

Potential Impacts of Covid-19 on Agriculture and Socioeconomic Aspects of Farming Community in Arsi Zone, Oromia Region, Ethiopia

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Abstract

Since the first Coronavirus (COVID-19) cases detected in Ethiopia on March 3, 2020, the pandemic has posed a great challenge, as it causes many adverse effects on agricultural activities and thus on food and nutrition security, particularly in developing countries like Ethiopia. The sector is more vulnerable to the pandemic and can threaten the livelihoods of small holder farmers and urban community as well as the supply to the agro-based industries leading to social and economic crises. The current desk review was conducted to help decision making at all levels of administrations and

other stakeholders who are involved in supporting the agriculture and food systems in Arsi zone and the region at large. Relevant information from recent journal articles, organizational reports, newsletters and various expert blogs related to the current pandemics were gathered, in addition to expertise view. This paper presents the possible effects of COVID-19 on crops and livestock production and health, food value chain, nutritional security, natural resource conservation and socio-economic aspects of the farming community in Arsi zone with identification of possible strategies for overcoming the impact of the current pandemic. The spread of the virus particularly affects the farming activity and market access of small holder farmers to sell their products or buy essential inputs. This could create huge problem to agricultural production and food systems leading to the socio-economic crisis in the country. Therefore, the national, regional and zonal authorities should take proper steps to maintain well functioning of farming system and agri-food value chains.

Keywords: COVID-19; agriculture; food systems; food security; socioeconomic crisis

1. Introduction

Ethiopia has an estimate of 114 million human populations (Worldometer, 2020), where agriculture accounts for 41.4% of gross domestic product (GDP), contributing for 80.2% of the export earnings and 80% of the labor force that makes the sector to be the most important in supporting the economy of the country (Chipeta, Bezabih and Demese, 2015). Over 87% of the population of Ethiopia and Oromia regional state in general, and 88% of population of Arsi zone are rural resident in particular, where the livelihood of population is dependent on Agriculture (CSA, 2008). It is the output of this parcel of population that determines the political, economic and social

wellbeing of the country. However, this sector is among the most vulnerable segment of the livelihood as it has frequently been suffered from recurrent droughts and resulted in extreme fluctuations of agricultural outputs. This made the livelihood of the society at risk and to be aid recipient. In Arsi zone alone, the government supports over 100,000 rural households through productive safety net program. With this condition at hand, the recent outbreak of coronavirus (COVID-19), which was assumed to have been originated from Wuhan province of China and quickly spread across to almost all countries in the world becoming a pandemic (FAO & WHO, 2020), has posed a great challenge, as it causes many adverse effects on food and nutrition security, particularly in developing countries like Ethiopia, where there are many vulnerable populations to food security. This is mainly as a result of an effort to contain the aggression of the COVID-19 pandemic, where significant impact on supply chains and logistics, both for producers and consumers, as evidenced by closed borders, national lockdowns, and reduction in air traffic.

At the time of writing this desk review, the virus is confirmed to have infecting over 39,000 people across the country including Arsi zone, and it is expected that the spread could increase until it reaches peak unless strong preventive measures are taken. To mitigate the potential effect of this pandemic, the government has been taking several preventive measures including declaring state of emergency, partial to complete lockdown, quarantining, awareness creation and social protection to minimize the effect.

Regardless of efforts made, the agricultural sector is more vulnerable to devastation leading to food insecurity, social and economic crises, unless

special care and precaution is given to the sector. In response to this, a brief synthesis of expert's views was made on the impact of COVID-19 on food supply chains and its mitigation measures based on local observations and review from the experience of other countries. The review document presents the possible effects of COVID-19 on crops production, livestock production and health, food value chain, nutritional security, natural resource conservation and socioeconomic aspects of the zone with identification of possible strategies for overcoming the impact of the current pandemic. Thereby, this document can help decision making at all levels of administrations and other stakeholders who are involved in supporting the agriculture and food systems in Arsi zone and the region

2. Methodology

A team of professionals gathered from College of Agriculture and Environmental Science, Arsi University (Department of Plant Science, Animal production and Health, Natural Resource Management, Food Science& Postharvest Technology, and Agricultural Economics) made discussion on the contents of intended review and kept on compiling information accordingly. Relevant information was gathered from recent journal articles; recent reports from Food and Agricultural Organization (FAO); World health Organization (WHO); newsletters and various reports related to the current COVID-19 pandemics were considered, in addition to expertise view. A team of expertise was dedicated to make sure that all the relevant information is in place before finalizing this document.

