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Coronavirus (covid-19) pandemic: the aftermath on livestock products processing and distribution chain- A review

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Abstract

Coronavirus had been in existence for many years, but its effects has not been so evident as the whole world experienced recently. It represents an unprecedented emergency and grave societal threat. The better way to cure the emergence disease is by protecting public health. However, governments, policy makers and the international community must quickly need to act, recognize and attempt to mitigate the negative impacts (current and potential) of the pandemic and related response efforts on key sectors that contribute to food security, nutrition and livelihoods. The livestock sector is a key contributor to these areas, especially for the world's most vulnerable populations. In the light of recent challenges in food supply chain, there is now considerable concern about the food production, processing, distribution, and demand. COVID-19 resulted in the movement restrictions of workers, changes in demand of consumers, closure of food production facilities, restricted food trade policies and financial pressures in food supply chain. The effects of COVID-19 on the livestock sector are still largely unquantified and yet to be fully felt. Formal assessments have not yet been possible, but current observations reveal disruptions to livestock value chains. Lessons from past epidemics indicate these disruptions are likely to grow, along with their dire, socio-economic consequences. Moreover, considering the doubt on how these factors will play out in various areas affected especially meat processing and distribution in the years to come from the bulk of discussion in this review.

Keywords: Coronavirus, distribution chain, livestock products, pandemic, processing

Pandémie de coronavirus (Covid-19): les conséquences sur la chaîne de transformation et de distribution des produits de l'élevage - Un examen

Résumé

Le coronavirus existait depuis de nombreuses années, mais ses effets n'ont pas été aussi évidents que le monde entier l'a récemment expérimenté. Cela représente une urgence sans précédent et une grave menace pour la société. La meilleure façon de guérir la maladie émergente est de protéger la santé publique. Cependant, les gouvernements, les décideurs et la communauté internationale doivent rapidement agir, reconnaître et tenter d'atténuer les impacts négatifs (actuels et potentiels) de la pandémie et des efforts de riposte connexes sur les secteurs clés qui contribuent à la sécurité alimentaire, à la nutrition et aux moyens de subsistance. Le secteur de l'élevage est un contributeur clé dans ces domaines, en particulier pour les populations les plus vulnérables du monde. À la lumière des défis récents de la chaîne d'approvisionnement alimentaire, la production, la transformation, la distribution et la demande des aliments suscitent désormais des inquiétudes considérables. Le COVID-19 a

entraîné des restrictions de mouvement des travailleurs, des changements dans la demande des consommateurs, la fermeture des installations de production alimentaire, des politiques commerciales restreintes et des pressions financières dans la chaîne d'approvisionnement alimentaire. Les effets du COVID-19 sur le secteur du bétail sont encore largement non quantifiés et ne sont pas encore pleinement ressentis. Les évaluations formelles n'ont pas encore été possibles, mais les observations actuelles révèlent des perturbations dans les chaînes de valeur de l'élevage. Les leçons des épidémies passées indiquent que ces perturbations sont susceptibles de se développer, ainsi que leurs conséquences socio-économiques désastreuses. De plus, la prise en compte du doute sur la manière dont ces facteurs joueront dans divers domaines touchés, en particulier la transformation et la distribution de la viande dans les années à venir, constitue l'essentiel de la discussion dans cette revue.

Mots clés: Coronavirus, chaîne de distribution, produits de bétail, pandémie, transformation

Introduction

Coronavirus disease 2019 (COVID-19) is an infectious disease of humans caused by a newly discovered coronavirus: severe acute respiratory syndrome coronavirus 2 (SARS-CoV2). This novel disease is easily transmissible, identified within December 2019 and declared a pandemic by WHO on 11 March 2020 (WHO, 2020). The first infections were linked to the Huanan Seafood Market (Wuhan, China) (Li *et al.,* 2020). In the recent development, Zhou *et al.,* (2020) used sequencing technology to show that SARS-CoV2 and bat coronavirus possess a similarity of gene sequence up to 96.2%, suggesting bats as the possible source of SARS-CoV2. However, the COVID-19 pandemic that has spread rapidly and extensively around the world since late 2019 has had profound implications on food security and nutrition. The unfolding crisis has affected food systems and threatened people's access to food via multiple dynamics (Charis, 2020).

