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**CANADIAN AGRI-FOOD
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IN A COVID-19 WORLD**

May T. Yeung and William A. Kerr

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SUMMARY

Canada is the world's fifth largest agri-food exporter, exporting half of its production, for an annual export value of C\$56 billion. The OECD forecasts increasing global demand for food products, providing opportunities for continued growth of Canada's export market. Canada's long, complex, internal supply chains stretch beyond its borders across the globe, terminating in a large array of countries with differing technical abilities, importing supply chains and business cultures. They operate in an internationally competitive environment that is subject to a wide variety of shocks — agronomic, logistical and political.

The shock delivered by the rapid spread of the COVID-19 pandemic, however, was unprecedented in its swiftness and in the magnitude of its disruptive effects. It represented a major test of the resiliency of Canadian agri-food supply chains, in both provisioning the domestic market and servicing export customers. If the ultimate measure of resilient food supply chains is providing safe, reliable availability of food to the population, so that shortages and scarcity are avoided to the greatest degree possible, it is clear that Canadian agri-food supply chains have proven to be highly resilient to the shocks COVID-19 presents. At first, there were no published reports or peer-reviewed documents to support this — it was too soon — but the fact that shortages of specific food products were temporary and within a few weeks, product availability and selection in Canadian grocery stores returned to pre-COVID-19 levels provides ample evidence. Food security in Canada was maintained.

While the pandemic has not yet run its course, in a few months Canadian agri-food supply chains returned to the high levels of efficiency they possessed prior to COVID-19, as evidenced by the lack of shortages at grocery stores, and were ready to take advantage of any export opportunities that may present themselves as those markets and our competitors deal with COVID-19.

Agri-food supply chains cannot adjust to shocks instantaneously. The food arriving today is the result of decisions taken months or even years ago. It is a flow that cannot be increased, slowed or diverted easily. Adjustments to shocks take time and may have widespread consequences. COVID-19 brought shocks to both the domestic agri-food market, and the international export market for Canada.

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COVID-19 brought two major shocks to the domestic market — a supply shock for some industries due to the direct effect of illness among the workforce and the indirect effect of border closures on the movement of agricultural workers. The demand shock arose from declining incomes as large parts of the rest of the economy shut down and the shift from meals consumed outside the home to in-home consumption required a major repositioning of some supply chains. While there were short-run shortages of some foods, there were always sufficient substitutes on the shelves so that there was a plentiful and diverse selection of food available at all times. For example, even at the height of the initial shock, if a particular cut of beef or chicken was not available, other cuts were; or if no beef was available, other protein sources from chicken to tofu were plentiful. Even then, such shortages were short-lived. There was no food availability problem and food prices were relatively stable during the onset of the pandemic and initial lockdown. Often, where there were problems of access, it was more an issue of consumers having the wherewithal to purchase food rather than a lack of supply. In short, Canadian agri-food supply chains — from farmers through to consumers — proved to be resilient in keeping Canadians fed and up to the challenges brought by COVID-19.

Canada's export supply chains, given their distance from markets, did not directly feel the disruptions being felt from COVID-19 in their destination markets. Changes like the shift from eating in restaurants to eating at home in those markets were largely masked from Canadian supply chains, given the point at which Canadian agri-food products enter foreign markets and the transportation lags involved. After all, unlike other sectors of an economy that can be shut down in a pandemic, people still need to eat. Disruptions to supply were overcome relatively quickly; thus, Canadian international agri-food chains proved to be resilient and adept at finding work-arounds when problems arose. Secondary disruptions are also apparent due to primary producers feeling economic and operational pressure from the adjustments and stoppages in the supply chain; for example, beef farmers holding back cattle, or potato farmers holding excess unused stock originally intended for the hospitality/restaurant industry.

This proven resiliency will be a considerable asset. Canadian agri-food chains were already efficient and internationally competitive, as evidenced by their consistent export performance. Their resilience has allowed them to remain so. Our major agri-food competitors however, may not prove to be as resilient. Thus, Canadian firms may have opportunities to increase exports as competitors struggle with COVID-19. Some of Canada's competitors have imposed export restrictions, resulting in under-served markets that can be accessed by Canadian supply chains. Others may struggle to maintain their production and quality levels or to move and transport product, given illness in their labour forces or disruptions to the movement of foreign workers. Importers may see high illness levels in a supplier nation and choose to source from elsewhere. It will be up to Canadian firms and industry associations to monitor the evolution of international competitors' responses to COVID-19 and how import supply chains in destination markets are coping with it. If domestic supply chains within foreign markets falter, then opportunities for

Canadian firms will likely arise. Research into the responses in important markets can assist firms in their monitoring.

The ability of Canadian agri-food chains to take advantage of new export opportunities arising from COVID-19 is premised on those supply chains retaining their high levels of pre-pandemic international competitiveness. Governments need to resist the temptation to deal with what were short-term difficulties in the domestic market by lumbering agri-food supply chains with efficiency-reducing regulations. Encouraging the establishment of smaller, less efficient meat-packing plants is one example (Carlberg 2020). While there may well be future pandemics or other major disruptive shocks, there is no reason to believe they will create the same type of challenges. Current packing plants are efficient and resilient (Brocklebank et al. 2008; Khorana et al. 2015); they are part of supply chains that will be able to take advantage of new opportunities created by COVID-19 as they arise.

Other, more chronic problems such as the international movement of seasonal workers should have permanent and feasible solutions devised to enhance international competitiveness (Falconer 2020a; Falconer 2020b). To maximize this opportunity, short-term economic pain due to COVID-19 impacts should be mitigated with policies such as bridge financing for producers and processors to ensure the primary agriculture production system in Canada is working at optimum capability. Assistance in monitoring competitors and export markets (both current and potential) as well as funding research into opportunities arising from COVID-19 would be helpful. Finally, continued support of the rules-based international trade system and its institutions will facilitate trade growth. Canadian international agri-food supply chains have proven that they can bounce back from the serious challenges of COVID-19. They should now be allowed to use that resilience to garner any new opportunities to export that arise. By 2050, the world's population is forecast to be nearly 10 billion people, all of whom will require food. Canada is one of the few countries in the world with the capacity to produce significantly more food than its domestic needs and is well placed to take advantage of the opportunities presented by a growing global population.

POSSIBILITÉS D'EXPORTATION AGROALIMENTAIRE DU CANADA DANS LE CONTEXTE DE LA COVID-19*

May T. Yeung et William A. Kerr

RÉSUMÉ

Le Canada est le cinquième exportateur agroalimentaire au monde. Il exporte la moitié de sa production, pour une valeur d'exportation annuelle de 56 milliards de dollars canadiens. L'OCDE prévoit une augmentation de la demande mondiale de produits alimentaires, ce qui offrira des possibilités de croissance continue pour le marché d'exportation canadien. Les longues et complexes chaînes d'approvisionnement internes du Canada s'étendent au-delà des frontières et mènent à un large éventail de pays dont les capacités techniques diffèrent. Ces pays importent à partir des chaînes d'approvisionnement et des cultures commerciales. Ils fonctionnent dans un environnement concurrentiel international soumis à une grande variété de chocs : agronomiques, logistiques et politiques.

Le choc provoqué par la propagation de la pandémie de COVID-19 est cependant sans précédent dans sa rapidité et dans l'ampleur de ses effets perturbateurs. Cela équivaut à un test majeur de la résilience des chaînes d'approvisionnement agroalimentaire au Canada, tant pour l'approvisionnement du marché intérieur que pour les clients à l'exportation. Si la mesure ultime de la résilience des chaînes d'approvisionnement alimentaire est l'apport d'aliments sûrs et fiables à la population, tout en évitant au maximum les pénuries et la rareté, il est clair que les chaînes d'approvisionnement agroalimentaire au Canada se sont avérées très résilientes aux chocs de la pandémie. Au départ, il n'y avait pas de rapports publiés ou de documents évalués par les pairs pour étayer cette idée – il était alors trop tôt. Mais de nombreuses preuves en ce sens résident dans le fait que les pénuries de produits alimentaires précis aient été temporaires et qu'en quelques semaines leur disponibilité dans les épiceries canadiennes soit revenue aux niveaux pré-pandémique. La sécurité alimentaire a été maintenue au Canada.

Bien que la pandémie ne soit pas encore terminée, en quelques mois, les chaînes d'approvisionnement agroalimentaire au Canada sont revenues aux niveaux élevés d'efficacité qu'on observait avant la COVID-19, comme en témoigne l'absence de pénuries dans les épiceries. Les chaînes d'approvisionnement se sont montrées

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prêtes à profiter de toute occasion d'exportation qui puisse se présenter, alors que les marchés et la concurrence ont dû composer avec la COVID-19.

Les chaînes d'approvisionnement agroalimentaire ne peuvent s'adapter aux chocs de façon instantanée. La nourriture qui arrive aujourd'hui est le résultat de décisions prises il y a des mois, voire des années. C'est un flux qui ne peut facilement être augmenté, ralenti ou détourné. Les ajustements aux chocs prennent du temps et peuvent avoir de profondes conséquences. La COVID-19 a provoqué des chocs à la fois sur le marché agroalimentaire intérieur et sur le marché d'exportation international du Canada.

