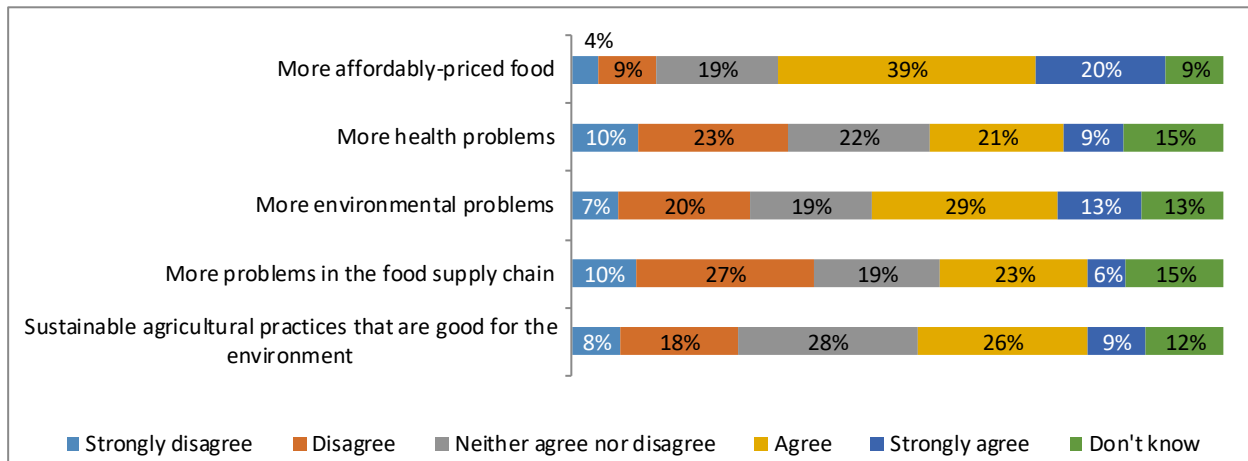
When asked about different types of plant breeding technologies and how natural participants perceived them to be, the majority of participants generally perceive changes to the genetic composition of plants to not be natural at all (Figure 2). Depending on the plant species, up to 20 genes can naturally mutate from one generation to the next. Two-thirds of Canadians believe that the mutagenic technologies used to develop crop and vegetable varieties for decades are not at all natural. One-third of Canadians believe that conventional plant breeding (chemical and radiation mutation breeding) does not alter a plants genes, when in reality, it creates randomly uncontrolled changes in over 30,000 genes. Less than 10% of Canadians believe that mutagenesis, genetic modification and genome editing are natural means of breeding new crop and vegetable varieties. The combination of fully sequenced plant genomes and digital biology has created very precise, controlled plant breeding technologies that create new varieties with a small number of genetic changes, of which the Canadian public has virtually no awareness. It should be noted that 10% of Canadians think that crossing one plant with another is not natural. Genetic changes for crop and vegetable varieties is essential for Canadian food production, especially as climate change impacts agriculture; if the plants grown to produce our food do not change to adapt with the climate, less food will be produced.

Figure 2: Naturalness of plant breeding technologies



It appears that Canadians are mainly indifferent or not strongly for or against the consequences of modern plant breeding. When asked to agree or disagree with statements regarding potential consequences of modern plant breeding, very few chose the extreme options of strongly disagree or strongly agree (Figure 3). A majority (59%) believe that new breeding techniques will result in more affordably priced food. Over one-third of the sample agreed that modern plant breeding can lead to sustainable agricultural practices that are good for the environment against 26% who disagree with that. When asked if these technologies are a risk for their health, 30% agreed. One thing that stands out in the results of this question was the level of unwillingness to respond to the statements. Respondents that answered either ‘don’t know’ or ‘neither agree or disagree’ account for between 28% and 40%.

