

**Review Article****Impact of COVID - 19 on Livestock Production and Best Practices to
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ABSTRACT

Livestock farming plays a vital contribution in food supply of rural and urban areas; gives off a wide diversity of products; creates employment, stimulates demand for goods and services; and promoting economic transformation by contributing to human and financial capital. COVID-19 has had a substantial impact on many sectors at global, regional and national levels; including the livestock sector. It negatively influences animal production through reducing access to animal feeds, inputs and services, markets and consumers; processing via reducing processing capacity, compromised storage and conservation and constrained informal businesses; and animal health by reducing testing and diagnostic capacity; disrupting animal diseases surveillance and reporting; reducing or even suspending national animal disease control programmes. With rigorous action, we can not only avoid some of the worst impacts but do so in a way that supports a transition to more sustainable livestock production systems that are in better balance with nature and that support healthy diets- and thus better health predictions - for all. Hence, since there were no cases reported for the transmission of COVID-19 from livestock animals to humans, it is highly recommended that farmers continue to rear, keep, care and maintain their livestock by taking measures into practices.

Keywords: COVID-19, livestock, impact, best practice**INTRODUCTION**

It was in December 31, 2019 in a Chinese city of Wuhan that a new human coronavirus now popularly known as COVID-19 emerged (Wang, 2020; WHO, 2020a). Since that time the pandemic outbreak of coronavirus has an impact on the entire food supply chain, confirming in the most terrible way that we are all part of a food system that is interconnected and fragile and that solutions must be developed

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together. The current Covid-19 pandemic that has led most, if not all, the countries to shut down the economy, in order to slow down the spread of the virus, is affecting the global food systems, disrupting regional agricultural value chains, and posing risks to household food security (Kurns, 2020).

Livestock farming plays a vital contribution in food supply of rural and urban areas, and it gives off a wide diversity of products that range from milk, meat, wool, fibre, eggs, feathers, hides and skin. It is also vital as it creates employment, stimulates demand for goods and services, as well as promoting economic transformation by contributing to human and financial capital for other sectors of the economy to develop (FAO, 2018).

COVID-19 has had a substantial impact on many sectors at global, regional and national levels, including the livestock sector (FAO, 2020; G20, 2020). The actions taken in many countries, such as lockdown, travel restrictions and border controls, have resulted in unintended or negative consequences for the livestock sector, including but not limited to difficulty moving live animals and animal products like milk, meat and eggs to markets, restrictions potentially limiting seasonal border crossings (transhumance) with ruminants, restricted capacity to purchase necessary production inputs, restricted access to labour and professional services (FAO, 2020c). When there is an outbreak of infectious disease, there is also an increase in hunger and malnutrition (Burgui, 2020; Sar et al., 2010). These difficulties have led to a decrease in processing capacity for animal products, as well as loss of sales and slowdown of market activity. Moreover, the situation worsens as the disease progresses, making movement restrictions more and more stringent, causing labor shortages for the harvest, or difficulties for farmers to bring their products to market. The purpose of this review is, therefore, to describe the impact of COVID-19 on livestock production and best practices to overcome, and to provide practical recommendations for actors along value chains to diminish this impact and improve the effectiveness of livestock production and livestock supply chain.

Covid-19 and Livestock

There are currently no restrictions on livestock trade or animal movement due to the COVID-19 response; and there is no evidence to support transmission of COVID-19 associated with animal and animal products consumption. Generally, because of poor survivability of these coronaviruses on surfaces, there is likely very low risk of spread from food products or packaging. It may be possible that a person can get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or possibly their eyes. This is not thought to be the main way the virus spreads, but CDC is still learning more about this virus. The virus that causes COVID-19 is spreading from person-to-person, mainly through respiratory droplets produced when an infected person coughs or sneezes. These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs. Spread is more likely when people are in close contact with one another.

Impact of COVID-19 on Livestock Production and Associated Activities

1. On animal production

a. Reduced access to animal feeds

Physical distancing and requirements for additional personal protective equipment are reducing the efficiency of industrial feed enterprises. Movement restrictions and illness are resulting in labour shortages and reduced supply of raw materials or other ingredients. Movement restrictions also disrupt transhumance, which cripples pastoralists' ability to feed their animals and further delayed feed supply (FAO. 2020; FAO & WHO, 2020). Cattle feeding requires several months for animals to finish to acceptable quality. The estimated losses to the feedlot sector reflect the decrease in value for animals placed into feedlots prior to the COVID-19 impact.

b. Reduced access to inputs and services:

Movement restrictions and disruption of national and international trade routes is curbing farmer access to breeding materials and replacement stocks (e.g. day-old chicks, semen, heifers, piglet and gilts), breeding materials and milking machine (Barrett, 2020; FAO. 2020; CDC, 2020; O'Conno et al., 2020). This can compromise sales for input providers. The disruption of public services (e.g. food safety inspection and animal health extension services), combined with interrupted delivery and use of vaccines and medicines is increasing the likelihood of new epidemics, including those involving animal diseases that cause major livestock losses and outbreaks of diseases (FAO. 2020) transmissible to humans. Import restrictions will have greater impact on areas which depend on imports to sustain production or rely on meat and dairy imports for consumption (e.g. large parts of Africa and Small Island developing states).

c. Reduced access to markets and consumers

Closure of live animal markets in many countries means small-scale producers cannot sell their products. The disturbance of the logistical channel and drop in demand are reducing sales and lowering prices. As a result of limited access to markets and slaughterhouses/processing plants, farmers have to keep their stock longer or dump milk, leaving them with higher production costs or important losses. Disruptions of income from small ruminants or poultry are hitting women hardest, by reducing their purchases of household essentials and nutrition. Movement restrictions are also interrupting the role of intermediaries, who collect animals or products and aggregate them for further fattening, processing or retailing. As previous epidemic experiences show, disruptions of intermediaries can cause farmers to lose their link to larger buyers, especially without information systems linking value chain actors. In West Africa, many live animals' markets are closed and prices for cattle and small ruminants have dropped by more than half while pastoralists are forced to destock massively (FAO. 2020). The misconception on regarding livestock or livestock products being hosts or vehicles of the virus may result in further decline of demand for meat and other animal products; import and export restrictions and reductions are another impact.

2. On processing

a. *Reduced processing capacity*

Staff reductions due to lockdown measures are constraining meat and dairy processing industries, given their labour-intensive nature. Deliverance of animal and animal products causes the overstocking or wasting of them. Restricting animal movement can cause overcrowding and overuse natural resources such as water and grazing land. Reduced slaughtering and processing capacity can limit the meat output – notably for labour-intensive slaughterhouses and food processing plants. Product distributors are losing their routine customers such as schools, local markets, tea-coffee kiosks, restaurants, public gatherings/ collectors and travel industry (Huffstutter, 2020; Attwood, 2020; Hein, 2020, Good, 2020; MoA, 2020) .

b. ***Compromised storage and conservation:*** Transport disruptions and changes in retailing and consumption habits are forcing some collectors and processors to stock up.

c. ***Constrained informal businesses:*** Much of meat and dairy processing in developing countries is informal (i.e. up to 90 percent of volume). COVID-19 prevention and response disrupts these businesses. This disruption removes an outlet for small-scale producers, who often lack the capacity to sell to formal markets.

3. On live animal and animal products transport

a. *Constrained national transport*

Movement restrictions are compromising transport, which is reducing the supply of livestock and livestock products. Delays of vehicles transporting raw materials for processing meat threatened to cause a shortage until movement bans were loosened; milk processing and transport were disrupted by tight road traffic controls, leading to milk dumping/discarding.

b. *Constrained international transport*

Trade restrictions impact countries exporting livestock products as well as farmers whose incomes depend on exports. Livestock producers, traders and butchers lost their incomes since they could not export their animals and meat. Disruptions to live animal transport can also have serious consequences on the availability of products in the importing country.

3. Sales and consumption

a. *Modified retailing and product demand*

Retailing is reorienting toward supermarkets and online platforms, which are now spiking. This means more packaged longer-life and processed meat and dairy products being shipped.

b. *Reduced consumer purchasing power*

Quarantine and lockdowns are constraining purchasing power, particularly that of informal workers, and in countries with little or no social safety nets. The economic slowdown and increasing unemployment have already left people, including millions of migrant workers in many countries, with little or no income with which to buy

food. During the 2014 Ebola crisis in West Africa, the decrease in purchasing power reduced domestic animal production. In the current crisis, informal markets are being closed or constrained across Africa.

c. Reduced demand and public procurement

In most countries, closure of restaurants and reduced tourism is leading to a sharp fall in demand for food by these sectors. School feeding programs are also suspended, which is depriving millions of children of access to food. Fake news and rumours can also affect demand. For instance, in India, chicken sales were reduced significantly after posts on social media created the impression that humans could contract COVID-19 by consuming chicken (FAO, 2020).

4. On animal health

d. Reduced animal health activities

According to American Veterinary Medical Association (2020) due to labour shortage, there is reduced capacity to work on animal health activities- mitigating biosecurity, vaccination, treating sick animals and prophylactic treatment. The overstocking of animals could increase stress and the prevalence of animal diseases, and compromise animal welfare standards. Movement restrictions and quarantine measures limit farmers' ability to access basic veterinary services and animal health inputs, such as veterinary drugs, vaccines, disinfectants and supplies and challenges for veterinary and veterinary professionals to visit the farms (Slabodkin, 2020; Herper and Branswell, 2020).