Le COVID-19 a entraîné deux chocs majeurs sur le marché intérieur. Le choc de l'offre pour certaines industries en raison de l'effet direct de la maladie parmi la main-d'œuvre et de l'effet indirect de la fermeture des frontières sur la circulation des travailleurs agricoles. Et le choc de la demande, qui a résulté d'une baisse des revenus, alors qu'une grande partie du reste de l'économie fermait ses portes, sans oublier la tendance à prendre davantage les repas à domicile plutôt qu'à l'extérieur, ce qui a nécessité un repositionnement majeur de certaines chaînes d'approvisionnement. Bien qu'il y ait eu des pénuries à court terme pour certains aliments, il y a toujours eu suffisamment de substituts sur les étagères pour assurer en tout temps une abondance et une diversité de denrées alimentaires. Par exemple, même au plus fort du choc initial, si une coupe particulière de bœuf ou de poulet n'était pas disponible, d'autres coupes l'étaient; ou si le bœuf manquait, il y avait suffisamment d'autres sources de protéines, allant du poulet au tofu. Même là, les pénuries ont été de courte durée. Il n'y a pas eu de problème de disponibilité alimentaire et les prix des denrées sont demeurés relativement stables au début de la pandémie et du confinement. Souvent, là où il y avait des problèmes d'accès, il s'agissait davantage du fait que les consommateurs avaient les moyens d'acheter de la nourriture plutôt que d'un manque d'approvisionnement. En bref, les chaînes d'approvisionnement agroalimentaire au Canada – des agriculteurs aux consommateurs – se sont révélées résilientes pour assurer la nutrition des Canadiens et pour relever les défis posés par la COVID-19.

En raison de leur éloignement des marchés, les chaînes d'approvisionnement d'exportation du Canada n'ont pas ressenti directement les perturbations vécues dans les marchés de destination. Les chaînes d'approvisionnement au Canada ont été largement épargnées des changements vécus sur ces marchés, comme le passage du restaurant à la maison pour les repas, et ce, compte tenu du moment où les produits agroalimentaires canadiens entrent sur lesdits marchés ainsi que les retards de transport connexes. Après tout, et contrairement à d'autres secteurs de l'économie qui peuvent être fermés en cas de pandémie, les gens doivent toujours s'alimenter. Les perturbations en matière d'approvisionnement ont été surmontées assez rapidement. Ainsi, les chaînes agroalimentaire internationale du Canada se sont révélées résilientes et aptes à trouver des solutions de contournement en cas de problème. On observe également des perturbations secondaires du fait que les producteurs primaires ressentent les pressions économiques et opérationnelles

liées aux ajustements et aux ralentissements de la chaîne d'approvisionnement. À titre d'exemple, les éleveurs de bœuf qui doivent retenir du bétail ou les producteurs de pommes de terre qui doivent garder des stocks excédentaires initialement destinés à l'industrie de l'hôtellerie et de la restauration.

Cette résilience démontrée constitue un atout considérable. Les chaînes d'approvisionnement agroalimentaire au Canada étaient déjà efficaces et compétitives sur le plan international, comme en témoigne la constance de leur performance à l'exportation. Leur résilience leur a permis de le rester. Cependant, les principaux concurrents du secteur agroalimentaire pourraient ne pas se montrer aussi résilients. Ainsi, les entreprises canadiennes pourraient voir des occasions d'augmenter leurs exportations alors que la concurrence est aux prises avec la COVID-19. Certains concurrents du Canada ont imposé des restrictions à l'exportation, ce qui donne lieu à des marchés mal desservis auxquels les chaînes d'approvisionnement au Canada peuvent accéder. D'autres peuvent avoir du mal à maintenir leurs niveaux de production et de qualité ou à transporter leurs produits, en raison de l'état de santé de la main-d'œuvre ou des perturbations dans la circulation des travailleurs étrangers. Les importateurs peuvent constater des niveaux élevés de contagion dans un pays fournisseur et choisir de s'approvisionner ailleurs. Il appartient aux entreprises canadiennes et aux associations industrielles de surveiller la réaction des concurrents internationaux face à la COVID-19. Ils doivent aussi surveiller comment y font face les chaînes d'approvisionnement sur les marchés de destination. Si leurs chaînes d'approvisionnement nationales font défaut, il y aura probablement des débouchés pour les entreprises canadiennes. Une recherche sur la réaction des marchés d'importance pourrait aider les entreprises à faire le suivi nécessaire.

La capacité des chaînes d'approvisionnement de tirer parti des nouvelles possibilités d'exportation qui s'offrent dans la foulée de la COVID-19 repose sur le fait qu'elles conservent les niveaux élevés de compétitivité internationale qui étaient en place avant la pandémie. Les gouvernements doivent résister à la tentation de faire face aux difficultés à court terme en encombrant les chaînes d'approvisionnement agroalimentaire d'une réglementation qui en réduirait l'efficacité. Favoriser la création d'usines de conditionnement de viande plus petites et moins efficaces en est un exemple (Carlberg 2020). Bien qu'il puisse y avoir d'éventuelles pandémies ou d'autres chocs perturbateurs d'importance, il n'y a aucune raison de croire qu'ils donneront lieu au même type de défis. Les usines de conditionnement actuelles sont efficaces et résilientes (Brocklebank et al. 2008; Khorana et al. 2015) : elles font partie de chaînes d'approvisionnement qui peuvent profiter des nouvelles opportunités amenées par la COVID-19.

Il faut trouver des solutions permanentes et réalisables, conçues pour améliorer la compétitivité internationale, afin de faire face à d'autres problèmes plus chroniques comme le mouvement international des travailleurs saisonniers (Falconer 2020a; Falconer 2020b). Pour maximiser l'occasion qui se présente, les difficultés économiques à court terme dues à l'impact de la COVID-19 devraient

être atténuées par des politiques telles qu'un financement provisoire pour les producteurs et les transformateurs afin de garantir la capacité optimale du système de production agricole primaire au Canada. Il serait utile de prévoir une aide pour surveiller les concurrents et les marchés d'exportation (actuels et potentiels), sans oublier le financement de la recherche sur les occasions d'affaires qui découlent du contexte de pandémie. Enfin, un appui continu au système commercial international fondé sur des règles, de même qu'à ses institutions, facilitera la croissance du commerce. Les chaînes d'approvisionnement agroalimentaire international du Canada ont démontré qu'elles peuvent se remettre des lourds défis causés par la COVID-19. Elles devraient désormais pouvoir utiliser cette résilience afin de saisir toute nouvelle occasion d'exportation qui se présente. D'ici 2050, la population mondiale devrait atteindre près de 10 milliards de personnes, qui auront toutes besoin de nourriture. Le Canada est l'un des rares pays au monde à avoir la capacité de produire beaucoup plus de nourriture que ses besoins intérieurs et il est bien placé pour profiter des possibilités qu'offre la démographie mondiale croissante.

INTRODUCTION

Canada is a major agri-food producer and the world's fifth largest exporter; half of Canada's agricultural production is exported, worth an annual value of C\$56 billion. Beef/cattle, pork, wheat, canola and legumes/pulses comprise the main exports (CAFTA 2020b). Exporting agri-food products to global markets requires robust, efficient and reliable supply chains leading from the farmer to the international consumer. Canada's agri-food industry has such supply chains, making it a competitive supplier of food to the world, as demonstrated by its proportion of output exported. The COVID-19 pandemic of 2020 represents an unprecedented shock for these supply chains, testing their resiliency and Canada's agri-food supply, exports and overall economy. Overwhelmingly, Canada's international agri-food supply chains proved their resiliency and passed the tests COVID-19 presented (FCC 2020d; Israelson 2020; USDA 2020; White 2020a).

This paper will discuss the resiliency of Canada's agri-food supply chains in adapting to COVID-19 to date. A brief discussion of existing agri-food trade and future growth forecasts will provide the background for Canada's targeted recovery through accelerated growth into these markets. The impact of COVID-19 on international agri-food trade will be discussed and a snapshot of new import challenges as well as forecast consumer demand will be provided. The paper will provide a framework by which new or expanded opportunities for agri-food exports can be assessed and make recommendations whereby Canadian supply chains can grow.

Appendices containing detailed information regarding six of Canada's major export products — wheat, barley, canola, pulses and legumes and meat (beef and pork) — are attached.

1. COVID-19 AND INTERNAL AGRIFOOD SUPPLY CHAIN RESILIENCE

The COVID-19 pandemic has focused attention on global agri-food supply chains as they suffered both demand and supply side shocks. The demand shock of the loss, virtually overnight, of restaurant and food service demand, coupled with a surge in grocery store/consumer demand caused unprecedented challenges to the agri-food supply chain in North America and elsewhere. Yet, grocery chains were able to return to stocked shelves in a matter of weeks (Charlebois 2020; Goddard 2020; Lusk 2020; Terazono 2020; WTO 2020). The supply side shock came when workers in agri-food processing facilities contracted COVID-19, causing plants to close and to institute mitigation procedures. In a matter of weeks, most were able to resume operations, albeit at a slower pace (Goddard 2020; Lusk 2020; Richards 2020; Rude 2020a). The Canadian and U.S. agri-food systems are highly integrated and similar in providing domestic consumers with diversity and choice in their food selection as well as being competitive exporters to global markets. Both countries' large, complex agri-food supply chains are based on production decisions made months in the past, producing food that is governed by the constraints of nature and the seasons. Adjustments cannot be instantaneous.

If the ultimate measure of resilient food supply chains is the safe, reliable, diverse availability of food to consumers, so that shortages and scarcity are avoided as much as possible, it is clear that Canadian agri-food supply chains have proven to be highly resilient in the face of the shocks COVID-19 presents.¹ At first, there were no published reports or peer-reviewed documents to support this — it was too soon — but clear evidence was provided by the fact that shortages of specific food products were temporary and within a few weeks, product availability and selection in Canadian grocery stores returned to pre-COVID-19 levels. Food security, in terms of availability in Canada, was maintained.

While there were short-run shortages of some foods, there were always sufficient substitutes on the shelves so that there was a plentiful and diverse supply of food available at all times. For example, even at the height of the initial shock, if a particular cut of beef or chicken was not available, other cuts were, or, if no beef was available, other protein sources from chicken to tofu were plentiful. Even then, such shortages were short-lived. There was no food availability problem and food prices were relatively stable at the outset and initial lockdown stages of the pandemic.² Often, where access was a problem, it was more related to consumers having the wherewithal to purchase food rather than a food supply problem.