Moreover, the world has witnessed not only a major disruption to food supply chains in the wake of lockdowns triggered by the global health crisis, but also a major global economic slowdown. These crises have resulted in lower incomes and higher prices of some foods, putting food out of reach for many, and undermining the right to food and stalling efforts to meet Sustainable Development Goal (SDG) "Zero hunger" (HLPE, 2020). Already, before the outbreak of the pandemic, according to the latest State of Food Security and Nutrition report (FAO *et al.,* 20120), some two billion people faced food insecurity at the moderate or severe level. Since 2014, these numbers have been climbing, rising by 60 million over five years. The situation is fluid and dynamic, characterized by a high degree of uncertainty. According to the World Health Organization, the worst effects are yet to come (Ghebreyesus, 2020 and Khorsandi, 2020). Most health analysts predicted that this virus will continue to circulate for at least one or two more years (Scudellari, 2020). Some bottlenecks remain, and some new disruptions may emerge as COVID-19 continues to spread. The rapid response of food / livestock products supply chains has underscored the importance of an open and predictable international trading environment, which allows firms to tap into new sources of supply when existing sources are compromised. Policy makers have so far mostly avoided the mistakes made during the food price crisis of 2007-2008, and have also taken a range of other steps which have helped ensure the continued functioning of food / livestock products supply chains (OECD, 2020).

Effect of COVID-19 on processing of

livestock products

The enforced closure of businesses, restaurants, school, travel restrictions and border, overall demand for dairy showed a 12–15% decline in the U.S. (Ghebreyesus, T. A. 2020), leading to milk surplus and dumping. Whole egg demand increased but liquid egg demand, usually 30% of the U.S. egg market, decreased, leading to plant closures, contract cancellations, and the euthanasia of laying hens. This hindered farmers from accessing farming inputs, supplies and equipment such as feed, replacement stock (chicks, piglet, gilts), breeding materials and milking machine according to ESIEC (2020) which reported the operational situation and demands in small, medium, and micro enterprises are affected by by COVID-19 pandemic. It showed that as of February 2020, logistical interruptions were the main issue agricultural enterprises faced: 38.5 percent of livestock operations listed this as the biggest challenge. The main reason for logistical interruptions is the shortage of raw materials, especially the sufficient supply of feed for livestock farmers (Zhang, 2020). Also, in United State of America, majority of the pig farmers culled or aborted herds as they have not been able to sell and ship their animals due to closure of processing facilities (Vincent and McCullough *et al.,* 2020). As reported by Barrerr (2020) that, farmers in Wisconsin in USA dump about 25,000 gallons of fresh milk a day because there was no place for it to go.

Disruption of livestock processing operations by COVID-19 pandemic

COVID-19 has led to disruptions in food processing industries, which have been affected by rules on social distancing, labour shortages due to sickness, and by lockdown measures to contain the spread of the virus. Many firms have also reported high rates of worker absences; for example, staff availability was reduced by up to 30% in French meat processing facilities in the regions of the country worst hit by COVID-19 (www.processalimentaire.com, 2020). However, Good, K. (2020) reported that in USA about 25% of pork production and 10% of beef production have been closed due to pandemic outbreak among staff. According to the report of Attwood (2020) and Hein (2020) which stated that several countries have raised concern regarding labour shortage in meat processing plants and farms while in the situation of lockdowns and/or suspension of foreign visas. The demand fell for high-end beef usually served in restaurants while farmers and processors struggled to cope with changing levels and types of demand from different sectors. However, the greatest impact of COVID-19 on the livestock product supply chain commenced with disease outbreaks among processing plant workers, leading to plant closures and affects up and down the food chain (Hein 2020). COVID-19 clusters have been found in meat processing plants in various countries. Employees often work in close proximity to each other, making it more difficult to respect physical distancing requirements. In some cases, workers also live together in overcrowded conditions, which further facilitate the spread of the virus (www.euracity.com, 2020). Meat processing appears to be more sensitive than other types of food processing in part because of the labour intensive nature of operations. Many meat processing plants have shut down or have been forced to operate at reduced capacity. In the United States, cattle and pig slaughter fell by about 40% in April compared to the same period in 2019 (Hein,2020). Low demand from meat processors has left producers in North America with unsold mature animals. Increasingly, they are forced to resort to euthanizing animals to prevent overcrowding, particularly for pigs (www.foxbusiness.com, 2020). In Europe,

conditions currently do not yet appear to warrant such drastic measures (www.euracity.com, 2020). The effects of meat processing plant closures may be especially pronounced in North America due to the concentrated nature of the industry; in the United States, almost 60% of pork processing capacity comes from just 15 plants.