3. Impacts of Covid-19 on Crop Production

The Rural community in Ethiopia is entirely dependent on crop and livestock farming activities that provide source of food and generation of income

sources; in addition, it provides employment opportunities for majority of population, export earnings and supplies of raw material for agro-based industries. Despite the long tradition of farming; crop production and productivity remains much below the national requirement even during normal production seasons due to complex and interrelated factors that makes it to be the largest recipient of food aid in Sub-Saharan Africa. Besides these facts, the current COVID-19 pandemic could create additional burden on the countries effort to make the crop production sector to be more productive and self-sufficient in terms of supply. Therefore, the following points are the potential effects of COVID-19 pandemic on crop production sector.

A. Restrictions on imports and exports.

Like any other part of the country, agricultural inputs such as fertilizer and pesticides are key for crop production and are required to be imported and supplied to farming community timely. However, the current international travel restriction due to the pandemic hampers the timely delivery and adequate availability of the inputs in the sector which do have direct impact on crop production and productivity. The zone is known for its potential for production of wheat and barley in the country, and based on this potential; the existing wheat and barley processing factories depend on the grain supply from nearby farming community. Therefore, the delay in input supply directly affects the overall efficiency of crop farming activities.

On the export side, crop based food processing factories like Merti-Jeju Agro-processing Industries which employees thousands of work force are the one that could be affected the most by export restrictions as a result of travel ban being underway due to the pandemic. Moreover, exportable crops which

are also produced in the zone like Common bean is the one that could be affected due to loss of market demand regardless of its production unless the pandemic contained in short run.

B. Movement Restriction.

Due to restrictions on travel and movement, as well as the health impacts of the virus, crop production could face shortage of labor that in turn may significantly disrupt the agronomic operations and process. As the zone is known for production of large amount of vegetables throughout the year and given their relatively shorter shelf life, the restriction in the movement could induce huge amount of post-harvest losses. Furthermore, as harvesting vegetables normally engages large number of work force, the restrictions of movement could hinder the timely collection of vegetables from farm site which still exacerbate the post-harvest loss.

C. Effect on farm land preparation

Though some pocket areas of Arsi zone are practicing mechanized farming, larger part of the zone still running under traditional oxen based farming. Such mode of farming practice usually takes more time for preparing farm land before sowing. In response to this, farmers used to exercises group farming like “*debo*”, where the mass is mobilized to for timely land preparation. However, due to restriction of group works, farmers are being forced to work on individual bases. This approach is expected to delay land preparation which could have direct impact on yielding potentials of crops for delayed planting.

D. Reduced farm household income

Prices of food (especially staples such as wheat, barley and legume crops) are likely to rise due to disruptions to the agriculture supply chain, reduced supply and closures of many informal markets. This will severely reduce the income of farmers and their ability to feed their families, which in turn increases the risk of many farms going out of business.

4. Effects of COVID-19 on livestock production inputs and services

4.1 Reduced access to animal feeds: -Feed is the most important input in the livestock production in the country. Restricted movement affects the management of these enterprises that need daily access to basic inputs such as grazing, feeding, water provision, and other production supplies. Even though large number of livestock population relies on grazing of grasslands, these days, increasing number of households uses supplementary feeds to feed their livestock. Thus, feed processing factories are the main sources for the supply of these supplementary feeds (Agro-industrial by products), as land is prioritized for crop production and the pasture is not supporting the existing large number of livestock productivity in the zone. Meanwhile, urban and peri-urban areas of Arsi zone relies on agro-industrial by products, concentrate feed and fodder supply. Particularly they are strongly dependent on fodder and concentrate availability. Hence, the problem due to the disruption in concentrate and fodder supply market could affect the production and productivity of livestock.