In the late spring of 2020, after the initial lockdowns in response to the pandemic, most agri-food policy experts agreed that despite the shock, Canadian agri-food supply chains proved to be highly resilient in adapting to the challenges posed by COVID-19.³ There were issues, primarily in food-processing facilities such as meat packing, which have been remedied, as evidenced by the absence of shortages at stores. There are no longer media reports of meat product shortages. Problems in accessing seasonal foreign workers are now gradually tempering and the initial shock of the first overall shutdown is dissipating. As Lusk (2020) states “... we don’t have a food replicator for those commodities we tend to buy in grocery stores, it takes time to grow and manufacture them. Thus, the initial challenge with (the) food supply chain was a mismatch of supply and demand brought about by the fact that we cannot immediately respond to demand shocks because there are biological lags associated with agricultural production.” That does not mean there are

¹ This is not universal as some products and producers accomplished shifts to new crops markets and uses, but many if not most, experienced substantial product waste (for example, mushrooms, asparagus in the spring, apples and orchard fruit in the fall) and severe income loss such as in the livestock sector. Federal programs were implemented to assist the industry.

² During the initial onset of the pandemic and spring 2020 lockdown, Canadian grocery prices remained relatively stable despite the dual impacts on demand and supply in an environment of great uncertainty. Overall food prices were increasing in Canada before the pandemic due to a number of factors and COVID-19 will exacerbate this trend (Charlebois 2020; O’Shea 2020).

³ See Alan Ker and Ryan Cardwell, “COVID-19 and the Canadian Agriculture and Food Sectors,” *Canadian Journal of Agricultural Economics*, V68(2), June 2020. <https://onlinelibrary.wiley.com/toc/17447976/2020/68/2>.

no systemic problems and issues that need addressing or room for improvement,⁴ but in the face of unprecedented challenge, the Canadian agri-food supply system adapted and continued to function (FCC 2020c; Israelson 2020; USDA 2020; White 2020b). Further disruptions are probable but are not likely to be sufficiently large for a system breakdown (Orden 2020). The pandemic has shown that the North American just-in-time model, while vulnerable to short-run disruptions due to exogenous demand shocks, is responsive and can adapt, given sufficient time (Hobbs 2020; WTO 2020). Furthermore, it would be reasonable to expect agri-food supply chains to continue to function so long as efforts to mitigate COVID-19 continue to be successful.⁵ That includes export-oriented supply chains.

2. EXPORT TRADE VOLUMES PRE- AND POST-COVID — GLOBAL DEMAND

Disruptions caused by COVID-19 for Canadian export supply chains in the form of labour shortages, interference in transportation and distribution networks and thickening of borders have also been less severe than initially feared.⁶ Exports of some agri-food commodities declined with the initial closing of processing facilities due to COVID-19 in the workforce but have since regained momentum. International trade in agri-food is continuing, with adaptations to mitigate COVID-19 (FCC 2020d; Goddard 2020; Richards 2020; Rude 2020a; WTO 2020). World markets were well stocked prior to COVID-19 and prices of basic grains have remained relatively stable (AMIS 2020). The North American meat and livestock markets are also recovering, although in the spring during the initial lockdown, they were running at a reduced capacity of 10 to 15 per cent below 2019 levels (Lusk 2020; Rude 2020a). Weekly U.S. shipments of, and margins for, strawberries, potatoes, carrots, iceberg lettuce and onions in June 2020 are comparable to those of 2019, but some produce supply chains were and still are more severely impacted than others (Richards 2020).

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For example, due to COVID-19-related processing bottlenecks, Canadian cattle and hog producers face depressed demand, lower prices and an oversupply of livestock ready for slaughter. The entire livestock supply chain from the processor back to the farmer needs a synchronized slowing of production/processing in the face of the demand shock but that is difficult when dealing with production decisions made months or even years ago. Empty shelves were initially common but grocery stores were able to restock; food destined for the food service sector, however, could not be rapidly diverted to the grocery retailer supply chain; seasonal labour required for planting and harvesting could not be accessed, etc.

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Purdue University's new Food and Agriculture Vulnerability Index compares the geographic distribution of agri-food production and workers with locations of COVID-19 cases to infer whether a crop is at risk. Preliminary U.S. findings thus far indicate that due to the wide geographic distribution of crop production and the low percentage of rural population with COVID-19, the risk to agricultural production is very low (Purdue 2020). Agri-food processing facilities have been at greater risk due to less social distancing among workers. These same conditions apply in Canada.

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There have been delays in Canadian exports due to earlier rail blockades and bottlenecks at ports due to a lack of available shipping containers. Some Canadian agri-food sectors are heavily reliant upon seasonal temporary foreign workers and have experienced issues in immigration, travel and finding sufficient numbers of workers willing to come and quarantine/social distance when they do (Dyer 2020; Luymes 2020). While the situation is improving, labour is still below necessary levels at critical times in the season. Air freight capacity has declined by 42 per cent, affecting the ability to ship perishables (Leonard 2020). Delays and shortages could have been far more long-lived and severe but were not, as agri-food transport and distribution along the supply chain continued to function rather than experiencing full stoppage.

The world's population is expected to grow to nearly 10 billion — an additional 2.4 billion mouths to feed — by 2050 and the corresponding increase in demand for food will occur in places with high population growth, such as Sub-Saharan Africa, South Asia, the Middle East and North Africa (OECD/FAO 2019). In the next decade alone, total food use for cereals is forecast to grow by 1.2 per cent annually, 1.7 per cent for animal products and 1.9 per cent for pulses/roots and tubers. Demand for agricultural products to be used as food, feed and in industrial applications is forecast to increase by 15 per cent in the next decade. Canada is one of the few countries with the capacity to produce significantly more food than its own domestic needs, a rare large net exporter of food (Mussell et al. 2020). The next decade's forecast increase in global demand for all major agri-food commodities already exported by Canada are larger than existing total Canadian production (OECD/FAO 2019); thus, there will be growth opportunities for increasing Canadian exports. Some of Canada's top agri-food exports include wheat, beef, canola oil and pulses, products for which demand is forecast to grow significantly.

The projected nearly 18 per cent expansion of the global wheat trade between 2018/19 to 2028/29 will be driven by increased demand from gains in income, urbanization and population growth in developing countries. Demand is to increase mostly in regions that will struggle to produce wheat, such as the Middle East and Southeast Asia; in Asian countries, demand for noodles and bakery products will drive regional wheat demand (USDA 2019).

The growth in global meat consumption of 40 million tonnes in the next decade is attributed to people diversifying their protein sources as income levels rise (OECD/FAO 2019). Current meat consumption in higher income countries is greater than the rest of the world combined — rising global incomes will drive growth in meat production as well as trade in feed grains. Pork consumption is expected to grow the most rapidly at 1.2 per cent annually with beef following at 0.95 per cent. China, India and Brazil are expected to account for more than 1/3 of the increase in meat consumption to 2028 (USDA 2019). Increasing meat consumption will also increase demand for feed grains, yet nations with the highest forecast need for feed grains are unlikely to produce them, increasing the need for international trade. Barley is used for feed as well as for malting beer. Global barley trade is expected to increase nearly six million tonnes by 2028/29 with feed barley demanded by China, the Middle East, North Africa and Latin America. Strong growth for malting barley is expected to accompany robust demand for beer, particularly in developing countries. China's production of barley will not noticeably increase; thus, imports will be needed (USDA 2019).

World demand for pulses in their many forms is being driven by demand for plant-based proteins. A large and increasing segment of the world's population relies on pulses as a staple in their diets. The pulse ingredients market is projected to grow 4.5 per cent annually to US\$21.6 billion by 2023, with food and beverages comprising the largest share of the ingredients market (Research and Markets 2019a, b).

The world produced 31.7 million tonnes of canola oil in 2018; production is expected to grow by 5.8 per cent annually to reach 44.4 million tonnes by 2024. Demand will increase due to consumers seeking healthy oils, as well as canola's popularity in many forms of cooking and its growing use in the food service and hospitality industries. Canola meal is the second

most commonly used livestock feed after soybeans. Canola oil also has growing demand in industrial applications including as biodiesel and in lubricants (Research and Markets 2019c).

3. POST-PANDEMIC AGRI-FOOD TRADE ENVIRONMENT

The pandemic's economic consequences are projected to be a deep global recession in 2020, and likely longer, with world-wide economic growth predicted to shrink between two to five per cent (IMF 2020; Laborde et al. 2020). As people and livestock must still eat, international agri-food trade is expected to be somewhat insulated from the worst of the recession, particularly in higher income countries. An overall decrease in the range of 12 to 20 per cent in real trade value is, however, likely (Barichello 2020). Some staple commodities such as cereals and pulses will generally be isolated from the worst of the recession, while others such as beef and horticulture may suffer decreased trade prospects due to their higher cost as consumers seek out less expensive diets. Crops used for biofuels may experience declining trade due to the lack of demand for energy products in general and products with more complicated supply chains will also likely face decreasing demand (Barichello 2020).

Export restrictions may be imposed and several countries have done so in important staple crops. Table 1 in the Appendix lists active export restrictions in the spring/early summer of 2020. While not a restriction specifically related to the pandemic, Argentina implemented an export tax regime in December 2019 on a variety of commodities, including wheat (Boroughs 2020). The imposition of export bans by wheat and pulse exporters, for example, could actually cushion Canadian producers from the worst of the recession by decreasing global supply and driving up price, to the detriment of global food security, particularly in import-dependent developing countries.

Consumers around the world are concerned about their health and personal finances during the pandemic and resulting recession, with corresponding changes in spending and purchasing behaviour. More food purchasing is occurring online and much less food is being consumed away from home. There is a focus on healthy food, and greater preferences for local suppliers. In the Asia Pacific region, between 30 and 70 per cent of respondents in a recent survey were concerned about their ability to make ends meet (Kuijpers et al. 2020). During the shutdowns, global prices for most food products increased due to uncertainty affecting supply chains (Epp 2020; Statista 2020) rather than actual shortages. Yet, global demand for food products such as pork remains strong (Epp 2020). Table 2 in the Appendix provides examples of international demand for some products exported by Canada and compares Canada's export readiness with that of its competitors in those products. The combination of the pandemic and resulting recession will affect the demand for individual agri-food commodities in every market differently.