Effects of COVID-19 on the livestock product supply chain

The immediate impact of COVID-19 was a wave of panic buying by the public. Among the products that disappeared from supermarket shelves in the first few days were toilet rolls, disinfectants and sanitizers, pasta, rice, flour, and yeast, and in some countries, eggs, cheese, and milk. (Charis, 2020). General trends included increased meat, egg, and dairy retail sales with a sharp upward spike as lockdowns were announced (Weersink *et al.,* 2020) but then sustained sales when compared with year-on-year, from early March to July, where records are available (AVMA, 2020). This was a consequence of the increase in meals being prepared at home, with schools, workplaces, and restaurants closed. However, COVID-19 has imposed shocks on all segments of food supply chains, simultaneously affecting farm production, food processing, transport and logistics, and final demand. Not all livestock sectors and products have been equally affected, as different products experienced disruptions at different stages of the supply chain.

Consequences of COVID-19 pandemic on livestock products transportation and distribution chain

Bottle necks in transport and logistics have disrupted the movement of products along supply chains. Broadly speaking, agriculture especially livestock products and food products are transported using three main modes of transport: bulk (ships and barges); containers (by boat, rail or truck) and other road transport; and air freight (Serpil and Mehmet, 2020). Different products use different modes of transport: cereals and oilseeds, for example, are typically shipped in bulk; meat and dairy products are often shipped in refrigerated containers and trucks; and perishable products with a high value-to-weight ratio are transported by air in the "bellies" of passenger planes (Serpil and Mehmet, 2020). The impact of COVID-19 on these transport modes varies considerably (Clapp and Moseley, 2020). Bulk shipments have not seen any major disruptions, and prices for bulk freight are actually near multi-year lows (Laborde *et al.,* 2020). However, air freight has been severely disrupted. Global air cargo capacity in the week of 10 to 16 May, 2020 was 26% lower than during the same period in the year 2019, with the largest decline in capacity on routes between Europe and Latin America (with declines of more than 80%) and the disruption is caused by the steep decline in passenger air travel, which normally accounts for the majority of air cargo capacity (www.euracity.com, 2020). Disruptions to container and truck transport fall somewhere in-between; the number of container ships is currently 8% below normal due to COVID-19 restrictions such as limitations on crew changes, additional screening, mandatory quarantines, and reduced demand. Commercial road transport in April, 2020 was about 20% lower than usual in Canada and the United States. In Europe, truck traffic initially fell by more than 50% in Spain, 46% in France and 37% in Italy, although it has subsequently recovered, but in mid-April, the total distance driven by trucks in Europe was 24% below normal FAO *et al.,* 2019).

Impacts of COVID-19 pandemic on food / livestock products demand and security

Demand refers to consumer's desire and capacity to purchase goods and services in a given period of time (Nicola *et al.,* 2020). The demand of food has been affected due

to reduction in income and purchasing capacity. Panicked Consumers are stock piling foods which in turn has affected the food / livestock products availability and price (Nicolas *et al.,* 2020). The price of the commodities however depends on the country and their policy to control the pandemic. According to Padam *et al*. (2020) who stated that prices of the basic necessities are expected to be stable, while spike in price may occur for high-valued products (Siche, 2020). In the present scenarios, the consumption of animal protein has been decreased significantly due to misleading perception of animal as a reservoir of the virus. Food security simply refers to availability and accessibility of sufficient amount of nutritious food in consistent manner. Due to decline in international trade, disturbance in food supply chain and food production, food insecurity may arise. FAO (2020a) had mentioned that, small farmer and fisher may face difficulty in selling their product which in turn cause decrease in their income and purchasing capacity. Food insecurity raised due to COVID-19 will highly affect the poorest and the most vulnerable segments of the population (Watts, 2020). At present, 820 million people are facing chronic hunger and 113 million are facing acute severe insecurity (FAO, IFAD, UNICEF, 2020). Thus, disturbance in food / livestock products access brought by pandemic affects these groups immediately and severely. Around 10 million children depend upon the school meals to fulfill their nutritional requirement. But due to closing of schools and suspension of school meal programs, these children are no longer receiving daily school meals which may reduce their capacity to cope with diseases (FAO, 2020).