Figure 3: Perceptions of new plant varieties

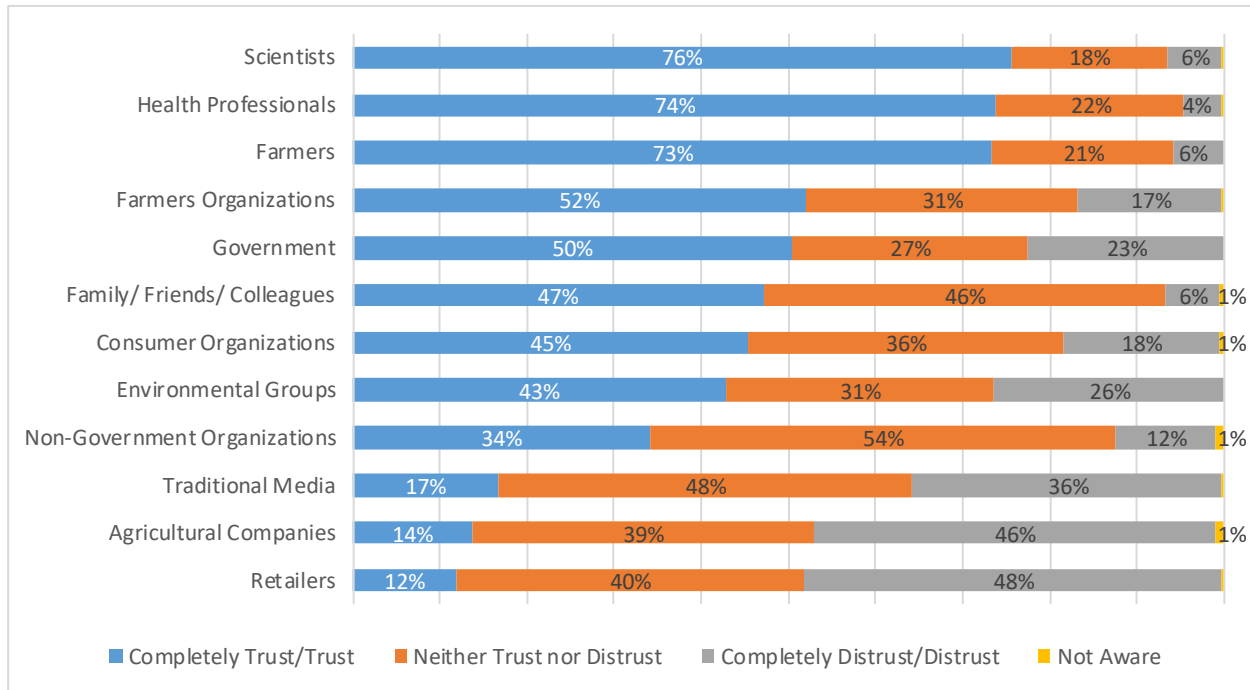


The fact that two-thirds of Canadians express confidence in the food safety system means that the majority of consumers are confident in the food products they routinely purchase will not cause harm to them or their family. While Canadians express confidence in the safety of the food products they are purchasing, when asked about the technologies used to provide these food products, it is revealed that Canadians are less confident.

3. Public Trust in Food Information

If the public does not trust the food they eat, this can be viewed as a failure in the system, whether it is the actual safety of the food or a failure to publicly communicate the safety of the system. Based on my recent research, when asked about their level of trust in a series of food information providers, scientists, health professionals and farmers at 76%, 74% and 73%, respectively, rank the highest as either completely trusted or trusted sources (Figure 4). Additional interesting observations are that traditional media sources are not well trusted, with 36% saying they completely distrust, compared to 17% that do trust. Environmental organizations have a surprising level of distrust, with 26% saying they completely distrust compared to 43% that do trust. Friends, family, colleagues and consumer organizations are trusted by nearly half of the respondents as responsible sources of food information. Governments are additionally recognized by exactly half of the respondents as a trusted source of information.