The policy actions of other countries will play an important role in the global supplies of agri-food products. Export restrictions from large producer nations will increase the price and reduce the supply of staple commodities such as wheat and rice, which will affect global food security, particularly in the developing world. The rise of trade protectionism, under the guise of COVID-19 food safety and/or sanitary and phytosanitary (SPS) regulations is a concern. Canada has already experienced these in the case of canola and

meat being prohibited from entering China prior to the pandemic. Canada's exports will remain vulnerable to the import restrictions of foreign markets as well as some countries' use of international trade as a political tool. While China has been an important and growing export market for many Canadian agri-food products, the relationship between the two countries has been eroded by political issues, with China unilaterally restricting Canadian agricultural exports, including canola, legumes and meat. This type of action can be expected to continue. Figure 1 illustrates some of the current trade tensions experienced by exporters supplying China. This reality suggests efforts should be made to diversify export destinations⁷ to include large and rapidly growing importers where Canada may not already have a competitive advantage (FCC 2019; Binkley 2020).

FIGURE 1. EXAMPLES OF TRADE TENSIONS RECENTLY EXPERIENCED BY EXPORTERS SUPPLYING CHINA



The efforts and actions of domestic lobby and special interest groups can also affect Canada's ability to produce, transport and export agri-food products. Recent rail blockades⁸ created months-long bottlenecks in transport from producing areas to ports, which affected domestic and international shipments of food products. The Canadian

⁷ Calls to diversify the markets for Canada's agri-food exports have long been made. Reasons include to mitigate the risks associated with an over-reliance on the United States market, which consumes 78.5 per cent of food exports and accounted for 77.3 per cent of agri-food export growth since 2015, as well as to facilitate growth (Industry Canada 2018; Binkley 2020).

⁸ For example, see Adam Kovac, "Justin Trudeau's Latest Challenge Appears Resolved after Tentative Deal Ends Rail Blockades in Canada," *USA TODAY*, March 7, 2020. <https://www.usatoday.com/story/news/world/2020/03/07/trudeaus-latest-challenge-rail-blockades-canada-deal-reached/4985418002/>.

energy sector's inability to increase transportation and distribution of its product to international markets serves as a warning, as agriculture could also become a potential target of such groups (White 2020a).

In early 2020, the Canadian red meat sector was forecast to have robust export demand, with positive profitability despite a volatile environment — livestock prices were projected to be higher than in 2019, processing was expected to operate at high capacity and greater market access achieved due to trade agreements (FCC 2020a). In December 2019, Canadian pork exporters expected as much as a 60 per cent increase in shipments to China (Powell 2019a) as the world's largest pork consumer lifted a ban on Canadian meat after an outbreak of African swine flu (ASF) decimated half its domestic herd. The Canadian grains, oilseeds and pulses sectors' 2020 forecasts expected volatility due to large global supplies and challenging growing conditions. Volatility in pricing as well as a marginal increase in input costs were to result in tight margins for most crop growers with the caveat that conditions could rapidly change (FCC 2020b). All of this suggests that the Canadian agri-food industry can be, and will remain, subject to ongoing shocks, and needs to maintain resiliency to survive.

While COVID-19 was an unforeseen shock, unprecedented in its swiftness and magnitude, the sector, including its supply chains, proved able to adapt and up to the challenge (FCC 2020d; Israelson 2020; USDA 2020; White 2020a). During the initial shutdown shock, consumers still had a wide offering of food products and adequate substitutes were available for products experiencing temporary shortages. As the pandemic has carried on, food diversity and availability in grocery stores are back to pre-pandemic levels — there are no more stories in the media about shortages. Canada's global food exports have also rebounded with exports rising (FCC 2020d).

4. A STRATEGY FOR CANADA'S EXPORT OPPORTUNITIES

Canada is a highly competitive agri-food exporter. Fifty per cent of its total beef/cattle production, 70 per cent of all pork produced, 75 per cent of wheat, 90 per cent of canola and 95 per cent of pulses/legumes are exported. Canadian farmers and food processors are heavily dependent upon income earned from exporting; half of all employment in crop production and a quarter of those in food manufacturing rely on exports (CAFTA 2020a). Overall, Canada's agri-food industry contributes to 11 per cent of Canada's goods-based GDP, nearly 10 per cent of trade in goods and employs over 250,000 Canadians (CAFTA 2020b). Primary export markets are China, Japan, the U.S., South Korea, Hong Kong and Mexico, with growth in Southeast Asia and the Middle East. In broad terms, Canada's competitors in agri-food are Australia, the U.S., Brazil, Russia and Argentina. Table 3 in Appendix 1 provides specific data for a sample of important export commodities and markets, including main competitors.

The global community is fighting the COVID-19 pandemic with the same tools of lockdowns and social distancing, and suffering the same economic ramifications. However, the ramifications are of different magnitudes depending on the health of their economies prior to the pandemic, their fiscal capacity and the degree and extent of both outbreaks and lockdown. Canada's "exceptional share of agri-food production capacity

that can be devoted to export” (Mussell et al. 2020) means the agri-food industry has an opportunity not only to make a significant contribution to Canada’s post-pandemic economic recovery, but also to increase its share of trade and exports.⁹

The pandemic may present opportunities for increasing and/or finding new markets for Canada’s agri-food exports, particularly those that already have established export supply chains. A four part strategy for Canadian agri-food export opportunities would consist of two Canadian factors and two in global markets. In Canada, firstly, outbreaks of COVID-19 must continue to be successfully controlled and secondly, Canadian agri-food supply chains must be protected from disruptions. Internationally, the COVID-19 status in competitor nations as well as government policies should be monitored.

Domestically, Canada must first continue to successfully mitigate COVID-19 among its population, to reduce outbreaks, flatten the curve and reduce the disease’s economic effects, including labour shortages due to worker illness, stay-at-home orders and lack of seasonal workers. Second, Canada must allow its already competitive food and agri-food supply chains to function at optimum levels by ensuring worker safety in processing facilities, in transportation and in distribution centres to prevent bottlenecks in trucking, rail and at ports. Allowing green lanes (such as expedited procedures for border crossings, inspections or paperwork) for agri-food supply chains to permit trade and designating essential workers throughout can help reduce disruptions caused by movement and travel restrictions (Gray 2020; Hobbs 2020; Laborde and Pineiro 2020). Canada’s size and widely dispersed agricultural producing/processing regions are serviced by long agri-food supply chains connected by long-haul trucking and rail networks. These need to continue to function well in order to facilitate exports. Means by which to bolster agri-food supply chains against COVID-19 or other new major disruptive shocks, including other pandemics should be researched and contingency plans prepared. For example, while labour shortages and access to seasonal workers have long been issues in the Canadian agri-food sector, the pandemic has exacerbated these problems due to travel restrictions (Falconer 2020a; Falconer 2020b). Even with the Canadian government’s efforts to expedite the entry of temporary foreign workers despite international travel restrictions and the provision of funding to farmers and producers to offset the cost of workers’ two-week quarantines (Government of Canada 2020), workers were and still are in short supply.¹⁰ Canadian producers’ inability to access sufficient seasonal labour in a timely manner during planting and harvest resulted in lost crops, particularly in the highly time-sensitive horticultural sector.

Potential government responses or interventions that might negatively impact Canada’s already resilient and well-functioning agri-food supply chains should be resisted as

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Prior to the pandemic, expanding Canada’s agri-food export potential has long been a stated policy goal of successive federal governments. Canada has set the goal of achieving at least \$75 billion in agri-food exports by 2025 (Industry Canada 2018).

¹⁰

Access to and shortages of labour are a long-recognized issue facing agri-food production and processing in Canada. Industry and government have suggested changes to the Temporary Foreign Worker program to improve access to labour. The pandemic has imposed additional restrictions on labour, which have exacerbated these existing problems and may be the impetus to implement the suggested changes. The agri-food industry and all levels of government have sought to encourage local labour to enter the industry, with little success (CFA 2020).

cascading reactions can distort supply chains, creating artificial shortages, locally and globally. Over time, these artificial shortages become ingrained, affecting supplies long after the pandemic abates (Mussell et al. 2020). Programs should not distort production decisions or trade and should avoid trade restrictions.¹¹ Attempts to reform existing programs while combating a pandemic should be resisted (Kerr 2020; Rude 2020b).

In most developed countries, planting, harvesting, processing, distribution and transport of crops and food are very dependent upon manpower, especially temporary or migrant labour. For example, in Canada, many horticultural crops are planted and harvested by temporary foreign workers and horticultural producers are having difficulties obtaining seasonal labour as delays and backlogs are still occurring for the fall harvest, even with border exceptions and support for incoming workers.¹² In the meat-packing industry, outbreaks have closed plants and slowed their production lines to adapt to processing with COVID-19. However, in many non-Western countries, mechanization is not as prevalent in agri-food production; instead, they rely even more heavily on manpower. Therefore, each of the phases of crop and food production presents a supply chain link potentially vulnerable to COVID-19. Ecuador is suffering badly from COVID-19 and is unable to harvest bananas, which need to be harvested by hand daily. While the harvesting of wheat in India and Bangladesh is mechanized, the loading and unloading of wheat in the transportation and distribution network is done by hand (Mohapatra 2020; Neo 2020).