The absence of market for live animals could create a pressure on the pastoralist grassland or rangeland resources since the animals could stay on the farm for long time. The effect on grassland could be through exceeding

the carrying capacity of the resources available for feeding the existing animals. This could affect the long-term availability of the forage for the animals. Pastoralists and transhumant livestock keepers dependent on natural resources are also likely to be affected by border closures, as they rely on seasonal movements of livestock for feed. This will result in negative impacts on production and productivity(El-Sawalhy, 2020; FAO, 2020b).

4.2. Reduced access to 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 and Artificial Insemination, AI). AI, which is the key input in dairy production, is one of the services that could be affected by the pandemic due its nature of being time sensitive. This service also needs the supply of semen and storage facilities which could be affected by the restrictions. The disruption of public animal health extension services, combined with interrupted delivery and use of vaccines and drugs due to pandemic will increase the likelihood of new epidemics, including those involving animal diseases that cause major livestock losses and outbreaks of diseases transmissible to humans(FAO, 2020b). Movement restrictions due to COVID-19 will also affect the availability of regulatory/enforcement and disease surveillance services with concomitant negative impacts on the control of diseases (El-Sawalhy, 2020).

4.3. Effects on animal-based livelihoods and employment

The government has been making an effort to expand well-functioning livestock related micro enterprises that created huge employment opportunities for the youth and women. As the livelihoods of large number of farmers in Arsi zone is linked with livestock and livestock products, strong restrictions may affect the income of farmers who depends on the

sector. The disruptions of economic activities due to COVID-19 in the animal resources value chains from production to marketing and consumptions will lead to a temporary or permanent discharge of workers that could affect the livelihoods of many who depend on the chains for a living. This will result in massive unemployment and loss of much revenue(El-Sawalhy, 2020). Moreover, those areas whose livelihood relies on fishing activity could also be affected by the pandemic in Arsi zone, particularly around lake Batu and the surroundings, as Fishing activities reported to have declined in different parts of Africa, Asia and Europe due to physical distancing, limited supply of inputs and labor shortage (FAO, 2020a).

4.4. Effects on marketing and consumption of livestock and livestock products

4.5. Reduced product demand:

In Arsi zone, during early period of the pandemic, there were visible signs of reduced demand for livestock products (milk and meat) because of closure of hotels, cafeteria, street traditional coffee services and people were made to stay at home (especially during the time when “*bajaj*” and other vehicles are temporarily banned) and the condition may be worsen in the upcoming season if this pandemic continues for few more months and this is expected to hard hit the income of the smallholder farmers who supply these products.

4.6. Effects on Animal Product Processing

Staff reductions due to lockdown measures are constraining meat and dairy processing industries, given their labor-intensive nature. Currently, the United States is experiencing multiple slaughter plant closures due to

personnel being exposed to or ill from COVID-19 and unable to work. In France, staff shortages due to childcare, quarantine and sick leave have reached 30% in some slaughterhouses. There are similar instances in Egypt, Jordan and Tunisia(AVMA, 2020).

In Arsi zone, livestock product processing industries, such as Bokoji Dairy Processing enterprise, the one that could be affected by the restrictions imposed by the pandemic. On the other hand, these enterprises receive their milk supply from smallholder farmers; livestock product processors can easily be affected if stronger travel restrictions are laid.

4.7. Impact on domestic transport, import and export of livestock and livestock products

Restriction on domestic transport: Movement restrictions are compromising transport and will reduce supply of livestock and livestock products. Cattle, shoats, equines and camels are transported to the nearby big markets in which large crowd of people gather especially during holidays. Some cattle markets such as those in Borana (Dubluk, Bake) are source of cattle for export or fattening farms in Adama. The government may ban these animal movements to contain the disease. Some cities such as Adama divided the market place at different areas of the city in response to COVID-19 preventive measure. Some cattle markets in Arsi zone, such as Sagure and Meraro are big markets which supply livestock to markets in Addis Ababa. They get their livestock supply from nearby areas and can easily be affected by travel restriction.