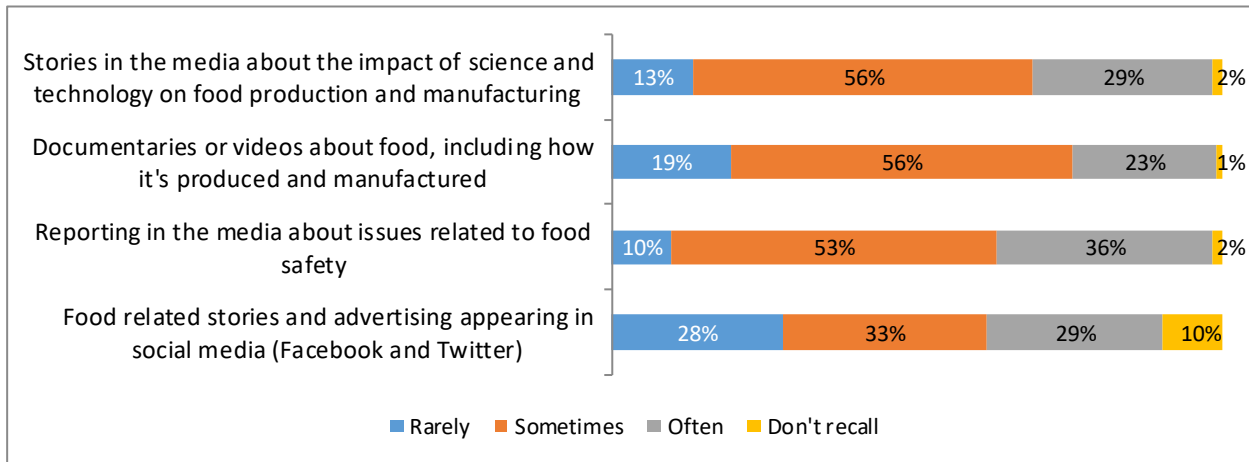
Figure 4: Trust in sources of food product information



As has been confirmed in other studies (CCFI, 2017), trust in the industry is exceptionally low, with trust levels in agricultural companies of 14% and retailers at 12%. Distrust in these sources ranges is far higher, revealing that consumers are as skeptical of food processing firms as they are of agricultural chemical companies. The level of distrust in retail firms is surprising, given the vast sum that these firms have spent on marketing themselves to the Canadian public in the past several years. There is a general lack of confidence in some food products as the American Association for the Advancement of Science (AAAS, 2015) reported that 88% of their scientific members believe that GM foods are safe, compared to 37% of the public that held the same opinion. This gap of 51% demonstrates that consumers and society have a lack of trust in science and agricultural food innovations.

One aspect of food safety that we gathered insights into was whether the public pays attention to news stories that relate to food, food safety or the science and technology of food products. Survey respondents indicated that media stories relating to food safety issues are most often paid attention to, with 89% saying they often or sometimes pay attention to such stories (Figure 5). Clearly, Canadians take food safety very seriously, with nine out of ten expressing that this information is to some degree, important to them. Media stories about science and technology regarding food production are also news items that listen to or watched, with 85% indicating they sometimes or often listen or watch. Those indicating they watch documentaries or videos about food are also a common part of what Canadians tune into, with 79% indicating the listen to or watch these. Over the past 10-15 years, numerous documentaries have been produced that were critical of the food industry, however, in the past several years, documentaries presenting a more scientific perspective are being shown. Stories and advertising in social media outlets are the least likely to have a serious impact on the participant, with the highest percentage of participants unable to recall (10%), and 28% rarely paying attention.

Figure 5: Frequency of watching or hearing about food-related news



On the whole, Canadians express trust in the food system, especially when the information is provided by those viewed as experts, such as scientists, health professionals and farmers. Additionally, Canadians identify that they have considerable interest in, and pay attention to, stories relating to food or the science and technologies regarding food production.