Labour displacement is the largest threat COVID-19 poses to food production and export systems. Hence, the COVID-19 status in countries that compete with Canada's agri-food commodity exports should be monitored by stakeholders such as industry associations and government. The shape of their pandemic recovery curves (V, U, L,W, K or swoosh) will affect their agri-food industries' abilities to produce, distribute and export. The vulnerabilities and resilience of a particular competitor commodity's supply chain in coping with the pandemic should be examined. Factors such as degree of mechanization, vulnerabilities in labour-intensive links, the nature of the commodity and its production and the degree of COVID-19 incidence in the industry should be assessed. If the country is less able to contain the spread of COVID-19, agri-food production will suffer labour shortages, processing slowdowns and supply-chain bottlenecks. If the supply chain is less resilient, it may not be able to produce or export the volumes normally expected. Canada could make up that export shortfall. So long as COVID-19 is active, these opportunities will exist. Table 4 in the Appendix provides a snapshot of some countries with competing agri-food exports and how COVID-19 was affecting them in the spring/early summer of 2020. In the medium to longer term, Canadian agri-food exporters should seek means to diversify their product range to include greater value-added processing or new uses

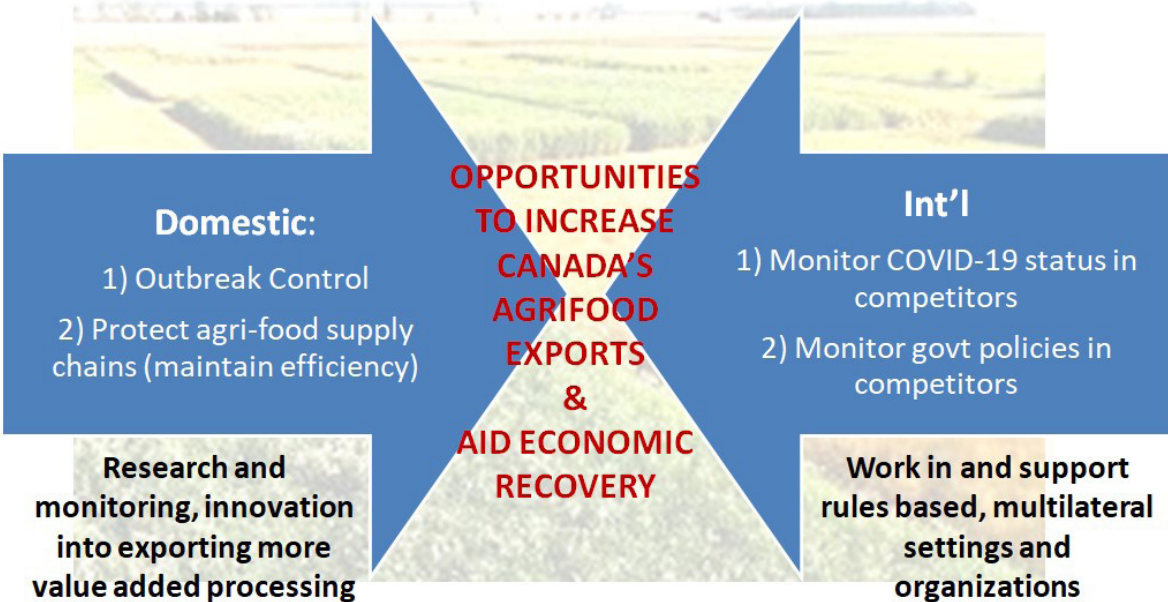
¹¹ As a founding principle in the economics of international trade, government policies should not be trade-restricting or act as a trade barrier, nor should government policies act as incentives or disincentives that alter production decisions, as they will then artificially distort markets for those products. See Gaisford and Hester (2007); Kerr and Perdakis (2014).

¹² For example, see CKTB, "Ontario is Losing 12 Percent of its Asparagus Crop because of Farm Labour Shortage," June 4, 2020, <https://www.iheartradio.ca/610cktb/news/ontario-is-losing-12-percent-of-its-asparagus-crop-because-of-farm-labour-shortage-1.12592014> and Klaudia Van Emmerik, "Okanagan Pear, Apple Growers Facing Significant Crop Losses due to Labour Shortage," Global News, September 2, 2020, <https://globalnews.ca/news/7313124/okanagan-pear-apple-growers-labour-shortage/>.

and applications.¹³ The pulse industry’s growth in exporting plant-based protein as an ingredient is an example, as is canola’s increasing role as a biofuel.

The nature of any foreign government’s support or policies for the agri-food industry or competitive commodities should also be assessed by stakeholders as these can affect supply chain resiliency. Immigration and labour policies that affect access to seasonal, temporary or migrant labour should be monitored. The imposition of export restrictions from any country can significantly shift the global supply of any commodity. For example, should the wheat-growing regions of the Black Sea (Russia, Ukraine) or Argentina impose export restrictions, global wheat supplies and prices will change drastically (Boroughs 2020). Figure 2 visually summarizes this strategy.

FIGURE 2. A STRATEGY FOR CANADA’S AGRIFOOD EXPORT OPPORTUNITIES



Source: Yeung and Kerr 2020.

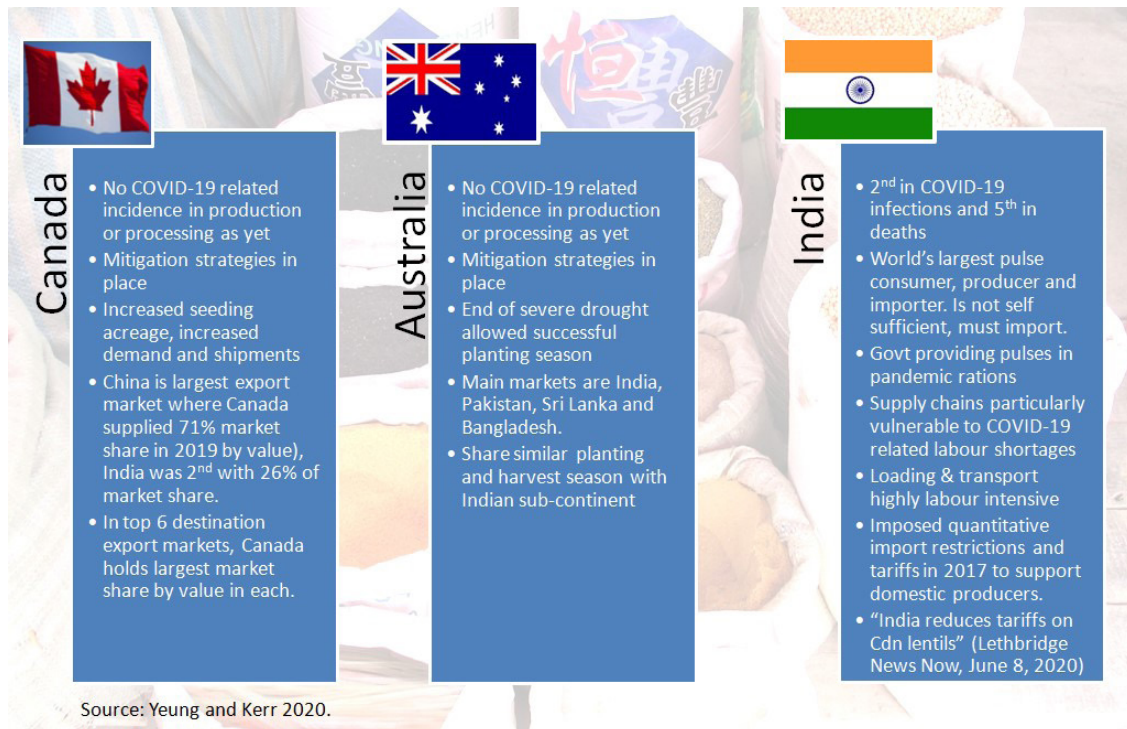
The following figures illustrate how these four factors can be monitored and assessed for potential opportunities to increase Canadian agri-food exports. Figure 3 looks at the implications COVID-19 has had in the meat-processing industry while Figure 4 provides a snapshot into the global pulse trade, both during the summer of 2020.

¹³ Innovation and value-added processing have long been touted as a means for diversifying and growing Canada’s agri-food exports. Despite some successes, challenges ranging from declining investment in machinery and equipment to a lack of labour have limited progress (Industry Canada 2018).

FIGURE 3. A SNAPSHOT OF COVID-19 IMPLICATIONS IN MEAT PROCESSING, SUMMER 2020



FIGURE 4. A SNAPSHOT OF COVID-19 IMPLICATIONS IN PULSES, SUMMER 2020



CONCLUSION

An adage says: “If it ain’t broke, don’t fix it.” If the measure of a nation’s agri-food system is ensuring the safe, reliable availability of food to consumers, so that shortages and scarcity are avoided as much as possible, the domestic Canadian agri-food system “ain’t broke”, despite the shock and challenges of COVID-19. In fact, it has proved itself well able to cope with a much larger disruption than ever anticipated. While Canadian consumers were faced with temporary shortages of certain food products during the initial stages of the pandemic, there was a wide variety of substitutes on the shelves so that there was always sufficient food available. No one experienced hunger due to a lack of food availability. Even as the pandemic has dragged on, Canadian grocery stores are fully stocked to pre-pandemic levels and variety of food. As jobs were lost and incomes fell, the call on food banks increased but that is a wherewithal-to-purchase problem rather than a food availability problem. The Canadian agri-food supply system has adapted to the challenges presented by the pandemic and continued to function so that Canadians’ food security was maintained.

While the Canadian agri-food system “ain’t broke”, there is room for improvement. The pandemic did bring to a head existing weaknesses in the policy environment which could affect both domestic supplies and export capacity, such as labour shortages and constraints on the supply of seasonal foreign workers (Falconer 2020a; Falconer 2020b). The overnight loss of the hospitality and restaurant markets due to lockdowns devastated some sectors of agri-food production, particularly those of highly perishable or time-sensitive crops. Unable to rapidly find or ship to new markets, entire crops were lost. The livestock industry experienced months-long production bottlenecks at processing facilities, forcing producers to hold or cull their herds and incurring unsustainable losses. Contingency policy initiatives such as short-term bridge financing to quickly and effectively support producers during these kinds of situations need to be prepared. The government of Canada implemented examples of such initiatives to assist the agri-food sector in coping with the pandemic¹⁴. Funding was announced for producers, processors, primary sectors and surplus food purchasing (AAFC 2020). Improvements in labour and immigration policies should be assessed and implemented as discussed in footnote 10.