4.8. Reduced funding to animal resources sector

In the short-term, there will be reduced funding for animal health and production activities as more resources will be diverted to cater for COVID-19 prevention and containment and human health needs. Depending on the aftermath of COVID-19 effect, long-term funding for animal health and production may be reduced. There will be reduced donor aid and support as the major donor countries are facing possible economic challenges and this will further affect the animal resources sector that is already suffering from inadequate funding in Ethiopia. Arsi zone holds the largest share of livestock population in the country, and as a result of reduced fund due to the effect of the pandemic, the development of the livestock sector in the zone could also be affected the most.

5. Effects of Covid-19 on Natural Resources

Some development and adaptation activities are time variant and they implemented during dry or wet seasons. For example, soil and conservation work, seedling preparation, site selection, seedling plantations are some of the development and adaptation activities will need to be done at the right time by mass mobilization. Since, the day COVID-19 officially announced as one of a serious pandemic disease of the country, all this development and adaptation works were stopped or not worked to achieve the breakdown plan for this year and aggravated overlapping vicious cycles between nature and human.

Unlike other sectors, impact of COVID-19 on natural resources is not observable with short term. However, there are some indirect effects of COVID-19 on natural resource related works.

5.1. Climate Change:

Strengthening sustainable natural resources management through safeguarding landscapes and watershed management are among the priority options that are being implemented through mass mobilization of farmers and other development sectors starting from 2011 each year for two months , February- March(NAP-ETH, 2019). In 2019, 350 million tree seedlings were planted in a day and a total of more than 2.6 billion trees have been planted throughout the country as part of the "Green Legacy Initiative" program. With similar initiatives, five million hectares has been planned to be covered by 2020 (GESDA, 2019). However, COVID-19 has created unfavorable condition on soil and water conservation works, seedling preparation, site selection for plantation. If the restriction on human movement is continued due to the pandemic, the zone might not be in a position to engage on activities of seedling plantation and other development works which needs mass mobilization for natural resource conservation activities.

5.2. Watershed Management: For the past four years, Ethiopia has implanted community based participatory watershed development and tried to improve agricultural productivity through water and soil conservation. Globally, the country has been perceived as a model in terms of mobilizing the community to conserve the natural resources without any payment and believed to have saved about 58 ETB in the last four years (ENA, 2020). Arsi zone has been well known for the activities of water shed management through mass mobilization, and the current pandemic could significantly affect these activities if the pandemic continues.

On the other hand, seedling raising activities for biological soil and water conservation, rehabilitation of degraded land, enrichment plantation and

other ecological benefits might not be adequately raised because of weak supervision as a result of the pandemic effect. Moreover, Participation of different sectors; community engagement and intervention/ support of NGO could be decreased because of COVID-19.

5.3. Flooding and Drought: In Arsi zone, there are districts identified as vulnerable to flooding like Dodota, Gololcha, Chole, Zuway, Dugda, Munesa and Seru (IFRC, 2016). If current scenarios continues through the upcoming main rainy season (June to August), it is difficult to supply the necessary humanitarian service to the displaced community. These communities could be exposed to the pandemic unless precautions are taken in such districts which are exposed to flooding disasters. Furthermore, nine of the districts in the zone which are already under government safety net program are the ones that could be hit by the scenario as they are under erratic rain fall.

5.4. Eco-tourism: Tourists coming from different countries are visiting various parks of the country for watching wildlife and recreation areas while travel restrictions in response to the COVID-19 pandemic could negatively affect the sector. As a consequence, Arsi-Bale Mountains, which are known to be among tourist destination in the country, could be affected by lack of visitors and the impact of this can also be reflected on economically dependent surrounding community.