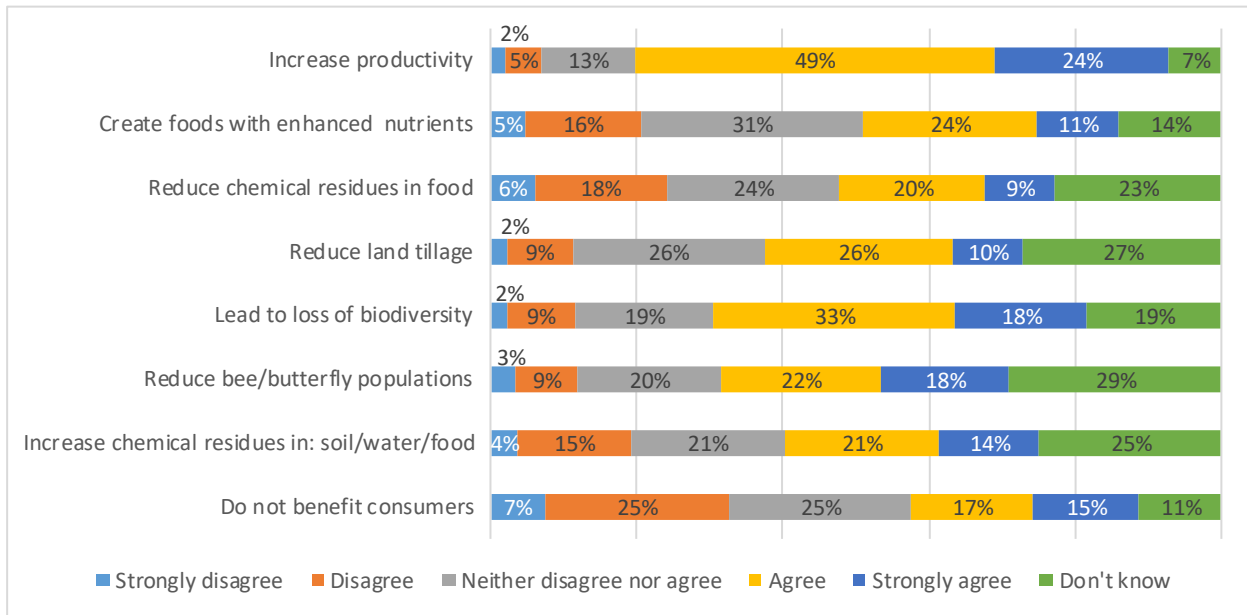
4. Uncertainties about Food Production

While Canadians have high levels of confidence in food safety, they are seeking additional information about a multitude of effects from food production. Canadians are interested in how their food is produced but indicate high levels of uncertainty about many potential positive and negative impacts of their food production (Figure 6). Respondents indicate confidence that new breeding techniques would result in an increase in productivity, with 73% either agreeing or strongly agreeing with this statement. Contrasting this is that 51% of the respondents believed that new breeding techniques would lead to a loss of biodiversity, compared to only 28% that disagreed. Reductions in chemical residues in food were viewed as a potential benefit by 29%, yet 24% disagreed with the statement. One-third of respondents disagreed that consumers do not benefit, which was equal to those that agreed with the statement that consumers do not benefit.

The main benefit that consumers receive from innovative crop breeding technologies is lower food prices. An analysis of the share of benefits that consumers receive from GM crops, reveals that 20% of the total benefits are received by consumers (Smyth, Kerr and Philips, 2015). Other plant breeding benefits include new crops with higher nutritional content, such as increased proteins in crops like potato, rice and wheat or better fatty acids in canola, cotton and corn (Newell-McGloughlin, 2014). Additional food nutritional research is focused on improving essential amino acids, carbohydrates, micronutrients, vitamins and mineral availability.

Other statements about potential benefits or potential adverse effects exhibit higher levels of uncertainty as a striking observation in Figure 6 is the significant percentage of respondents that did not express an opinion on potential positive or negative impacts. Combining those that selected 'neither disagree or agree' with 'don't know' resulted in the majority of responses in some options, such as in whether tillage will be reduced (53%) or impacts on bee and butterfly populations (49%).