International supply chains hardly missed a beat – as exports continued, being somewhat removed from shocks (FCC 2020d; Israelson 2020; WTO 2020), such as the shifting from food purchased at restaurants to food purchased for home consumption in their destination markets. Thus, governments must resist intervening to alter supply chain systems in the wake of short-run COVID-19 difficulties – measures such as encouraging the establishment of smaller (less efficient) meat-packing plants (Carlberg 2020) or

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In May 2020, the Government of Canada provided \$252 million funding in an effort to support farmers, food businesses and food processors through the COVID-19 pandemic. Funding earmarked for the beef sector included \$50 million for a set-aside program through AgriRecovery. It also included \$77.5 million in funding to support business continuity within agriculture processing facilities, which includes but is not limited to beef facilities. A federal Surplus Food Purchase Program was created with an initial \$50 million in funds designed to help redistribute existing and unsold inventories, which could include products such as potatoes and poultry, to local food organizations who are serving vulnerable Canadians. All levels of government were working to increase AgriStability interim payments from 50 per cent to 75 per cent as well (CCA 2020). AgriRecovery and AgriStability are part of the business risk management programs provided by the Government of Canada to the agricultural industry (AAFC 2020b).

mandating a shift away from export crops to increase the local component¹⁵ of domestic consumption. Moves such as these would negatively impact international competitiveness while doing little to improve domestic food security.¹⁶ Further, while there may be future pandemics or other major disruptive shocks to Canada's agrifood supply chain, there is no reason to believe that their spread and effect will be the same as COVID-19, so any policy changes should not be based on mitigating a specific repeat of COVID-19.

As Canada's agri-food competitors have their own struggles in dealing with COVID-19, they may be unable to maintain their export activities, thus creating opportunities to increase Canada's agri-food exports. As long as Canadian supply chains are unencumbered and can retain their existing international competitiveness, they will be able to act upon the opportunities that arise. They can be assisted by industry and export associations¹⁷ working with federal and provincial governments who undertake effective research and monitoring of foreign markets in identifying opportunities and the status of the supply chains of international agri-food competitors.

When new export opportunities are found, whether in new markets or new products, once a supplier or product is established and proven, buyers and importers are often loath to shift away without due cause. If the product meets or exceeds quality and performance at a competitive price, it is easier to stick with it, as shifting away to a competitor takes effort, i.e., switching costs. Canadian firms and products should be able to take advantage of this tendency.

POLICY IMPLICATIONS

During the unprecedented shocks arising from COVID-19, Canadian agri-food supply chains proved themselves to be resilient, ensuring there were no threats to Canadians' food security due to problems with availability in the domestic market. While short-run shortages of individual foods were manifest, there was always a range of substitutes on the shelves such that sufficient food was always available. Export supply chains were somewhat isolated from the COVID-19 shocks in their destination markets and were able to readily adapt to changing conditions. To take advantage of the opportunities presented by COVID-19, Canadian agri-food export supply chains need to retain the high

¹⁵ This is not to besmirch the role of local food production and "locavore" consumption. The reality of Canada's environment curtails the local production in sufficient volumes of many types of food sought by Canadians, even with greenhouse technology and significant investment. If increasing such local production over imported options can only occur with government intervention (such as subsidies), overall costs to consumers will increase and be economically inefficient. See Gaisford and Hester (2007); Kerr and Perdakis (2014).

¹⁶ One of the tenets of competition theory in economics is that inefficient firms are unsustainable — see McNulty (1968). Smaller firms in a global market facing international competition such as in meat processing are particularly vulnerable to these principles. International competitiveness in beef and pork supply chains is, in part, determined through the achievement of economies of scale in slaughter and processing facilities (Benarroch 2007; Brocklebank et al., 2008; Khorana et al., 2015).

¹⁷ In Canada, federal and provincial industry and producer groups work collaboratively in committees, working groups, associations and organizations to monitor and assess their domestic and international issues, consulting or in conjunction with federal and provincial government agencies. For example, the Canadian Agrifood Trade Alliance works collaboratively with organizations such as Pulse Canada, the Canola Council of Canada, the Canadian Cattlemen's Association, Grain Growers of Canada and Food Health and Consumers of Canada (CAFTA 2020b).

level of efficiency and international competitiveness they exhibited prior to the pandemic. Thus, it is important for government policy initiatives to:

- Continue to enable clear and open international supply chains, avoiding constraints that will reduce their efficiency – constraints conceived in response to the COVID-19 crisis, but which could hinder export market growth;
- Prepare and plan for a new pandemic or disruptive crisis, but not necessarily another COVID-19. Do not attempt to specifically prepare for the arrival of a second virus exactly like COVID-19. While there may be other pandemics in the future, there is no way of knowing if the effects will be the same as COVID-19. It is better to allow export supply chains to improve their resiliency as there will be future shocks that will have to be dealt with;
- Deal with specific problems identified during the COVID-19 crisis, in order to retain export supply chain strength and resilience:
 - Improve Canadian agri-food firms' timely access to foreign workforces;
 - Provide suitable income protection and short-term bridge financing for farmers, ranchers and processors who may have supply chains disrupted in the short run.¹⁸
- Provide assistance in monitoring competitors and export markets through work between stakeholders such as government and industry associations (both current and potential) and fund research into opportunities arising from COVID-19;
- Continue to support the rules-based international trade system and its institutions.

¹⁸

See footnote Number 14.

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APPENDIX

TABLE 1. ACTIVE FOOD EXPORT RESTRICTIONS, BY COUNTRY AND COMMODITY, JUNE 5, 2020.

Algeria	Semolina, flour, pulses and rice, pasta, oils, sugar, coffee, mineral water, tomato paste, food preparations, milk in all its forms including those intended for children, fresh vegetables and fruit with the exception of dates, red and white meats.
Armenia	Onions, garlic, turnips, rye, rice, buckwheat, millet, cereals, whole meal and granules from cereal grains, peeled buckwheat, prepared foods from buckwheat, crushed and uncrushed soybeans and sunflower seeds.
Belarus	Onions, garlic, turnips, rye, rice, buckwheat, millet, cereals, whole meal and granules from cereal grains, peeled buckwheat, prepared foods from buckwheat, crushed and uncrushed soybeans and sunflower seeds.
Egypt	Pulses
Kazakhstan	Onions, garlic, turnips, rye, rice, buckwheat, millet, cereals, whole meal and granules from cereal grains, peeled buckwheat, prepared foods from buckwheat, crushed and uncrushed soybeans and sunflower seeds.
Kyrgyzstan	Onions, garlic, turnips, rye, rice, buckwheat, millet, cereals, whole meal and granules from cereal grains, peeled buckwheat, prepared foods from buckwheat, crushed and uncrushed soybeans and sunflower seeds. Wheat, flour, vegetable oil, sugar, chicken eggs, rice, pasta, disinfectants and antibacterials, napkins, as well as compound feed and bran.
Russia	Onions, garlic, turnips, rye, rice, buckwheat, millet, cereals, whole meal and granules from cereal grains, peeled buckwheat, prepared foods from buckwheat, crushed and uncrushed soybeans and sunflower seeds. Wheat and meslin, rye, barley and corn. Processed grains.
Turkey	Lemon
Ukraine	Buckwheat, buckwheat grain. *Ready to ban wheat exports if necessary – April 15 (Polityuk and Karazy 2020).
Ghana	Soybeans

Source: IFPRI, Food Export Restriction Tracker, <https://public.tableau.com/profile/laborde6680#!/vizhome/ExportRestrictionsTracker/FoodExportRestrictionsTracker>.

TABLE 2. SNAPSHOT OF INTERNATIONAL DEMAND AND EXPORT READINESS FOR SELECT EXPORTERS SUMMER 2020

Pork	
U.S.	<p>Exports should be high due to trade agreement with China, and its recovery from effects of ASF.</p> <p>U.S. exports rising overall with YTD 40 per cent increase in volume and 50 per cent increase in value.</p> <p>Pork is the largest source of protein in China and Asia.</p> <p>Hong Kong, Taiwan, China restaurants are returning to operations with Korea, Japan soon to follow.</p> <p>Asian grocery retail and e-commerce booming for cooking at home.</p> <p>Due to ASF, growth opportunity for fresh, chilled pork into Asian wet markets.</p> <p>U.S. ships pork to China, Japan, Mexico and Canada.</p> <p>China will take cuts not wanted in North America.</p> <p>Pork exports benefit from trade agreements with Japan and China.</p> <p>Pork exports surging 40 per cent even while there are domestic pork shortages, despite some meat-packing plants reducing exports, although this growth was recorded as sales six months prior to the pandemic (Epp 2020; Funk 2020).</p>
Canada	<p>Increase of exports by seven per cent in 2020 but is hindered by a lack of shipping containers and rail blockades; these backlogs are expected to clear. A fluid export situation in Asia, improving but uncertain.</p> <p>Increased demand from China, Japan, Mexico and Europe (Einstein-Curtis 2020).</p>
Spain	<p>Is the world's third largest pork exporter, experiencing a 10 per cent increase in exports in 2020. Experienced some road transport difficulties due to intra-EU COVID-19 lockdowns, which decreased EU sales by seven per cent. Substituted greater exports to other countries by 33 per cent, including an 80 per cent increase to China as it recovers from ASF. Current U.S. processing issues are placing downward pressure on global pork exports (Pigworld 2020).</p>
Beef	
Canada	<p>Beef exports are expected to increase by 12 per cent, with transportation and shipping backlogs expected to clear. As ASF reduced pork supply, beef is purchased as a substitute protein. Facing U.S. competition in Japan due to trade agreement. U.S. remains Canada's main beef/cattle market. Beef is a relatively more expensive protein; as recession proceeds, consumers may choose less expensive protein options (Barichello 2020; Einstein-Curtis 2020; Rude 2020a).</p>
Meat	
U.S.	<p>Meat exports surging in spite of domestic shortages, even with reduced exports at some facilities.</p> <p>Pork 40 per cent export growth, beef nine per cent export growth, but this growth reflects sales from six months prior to COVID-19, before plant shortages (Funk 2020).</p>
Brazil	<p>COVID-19 infection rate increasing, with outbreaks in meat processing growing – requires monitoring.</p> <p>Record beef exports to China expected, 17 of 25 export licences to China for beef, six for poultry, one for pork, one for donkey (Food Processing Technology 2020).</p>
Australia	<p>Minimal interruption of exports due to few COVID-19 infections.</p> <p>New air freight network to facilitate exports; beef comprises 16 per cent of agricultural exports.</p> <p>China is their largest trading partner, consuming 38 per cent of all exports.</p> <p>Recent bans on Australian beef, barley as the political relationship deteriorating, more bans likely (Fortune 2020; Needham and Packham, 2020).</p>