6. Impact of COVID-19 on food systems and nutrition security

The COVID-19 is affecting food systems directly through impacts on food supply and demand, and indirectly - but just as importantly - through decreases in purchasing power, the capacity to produce and distribute food. It

may also contribute to the intensification of food insecurity condition of the poor and vulnerable farming households (Choularton *and* Mallory, 2020). In Arsi zone, about 38 percent of districts are under government safety net program and also considered to be nutritionally insecure. The aggression of the current pandemic could further worsen the existing situation in the zone. Actions to minimize the spread of the COVID-19 (self-isolation, restaurant closing, restrictions of movements, etc.) have an impact on food security and nutrition, and the disease itself is influencing food production and distribution (FAO, 2020). Several regional governments in Ethiopia banned all public transportation and imposed restrictions on other vehicle movement between cities and rural areas. While these actions are expected to slow the spread of the disease, they are likely to have substantial effects on food value chains, and thus on the livelihoods of farmers and other workers, and on consumption (Hannah Itcovitz, 2020). It could be expected that any disruption in the complex value chains of the Agricultural Sector and agro-industries will inevitably lead to wastage of fresh produce. This could either be in the form of the inability to complete harvests, difficulties in bringing farm products at the export locations of the country, and importing countries refuse to unload products or where a slowdown in the domestic or international economies mean that products are not reaching retail outlets (Troskie, 2020).

Food value chain involves the interaction of various actors from production to consumption. This to be efficient, it requires active actors and support providers which facilitate the transformation of production to the end consumer. The food value chain can be broadly divided into two groups: the staple commodities (wheat, maize, corn, soybeans and oil seeds) and the high-value commodities (fruits, vegetables, dairy products, meat and

fishery). The staple commodity production is capital intensive and the logistics to distribute the commodities is affected, as it hampers food transportation across cities, provinces, regions and countries (FAO, 2020c).

The crisis is having heterogeneous impacts across different value chains, depending on the nature of products; access to affordable inputs; trade patterns with major exporting/importing countries; the ease and cost of transportation; and changes and regulations in commodity prices (Hannah Itcovitz, 2020). The high-value commodities, on the other hand, require a large amount of labor to produce. So they are substantially affected when employees get sick or local and migrant laborers are not able to travel due to lockdowns. Logistical barriers that disrupt the food supply chains affect the high-value commodities even more because of their perishability. The high-value supply chain includes food processing plants, which are also labor intensive. Currently, most of the sorting and packing lines do not comply with the social distancing requirements (FAO, 2020c).

Due to lockdown, the agricultural products in the urban areas are selling at a high price while the farmers are not getting the fair price of the product in agricultural districts. Transport of animal, poultry and fish feed is hampered. Moreover, due to the closure of local restaurants and hotels, the market demand for eggs and chicken has lowered. All this will likely impose further impacts on food production and crop supply chains (Bodrud-Doza et al., 2020). We also know from dealing with past health crises that these can have a drastic effect on food security, especially that of small holder farming communities. The suffering may worsen as restrictions on movement lead both to labour shortages at harvest time even as other farmers might not be able to bring their produce to market (FAO, 2020a).