- Reduced testing and diagnostic capacity (Slabodkin, 2020; Herper and Branswell, 2020);
- Disrupting animal diseases surveillance and reporting (WHO, 2020);
- Reduced or even suspended national animal disease control programmes;
- National activities on outbreak investigations, animal disease surveillance, and vaccination campaigns cannot be implemented as planned.
- Late or insufficient response to the outbreak of trans-boundary animal disease may occur (Phelps, 2020).
- Global, regional and national animal health programmes and efforts might be delayed or cannot be implemented as planned (FAO, 2020).

Best Practices/Guidelines to devastate/ overcome

To lessen the influence of COVID-19 and warrant continuity of the livestock production and supply chain and animal health activities, practical recommendations and precautionary measures should be taken. These are for livestock producers/owners, actors along value chains, animal health professionals and policy makers – targeting to guard people and animals, and to diminish the disturbance of services. The below-mentioned options are provided for consideration by national policy makers to mitigate the impact of COVID-19 on the livestock sector:

- ✚ ***Establish production safety nets***, which may include new or resupplied feed reserves, special permits to transport drivers allowing animal feed distribution in remote areas and waivers for agri-food system operations to keep inputs flowing.

- ✚ ***Establish emergency management procedures and services***, including communication to mitigate rumours, advise stakeholders and seek feedback.
- ✚ ***Allow food markets to remain open while facilitating physical distancing***-public health-conscious rules, procedures and equipment; and the application of behavioural insights to market processes and environments (biodiversity, land, water, and ecosystems) where diseases flourish.
- ✚ Maintain open borders for imports and export;
- ✚ Provide guidelines for COVID-19 control and prevention along the supply chains to protect value chain actors and their families;
- ✚ Provide grants to increase packaging and freezing capacities;
- ✚ Organize grouped slaughtering points and support the installation of the cold chain to reduce unregulated slaughtering and improve meat inspection;
- ✚ Find alternative ways to reach children of the school feeding programmes and distribute animal-protein-rich foods to improve nutrition and smallholder incomes.
- ✚ Promote group collection and delivery of milk to processing companies.
- ✚ Help small- and medium-sized businesses mitigate short-term COVID-19 impacts via dedicated financial facilities (e.g. temporary tax relief, dedicated emergency loan programmes, direct stimulus payments, tax exemptions etc).
- ✚ Communicate with suppliers (e.g. feed, consumables) and professional service providers (e.g. veterinarians, mechanics, milk collectors) to find solutions to secure supplies, inputs and services
- ✚ Obtain the latest information on the evolving COVID-19 situation from trusted sources e.g. official news releases, radio programmes provided by local governments, field livestock/veterinary officers, livestock market officers, livestock NGOs, veterinary pharmacies and farmers associations.
- ✚ Implement practical biosafety and biosecurity measures to prevent human contamination with COVID-19 on the farm.
- ✚ Avoid contact or apply physical distancing outside the farm so you do not get sick and have to leave your animals alone.
- ✚ Develop, endorse and implement policies to mitigate impact of COVID-19 on livestock production and value chains.
- ✚ Develop and disseminate information materials and collaborate with partners to organize outreach activities, in order to sensitize livestock production and animal health stakeholders, including relevant recommendations in this document.
- ✚ **Biosecurity:** While taking extra measures to reduce the spread of covid-19, remember to maintain the biosecurity practices that prevent the spread of any animal-to- animal and animal-to-human disease. Since there were no cases reported for the transmission of COVID-19 from livestock animals to humans, it is highly recommended that farmers continue to rear, keep, care and maintain their livestock. Despite the fact that no cases were reported, it is still important to follow some hygiene practices, as listed above.

CONCLUSION AND RECOMMENDATION

The pandemic called COVID-19 disease has a great impact on the actions and activities of humanity; agriculture is not outside this impact. Food demand and thus food security are greatly affected due to mobility restrictions, reduced purchasing power, and with a greater impact on the most vulnerable population groups. The COVID-19 crisis threatens the livestock production, food security and nutrition of millions of people, many of whom were already suffering. Many small, medium and large livestock farms and industries are looming. With rigorous action, we can not only avoid some of the worst impacts but do so in a way that supports a transition to more sustainable livestock production systems that are in better balance with nature and that support healthy diets- and thus improved health predictions - for all. Since there were no cases reported for the transmission of COVID-19 from livestock animals to humans, it is highly recommended that farmers continue to rear, keep, care and maintain their livestock by taking measures into practices.

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CONFLICT OF INTEREST

None

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