Wheat	<p>Global demand for home staples such as flour, pasta, bread, snacks undergoing exponential growth due to lockdowns. Pizza takeout and pantry stockpiling are surging wheat demand. With restaurants operating at 50 per cent capacity, not much improvement in food service demand is expected. Wheat and durum for mills and pasta experiencing a global increase in demand.</p> <p>Wheat demand in Southeast Asia booming as consumer taste and preferences are shifting to wheat-based products. Indonesia is the largest market with the Philippines, Vietnam and Thailand following. No domestic production of wheat in Southeast Asia. The Philippines has strong U.S. ties while Indonesia's main supplier is Australia.</p> <p>Number of non-traditional wheat exporters, such as India, is increasing.</p> <p>Countries preparing for shortages due to Black Sea export restrictions are sourcing wheat as food security purchases.</p> <p>Global supplies of wheat are plentiful at the moment. (Dyer 2020; FCC 2020c; Reynolds 2020; Powell 2020; Pratt 2020a; Turner 2020a)</p>
Canada	<p>Most wheat exports are shipped via ocean freight; experiencing a shortage of shipping containers in Canada, which is limiting ability to move wheat and other commodities.</p> <p>Softening demand for feed in Canada due to lower livestock inventories. (FCC 2020d)</p>
Australia	<p>Production improved with end of drought, transport cost advantage to Asia. (ABARES 2020)</p>
Argentina	<p>Pre-COVID-19 export tax regime including on wheat, corn, soybeans, oil and meal. Recent increases (soybeans) and adjustments (Boroughs 2020).</p>
Rest of World	<p>South Asia harvesting is mechanized but movement, transport, distribution done by hand – wheat-based processed foods shortages.</p> <p>Russia's export restrictions likely to increase world wheat prices, reduce supply (Neo 2020)</p>
Legumes/Pulses	<p>Global demand for red lentils is growing as a staple in Middle Eastern and Indian cuisines, as well as in North American and EU pantries.</p> <p>India implemented new domestic rations in response to COVID-19, which reduced its pulses exports. India intends to become pulse self-sufficient, imposed policies to support domestic production. Canadian red lentils exports continue despite the imposed duty. Pandemic lockdown greatly affected agricultural supply chains due to heavy reliance on labour to transport and distribute product. Declaration as essential services came after labour departed for home. Delays to rebuild labour links in agricultural supply chains.</p> <p>Global popularity of plant-based protein and meat alternatives is increasing, which increases demands for legumes and pulses. Veganism and vegetarianism are expected to continue to grow. North American ingredient market demands peas and that is an expected growth area.</p> <p>Global shipping constraints due to COVID-19 mean global pulse and legumes processors stockpiling supplies. This increase may be temporary as economies open up and the need to stockpile declines. Consumer demand for shelf-stable, inexpensive staples due to COVID-19 resulting in hoarding, which is temporary as the pandemic eases.</p> <p>China's demand for pulses/legumes increasing.</p> <p>In March, with a COVID-19-related demand surge, pulse prices increased, with increased planting.</p> <p>Some issues related to trucking logistics and access to ocean carriers for export.</p> <p>(Powell 2020; Pratt 2020c; Pulse Australia 2020b; Pulse Pod 2020a; Pulse Pod 2020b)</p>
Canada	<p>Containerized shipments are declining due to a lack of available containers and shortage of export slots. Industry is concentrating on pulse ingredients such as texturized vegetable protein to food manufacturers.</p> <p>Canada is the world's largest exporter, four times the next largest, Russia.</p> <p>Pulse flour sales forecast to grow to \$4.2 billion. Pea protein soaring. (CTV 2020; Pratt 2020c; Pulse Pod 2020a)</p>

<p>Canola</p>	<p>China 30 per cent of usual volume, one per cent dockage content limit but still accepting canola oil and meal. Canada is diversifying markets – interest from Bangladesh, Pakistan, Europe. U.A.E. is a large growth market for seed to crush into oil to export.</p> <p>U.S., Mexico potential markets as well.</p> <p>Domestic market for biofuels a priority.</p> <p>Inputs were able to be accessed; spring planting completed.</p> <p>Outbreak risk in feed grain processing possible but much different conditions than meat processing with much less risk.</p> <p>EU largest purchaser in 2019/20 for biodiesel, at risk due to COVID-19 as lockdown resulting in declining energy demand, biodiesel production slumping.</p> <p>(Pratt 2020b; Top Crop Manager 2020).</p>
<p>Barley</p>	<p>Canada's supplies in good status, with supply chain running well. Domestic feed demand declining.</p> <p>Current shipments 20 per cent behind last year.</p> <p>China applied 80 per cent tariff on Australian barley, their largest supplier. Possible benefit to Canada.</p> <p>China's barley demand experienced a 12 per cent decline overall as the need for animal feed was reduced by ASF. Also cheaper feed alternatives available.</p> <p>China substituting U.S. barley and other U.S. products to meet new trade agreement conditions.</p> <p>(Dyer 2020; Tan 2020; Turner 2020b)</p>

TABLE 3. MAJOR CANADIAN COMMODITY AGRI-FOOD EXPORTS AND DESTINATION MARKETS

Commodity and 2019 Canada total exports, US\$	Main 2019 export markets, ordered by value; Canada's ranking as supplier and market share (%) of total imports, value (US\$).	Main competitors in those markets.	Notes
Canola US\$4.269 billion	Japan (seeds and oil) First 94% of \$1.03 billion	None	
	China (seed, oil, meal) First 87% of \$1 billion YTD to March 2019 restrictions imposed; 2018 - 94% of \$2 billion; 2017 - 96% of \$2 billion; 2016 - 97% of \$1.5 billion.	None, but other oils are substitutes for Canadian canola. China normally takes nearly 50% Canadian canola production.	Restrictions imposed by China in March 2019, reduced total imports 50%. To offset the loss of Canadian supply; China switched to imports of different oilseeds/oils.
	Mexico (oil, meal, seed) 100% of \$377 million.	U.S. Ukraine	Canada replaced U.S. and Ukraine in 2019; imports overall declining since 2013.
	Other markets: U.A.E., Pakistan, EU for biodiesel (Portugal, France, Germany, Italy, Belgium). U.A.E. 2019 imports increased 383% as processors crush seed into oil to export to China and others (Markets Farm 2020).		
Wheat and Meslin US\$5.385 billion	Indonesia (2018) Third 22% of \$2.5 billion	Australia, Ukraine, Russia, U.S.	Shifting consumer tastes to wheat-based products.
	Japan 2nd 30% of \$1.47 billion	U.S., Australia, Russia	U.S. and Japan trade agreement allows duty-free entry of U.S. wheat.
	U.S. 1st 80% of \$432 million	Argentina, Italy	
	China 1st 50% of \$901 million	France, Kazakhstan, U.S.	
	Mexico 2nd 10% of \$929 million	U.S. is 84%.	
	Columbia 1st 72% of \$431 million	U.S., Argentina	
	Peru 1st 60% of \$512 million	U.S., Argentina, Russia	
Legumes/Pulses US\$2.316 billion	China 1st 71% of \$799 million	India (2nd 10%), Myanmar, Uzbekistan, Indonesia	Pea exports to China increased YTD 44% 2019/20 (Markets Farm 2020).
	India 1st 26 of \$1.5 billion	Myanmar (2nd, 22%), Tanzania, Mozambique, Brazil	
	Bangladesh (2015) 1st 53% of \$426 million	Australia (2nd, 43%), Turkey	
	U.S. 1st 51% of \$358 million	India, Mexico, China, Nicaragua	