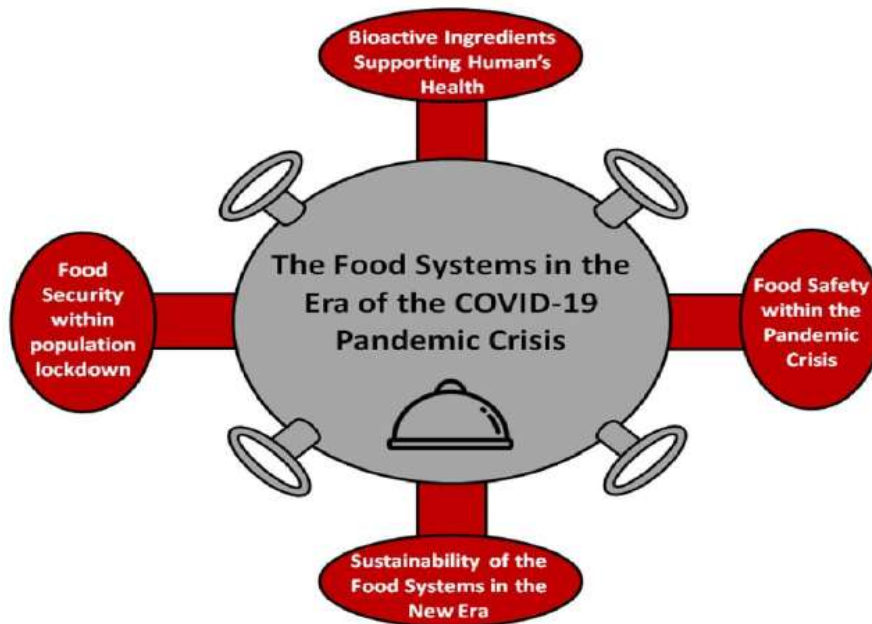


Figure. The food systems crisis in the era of COVID-19 pandemic (Source: Zurayk, 2020)

7. Socio-economic Impacts of Covid-19 on Agriculture

The COVID-19 pandemic is posing huge socio-economic crises globally. The crises are global, but their impacts are deeply local. It can be catastrophic not only to the health of the people of this planet but also in social and economy of the world. Many fears that the pandemic could lead the global economy far from recession to even depression, if not contained sooner. Many of the developing countries in Africa including Ethiopia have already begun feeling the economic impact of the pandemic. Report shows that airlines industry across the world is badly affected by the pandemic. As a result, the tourism industry of Africa in general and particularly that of Ethiopia, which involves the hotel, hospitality, tour and travel operators

employing many people and generate tens of billions of dollars is severely hit by COVID-19 (FAO,2020).

7.1. Effect of COVID-19 on Income of Farmers: Now a days, in most countries, because of COVID-19 pandemic, transportation systems are interrupted. These together with physical distancing and boarder closures pose serious challenges to maintain safe business continuity throughout the rural economy especially in developing countries. In both developed and developing nations, most farmers also depend on non-farm and off-farm activities for their livelihoods, as they work for other farmers, in the processing industry or in other sectors. Thus, it is expected that this scenario can also holds true in Arsi zone as many farmers in the zone participate on off-farm activities in order to supplement their incomes.

7.2. Effect of COVID -19 on most vulnerable communities: The prevalence of food insecurity, in the horn of Africa in general and specifically Ethiopia, is very high every year even during normal production seasons and similar scenario holds for Arsi zone. These days, the international support from aid agencies and NGOs is interrupted, as travels are restricted and community meetings are prohibited because of COVID-19. With increased donor attention to contain the pandemic both domestically and internationally, aid and support may drop precipitously which will be reflected on aid recipient rural community.

As the number of infections in vulnerable countries grows among populations who are already malnourished, weak and vulnerable to disease, a "crisis within a crisis" could emerge, in which the health crisis will be compounded by a hunger crisis. And that, in a vicious feedback loop, will

leave more people weaker and vulnerable to the virus. There is high probability that COVID-19 pandemic crises can worsen problem of the vulnerable farmers in the country and Arsi zone in particularly.

7.3. Effect of COVID-19 on agricultural labor and social capital Labor shortages (due to morbidity, movement restrictions, social distancing rules) are starting to impact producers in food supply chains – particularly for farm activities that require workers to be in close proximity. The agricultural activities in rural Ethiopia also depend on field laborers from surrounding villages to help (like *debo* and *wonfel*) during planting, weeding and harvesting. Because of movement restrictions, and social distancing rules of COVID pandemic crises, now a day, there is less likely that local farmers can support each other as usual. As a result, agricultural labor shortages, the pandemic can affect food production of disable, sick and older farmers in Arsi zone and at a national level. Additionally, COVID-19 has an impact on social capital, norms, networks and associations such as “*Iqub*”, *Mahiber*, *Idir*, *Debo*, and *Wenfel* social capital farmers.