Figure 6: Potential effect statements from modern plant breeding techniques



5. Improving Consumer Food Production Awareness

For decades, governments have had to balance the delicate line between regulating innovations, products and industries and publicly supporting Canadian products and technologies. Many governments have chosen to be conservative in their support of a specific product or technology, but to offer support for the approval process, the public funding that may have been provided or to promote the society-wide benefits. This delicate balance was successfully observed in most instances, until recently. Social media is impacting society’s perception of science, innovation, food production and food safety, to the point that a serious rethink is required about the role of state advocacy.

Canada has a world leading science-based regulatory system that delivers consistent risk assessment decisions in a timely manner. This is crucial for innovation investments (Smyth, McDonald and Falck-Zepeda, 2014). While it is essential that the regulatory independence of Health Canada and the Canadian Food Inspection Agency regulators be maintained, thereby continuing to provide the trust that Canadians have in our food safety system, the lack of a consistent, factual voice about the safety of Canadian food products is noticeably absent. While science communication by the agricultural industry, including firms, universities, farm organizations and farmers, has improved, these efforts are frequently disconnected and too fractionated. These communications are often directed at specific or focused issues within the various segments of the agricultural industry and there is a lack of national voice that speaks to the overall safety of the risk assessment process, what risks are assessed and how monitoring is an ongoing part of the regulatory process. The absence of a trusted government agricultural science voice has allowed the void to be filled by communications from various organizations that are critical of modern agricultural technologies and practices.

Canada has long been a strong supporter of innovation, through direct funding programs, innovation incentives and research partnerships, however, the commercial success of these investments has the potential to be jeopardized if Canadian consumers are not receptive of

the resulting technologies and products. Investments in agricultural research risk being stranded or providing less than optimal returns, if successful commercialization fails to occur. The time has come for the federal government to innovatively and strategically invest in informing Canadians about the provenance of their food products. This could be accomplished through the following three recommendations.

First, facilitating the development of factual, educational materials regarding agriculture, food production, nutrition and health for uptake into elementary and high school curriculums would provide much-needed resources for provincial education curriculums seeking these materials. The lack of a coordinated science-based education provides a lifelong information deficit. Development of materials on how food is produced, the effects of a changing climate on food production and discussions about nutrition sources, for example, will improve the knowledge and information of future consumers. There are programs already in place, such as Farm and Food Care or Ag in the Classroom, that can be drawn upon to ensure there is not a duplication of effort. Research by Bradley, Waliczek and Zajicek (2010) found that a course as short as 10 days improved student knowledge by 22%.

Second, agriculture has embraced sustainable production practices due to innovations from both the public and private sectors, but Canadians generally lack awareness of the benefits of recent agricultural innovations. For example, through a combination of improved farm equipment and genetically modified crops that have improved weed control, over 95% of the summerfallow acres in Saskatchewan have been removed between 1995 and 2018. These 11 million acres are no longer tilled for weed control, allowing for increased moisture conservation, reduced erosion and increased carbon sequestration. While the Canadian agriculture industry is beginning to tell these stories, public trust as sources of information can be low as seen in Figure 4, whereas trust in government is higher. Establishing a network of informed, evidence-based agricultural communication and resources is essential. This network would need to include federal and provincial governments, commodity and farm organizations, private firms and universities. This would provide a more widely accessible, factual based integrated network of information and resource materials for Canadians actively seeking information.

Third, federal and provincial ministries of agriculture should begin to proactively support Canadian agriculture and its successes. Tourism sites and events are actively promoted at both the federal and provincial levels, so why not agriculture? Canada has a thorough risk assessment process that has correctly assessed the risk of new food products for twenty-five years, which needs to be championed. Canadians lack awareness of the risk assessment process that exists for food products and proactively supporting the efficiency of the food safety process, provides information the public seeks regarding food production. Promoting research projects that examine things like changes in pollinator populations or the level of chemical accumulation in soil, will begin to address the publics' desire for reliable and trusted information.

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