Influence of COVID-19 pandemic on livestock products quality and safety

The current COVID-19 crisis has changed the food trade policies of some governments, moving towards restricting exports and facilitating imports. The main reason that countries impose export restrictions is to ensure the maintenance of the number of products in the domestic market. Although the export restriction typically produces this result in the short term, it also has some negative effects. However, the influences of COVID-19 on the livestock sector are still largely unquantified (FAO, 2020). Poultry and cattle growers were particularly affected under COVID-19 lockdowns due to market closures, declining demand or loss of export markets (FAO, 2020). Movement restrictions have led to a stoppage of livestock movement and trade, leaving many smallholder farmers in some countries unable to sell their livestock (FAO, 2020b) These market restrictions have curbed pastoralists' access to pastures and overall farmers' access to markets, breeding materials and replacement stocks (e.g. day-old chicks and semen). Furthermore, rumours and misperceptions linking animal products to the transmission of COVID-19 have led to numerous drops in consumption of products of animal origin and to significant losses to the livestock sector across Asia (FAO 2020b, c). The same authors reported that many farmers and herders were forced to liquidate their assets in order to meet their needs and recovery response options ranged from short-term emergency support to producers to avoid negative coping methods (selling of assets) to medium-term investments in market outlet designs and infrastructure in line with hygiene, safety, and health requirements to meet consumers' demands in a post-COVID-19 climate. Furthermore, those whose occupations were based on

fishing and fish products were also adversely affected. In Asia and the Pacific, millions of people are engaged in the primary and secondary sectors of capture fisheries and aquaculture. The livelihoods of these men and women were negatively affected during the pandemic (FAO 2020d). Measures to combat the spread of COVID-19 such as the ban on international and domestic travel, restriction on gatherings and festivities, and closure of food services, offices and schools have led to reduced demand for fish and fish products and a reduction in international trade. Migrants working on vessels and in processing plants have been unable to go back to their villages or their countries. In aquaculture, the supply of aquaculture inputs as well as the movement of labour was disrupted. Fish farmers have suffered losses because they cannot sell their harvests or had to sell at reduced prices (FAO 2020e).

Food / livestock products safety and COVID-19 pandemic

Food and Agricultural Organization provided advice to countries through advisories on the incorporation of COVID-19 health measures within supply chains to ensure their continuous functioning. There is no evidence that COVID-19 can be transmitted by food livestock products or its packaging and processing (FAO and WHO 2020). Therefore, growers, transporters, storage operators, processors, retailers, vendors and consumers could proceed with all operations without any apprehensions linked to food / livestock products, but it is of course conditional on them taking the necessary health protocols. Advice was provided on implementation of measures on farms; in transportation of fresh produce, labour and agricultural inputs; wholesale and retail markets and establishments; processing units; food services including app-based delivery services, and for consumers (FAO 2020b). Measures such as physical distancing, mandatory use of masks, frequent hand washing, regular temperature checks and frequent disinfection of surfaces are compelling new food-safety norms in Asia, Africa and the Pacific region and will have a positive impact on food / livestock products safety. The strong advocacy and uptake of these practices inspired by the pandemic provides a springboard for greater adoption of Codes of Practices and standards from farm to fork.

Conclusion

There is an opportunity today to not just respond effectively to the current crisis, but to roll back distortive, inefficient and environmentally harmful support, thereby freeing up financial resources for investments in a more productive, sustainable and resilient food system able to meet new challenges. As staple food, livestock and fisheries have been affected by this pandemic. Food safety and security are the global concern at present scenario. The supply chain has been hit hardest by COVID-19, which causes food security of most vulnerable segment of population at risk. And also, most of the migrant, informal, seasonal farm workers as well as livestock products processors are losing their jobs which may affect the demand for food. From this review, it is hereby recommended that:

Recommendations

Adequate processing and storage should be made available with good innovations and pre-existing ones to mitigate livestock products wastage and ensuring the availability of such products post-pandemic.

The government should enforce the measures to control the pandemic without disturbing the food / livestock products supply chain and considering the food security of their citizens.

Governments should encourage farmers by not only concentrating on plant-based foods which are limited in most essential amino

acids needed for a strong immune system rather balance both plant and animal research processing and storage.

Include support for individual and community responses, such as home and community gardens.

Ensure sustainable fisheries and aquaculture, as well as animal production and forestry, are integrated in policy responses to COVID-19 so as to reap their full potential in terms of nutrition and livelihoods.

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