		U.A.E. (2018) 1st 365 of \$292 million	Australia (2nd, 15%), Myanmar, India, Tanzania	
		Turkey 1st 46% of \$191 million	Kazakhstan (2nd, 19%) Russia, Mexico, Argentina	
		U.K. 1st 36% of \$240 million	France (2nd, 11%), U.S., India, Australia	
		Pakistan 4th 10% of \$556 million	Australia (1st, 22%), Russia 12%, Afghanistan (10.4%), Vietnam (8%)	
Barley		China 2nd 26% of \$1.561 billion	Australia (1st, 42%) France, Ukraine	China 10% YTD increase 2019/20 (MarketsFarm 2020)
	US\$532 million	Japan 2nd 27% of \$322 million	Australia (1st, 54%), Germany U.S.	
		U.S. 1st 95% of \$35 million	Germany	
		Kuwait (2018) 2nd 14% of \$139 million	Argentina (1st, 44%), Russia Germany	
Pork		Japan 2 nd 24% of \$4.634 billion	U.S. (26%), Spain, Denmark	U.S.-Japan trade agreement
	US\$2.593 billion	U.S. 1 st 60% of \$1.1 billion	Poland, Denmark, Mexico	
		China 7 th 7% of \$4.5 billion	Spain, Germany, Brazil, U.S., Denmark, the Netherlands	Banned Canadian beef and pork from June 25 - Nov. 5, 2019.
		Mexico 2 nd 12% of \$1.4 billion	U.S. 88%, Ukraine	
		Korea 4 th 8% of \$1.599 billion	U.S. 30%, Germany, Spain, Chile	
Fresh Beef		U.S. 1 st 50% of \$3.439 billion	Mexico, Australia	
	US\$1.769 billion	Mexico 2 nd 11% of \$770 million	U.S.	
		Japan 3 rd 3% of \$2.125 billion	U.S. 46% Australia 45%	U.S.-Japan trade agreement
Frozen Beef		Japan 3 rd 9% of \$1.4 billion	Australia 50%, U.S. 31%	New Zealand and Mexico are smaller but important markets. U.S.-Japan trade agreement
	US\$413 million	Hong Kong 3 rd 7% of \$1.636 billion	Brazil 41% U.S. 37%	U.K., Ireland also markets.
		China 6 th 1% of \$7.931 billion	Brazil 26%, Argentina 22%, Australia 19%, Uruguay 14%, New Zealand 13%	Banned Canadian beef and pork from June 25 - Nov. 5, 2019.

U.S. 6 th 2% of \$2.155 billion	Australia 42%, New Zealand 29%, Nicaragua 11%, Uruguay 8%
Korea 5 th 1% of \$2.055 billion	U.S. 58%, Australia 35%, New Zealand 3%, Mexico 1.4%

Source: ITC, TradeMap data

**TABLE 4. COVID-19 IMPACTS IN SELECT COUNTRIES' AGRI-FOOD PRODUCTION
SUMMER 2020**

Pork	<p>Canada</p> <p>Pork industry in financial crisis due to COVID-19-related processing lags at U.S. meat-packing plants, creates oversupply of animals ready for slaughter with nowhere to go. Producers' selling price decreases, costs increase, animal welfare issues for farmers as hogs cannot be held back for more than two weeks. Oversupply will be corrected by culling. Mismatched supply and demand at processing. Shortages and increased prices for consumers will follow. Biosafety protocols have reduced processing capacity.</p> <p>Overall herd is contracting due to market conditions, volatility and ASF. Expected shrinkage of one per cent prior to pandemic.</p> <p>Western Canadian plants are operating normally with biosafety protocols implemented, processing normal amounts; no pork shortages in Canadian stores. Eastern Canada harder hit by lags as 42 per cent of North American capacity closed end of April. (Dyer 2020; Einstein-Curtis 2020; Hein 2020; The Pig Site 2020).</p>
	<p>U.S.</p> <p>Up to 50 per cent meat-processing capacity affected, forecast meat shortages and restricted volumes of purchases at grocery, shortage of trained workers, lower processing speed, higher prices for consumers, low prices for producers. Pork has limited options in managing backlogged inventory, resort to depopulation. Meat export bans being proposed.</p> <p>Thirty deaths, 10,000 COVID-19 infections at meat-packing plants, expect back to 80-90 per cent capacity by July. Infections in U.S. counties with meat-packing plants spread at more than twice national rate in first week of orders to open up. U.S. meat packing is the most severely impacted of the world to date.</p> <p>Canada exports piglets to U.S. slaughterhouses. Mexico is destination for U.S. pork.</p> <p>Pork processing capacity at the end of May is running 10-15 per cent less than last year. (Durisin et al. 2020; Funk 2020; Glauber 2020; Lusk 2020).</p>
	<p>Spain</p> <p>Declared swine/pork as an essential sector. No major problems in production. Domestic demand declined due to loss of eating out/hospitality trade.</p>
	<p>Other E.U.</p> <p>Pork producers have experienced the same loss of restaurant/hospitality markets but surging domestic retail demand. Some road transport issues and delays in international shipping due to lack of containers. Slaughter pig market has stabilized with steady processing levels. Exports of frozen pork to China are increasing. Some plants have slowed processing lines due to worker illness and to implement social distancing. (Hoey 2020; Pigworld 2020)</p>

Beef	<p>Canada</p> <p>Overall herd has been contracting since 2003 due to BSE and market conditions. An expected three per cent shrinkage in 2020 with additional four per cent by end of year due to difficult weather and forage conditions; 2020 has lower feed costs for producers.</p> <p>Beef supply chain is longer and more complex than other livestock; shocks take longer to reach producers but also more time to adjust.</p> <p>COVID-19-related processing lags at U.S. meat-packing plants, creates oversupply of Canadian animals ready for slaughter with nowhere to go. Producers' selling price decreases, costs increase, animal welfare issues for farmers as beef on maintenance rations for 120-160 days finishing. Bottleneck will be in feeder cattle headed to feed lots in fall 2020. (Einstein-Curtis 2020; Rude 2020a).</p>
	<p>U.S.</p> <p>Up to 50 per cent meat-processing capacity affected, forecast meat shortages and restricted volumes of purchases at grocery, shortage of trained workers, lower processing speed, higher prices for consumers, low prices for producers. Cattle can be put on maintenance rations to help manage inventory. Meat export bans being proposed.</p> <p>Thirty deaths, 10,000 COVID-19 infections at meat-packing facilities, expect back to 80-90 per cent processing capacity by July; COVID-19 infection rates reflect government policies. Infections in U.S. counties with meat-packing plants spread at more than twice national rate in first week of order to open up. U.S. meat-packing sector is the most severely impacted of the world to date.</p> <p>Beef production down 25 per cent, with beef processing capacity at the end of May running at 10-15 per cent below last year. (Durisin et al. 2020; Funk 2020; Glauber 2020; Law 2020; Lusk 2020)</p>
	<p>Brazil</p> <p>At the end of May, 2,400 workers in 24 slaughterhouses were infected with COVID-19 in one state, 25 per cent of that state's total infections. Slaughterhouses are Brazil's COVID-19 hotspots. It is the world's largest beef and chicken exporter, fourth largest in pork with 446 slaughterhouses and an average 2,000 workers in each. Brazil uses a pasture system to finish cattle, has a higher number of smaller abattoirs and less industry concentration than the U.S. Infection rates reflect government policies. Pandemic containment efforts have been from companies and local authorities' level, not federal. COVID-19 status being monitored closely by global industry due to large impact on global meat supplies. COVID-19 infections increasing rapidly beginning of June. (Durisin et al. 2020; Global Ag Media 2020)</p>
	<p>Australia</p> <p>Minimal outbreaks of COVID-19, early adoption of mitigation strategies, no impact on industry, less industry concentration in processing.</p>
Wheat	<p>Generally small impact of COVID-19 on production in major exporters</p> <p>Expectations of record North American wheat crop plus high stocks. Canada strong demand and shipments, supply chain running well from inland elevators to railway terminals to ports, fertilizer plants to flour mills (Dyer 2020). Canada expects an 11 per cent production increase over the five-year average (Turner 2020).</p> <p>Black Sea region export restrictions from Russia and possibly Ukraine to end 2019/20 crop year. Substitution from other exporters, all types of wheat global exports increased five per cent over previous year (Turner 2020a); Ukraine — grain export limits possible to maintain bread prices, 2020/21 reduced crop due to poor weather, COVID-19 had minimal impact on spring sowing (Polityuk and Karazy 2020).</p> <p>Russia, the world's largest wheat exporter, implemented export ban through June.</p> <p>EU experiencing drought (Turner 2020a) and current EU wheat crop threatened by weather (Medetsky and Durisin 2020).</p> <p>Australia production 50 per cent increase over last year (Turner 2020a). Australia has high domestic feed demand which was exacerbated by drought (ABARES 2020).</p> <p>Italy small crop last year in addition to severe COVID-19 lockdown (Reynolds 2020).</p> <p>Argentina record wheat crop, near record exports with Brazil, its largest export destination, then Southeast Asia, North Africa, South America (Donley 2020). Export tax on wheat implemented December 2019, not related to COVID-19 at time of implementation but rate could change in response to COVID-19 if needed.</p> <p>South Asia transport and distribution labour-intensive, COVID-19 will affect supply chain (Neo 2020).</p>

Legumes/Pulses	<p>Canada 25 per cent increase in red lentil seeding, greater demand, no COVID-19-related production issues, processors have seen sales increase by 40 per cent, shipments are 400 per cent higher YTD over last year (Dyer 2020).</p> <p>India is world's leading pulse consumer, producer and importer. Pulses are part of the government's emergency pandemic rations. It is not self-sufficient in pulses, must supplement with imports. Expecting a record harvest in pulses and rabi but supply chains disrupted and distorted by lack of labour by March 25. (FE Online 2020; Pulse Australia 2020b; Pulse Pod 2020b)</p> <p>Australia's pulse production on target and unaffected by COVID-19 other than sourcing containerized shipping for exports (Pulse Australia 2020a).</p>
Canola	<p>Canadian canola shipments double last year's, with the EU and U.A.E. main destinations.</p> <p>EU's last rapeseed harvest "dismal" with the same expected this year due to weather and neonicotinoid ban.</p> <p>Ukraine current crop year suffering dry weather, supplies 60 per cent EU imports.</p> <p>China second largest canola producer in the world, suspended Canadian import licences. (McMillan 2020; Pratt 2020b).</p>
Barley	<p>Canada</p> <p>High degree of mechanization, protocols in place throughout the chain, no production issues related to COVID-19. Good supplies for 2020. (Dyer 2020)</p> <hr/> <p>Germany: Drought conditions</p> <p>High global inventories of barley in general, with Kazakhstan, Australia expected to have good production years (Turner 2020b).</p>

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