7.4. COVID-19 and poverty: Studies indicated that societies with a lower economic status are more vulnerable to rising rates of chronic illness from the COVID-19 further complicated by economic and social welfare hardships (ILO, 2020). This, in turn, further depresses productivity and raises health care costs, leading to increased poverty, and hence again more disease. This is a “disease-driven poverty trap”. From an economic perspective, the key issue is not just the number of cases of the COVID-19, but the level of disruption to economic activities which in turn aggravate the level of health risks.

7.5. COVID-19 and Health system: The health system of the country is very weak. If the pandemic reaches its peak, it will affect the health system both in rural and urban areas. At its maximum stage of the pandemic, it can even collapse the health systems of the country.

8. Conclusions

At the time of writing this desk review, the spread of the virus have been reported to be increasing across the country at an alarming rate. This indicates that there is high potential for the farming community to be infected by the virus. The spread of the virus in the farming community, particularly small holder farmers, affects the farming activity and market access to sell their products or buy essential inputs. This could create huge problem to agricultural production and food systems leading to the socio-economic crisis in the country. The problem of COVID-19 is more pronounced in Arsi zone as the livelihood of large parcel of the population is agriculture based, and its proximity to major urban areas like Adama and Addis Ababa. Despite the government and different stakeholders have been making maximum effort to create awareness to limit the spread of the virus, there seems to be reluctance and easing of social distancing guidelines being observed widely. Therefore, the regional and zonal authorities should take proper steps to make sure that the farming community is not affected in terms of production and productivity.

Moreover, there is a need to maintain the supply-demand of the daily needs of urban and rural community by allowing food value chains functioning.

9. Recommendations

- The government should be aware of the competition in resource allocations between public health and food security. The timely delivery of agricultural inputs in their locality is critical for maintaining the current agricultural productivity. To do so, all stakeholders including the federal and regional government as well as the zonal administration authorities should take coordinated action to minimize the damage that might be caused by staggering agricultural input supply and price spikes.
- Specific interventions to facilitate the safe movement of animals and animal products across borders by providing special travel permit or “Pass” during such a pandemic are needed.
- Reducing post-harvest losses, which are likely to substantially increase due to limitations in transport and access to markets, through improved storage capacities and small scale processing and conservation of fruits and vegetables need to be considered.
- Facilitate whole seller’s access to the livestock products in their localities and avoid the framers from travelling long distances for market as part of containment measures. Moreover, financial support for milk collectors is needed in order to come up with products whose shelf life is extended and access to packaging and ultra-high temperature (UHT) facility.
- Small and micro-enterprises such urban dairy and poultry farms run by organized youths in Asella are expected to be extremely vulnerable to the pandemic shocks, as they have limited cash reserves and so, the government needs to support them financially to bear the impact of revenue losses due to the effect of the pandemic. To reduce the incidence of post-harvest losses, keeping supply chains functioning well is crucial to food security. Hence, cooperatives should play an active role more

than ever in order to be a channel between the producers and consumers as well as input suppliers.

- Enhanced use of mechanized farming seems very viable alternative to overcome the problem that might occur due to the pandemic like the current one that restricts mass movement and impacts the availability of farm work forces.
- The country has a trend of having very little stockpile of agricultural inputs, and in a situation like the COVID-19 pandemic, where restrictions are imposed on cross border movement, the agricultural sector could be the one that can be severely affected by lack of inputs. Therefore, having sufficient amount of agricultural input in stockpile could minimize the damage that could be caused by lack of such inputs to the agricultural community like Ethiopia.
- Digital agriculture solutions that link farmers to buyers, agricultural input sellers and logistics services could help reduce the impacts of control measures related to COVID-19 on supply chains.
- To avoid the disruptions to food supply chains, the government should provide subsidies to smallholders either in the form of loans or inputs and equipment supply. This can help in stimulating and sustaining farm operations, and thus, increase the food security of farmers. In addition, the government should also ensure that the existing safety nets programs in place for ensuring food security of vulnerable households.
- During an emergency, governments should be able to purchase agricultural products from smallholder farmers to establish strategic emergency reserves of food supply.

- Governments and humanitarian actors need to assist those in need of urgent supply of food, nutritional and emergency support during the pandemic.

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