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SOIL & CROP SCIENCES | RESEARCH ARTICLE

The impact of COVID-19 on agricultural extension and food supply in Zimbabwe

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Abstract: The outbreak of the pandemic COVID-19 restricted normal execution of agricultural extension services and movement of agricultural produce to markets. Direct farmer access to extension services was limited due to travel restrictions and banning of public gatherings. The overall objective of the study was to assess the impact of COVID-19 pandemic on agricultural extension and food supply as well as the effectiveness of the suggested coping strategies in Zimbabwe. A structured questionnaire was administered to 100 Agriculture extension officers through phone interviews in adherence to the COVID-19 regulations of minimizing close contact to reduce transmission. Key informant interviews were conducted through phone calls and emails. The study revealed that agricultural extension and food supply was grossly affected by COVID-19. Use of social groups for communication during lockdown helps to reduce spread of COVID-19. Researchers recommend the development of online marketing strategies where people can make orders of various produce and become booked for purchases or deliveries during a specified time range. This will go a long way in minimizing people coming together in large numbers and risk contracting COVID-19.

Subjects: Agriculture & Environmental Sciences; Agriculture; Agriculture and Food; Sustainable Development; Rural Development

Keywords: pandemic; agriculture; lockdown; marketing

ABOUT THE AUTHOR

Prosper Bright Muvhuringi is an experienced Principal Livestock Specialist in the Ministry of Lands, Agriculture, Water and Rural Resettlement. He worked with several organizations (NGOs, Private Sector, Universities, and Government) in implementing nutrition specific and nutrition sensitive interventions which are critical in improving the livelihoods of the rural and urban populace. As an extensionist, he collects views and perceptions of the general public concerning government programs and report them to the responsible authorities for action. He is a holder of Master of Science in Animal Science, Bachelor of Science Honours in Agriculture (Animal Science), Bachelor of Social Science Special Honours in Monitoring and Evaluation Studies and International Diploma Animal Feed. Prosper also executes part time lecturing at Africa University and Zimbabwe Open University.

PUBLIC INTEREST STATEMENT

COVID-19 is a highly contagious and infectious respiratory viral infection, which spreads fast if there is close contact with the aerosols from an infected person. Because of its nature, the pandemic caused shut down of borders, movement and trading in an effort to contain the disease. The Government of Zimbabwe drafted and implemented laws to manage the spread of COVID-19 by using statutory instrument 77 of 2020. Since Zimbabwe's economy is hinged on agriculture, it therefore follows that agricultural activities were compromised by the introduced measures to contain the disease. The study sought to investigate how the COVID-19 pandemic had affected the agricultural extension and food supply systems in Zimbabwe. The research findings will inform responsible leaders on the kind of impacts associated with such social ills and for reference in the future the kind of mitigatory measures.

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1. Introduction

A severe highly contagious and infectious respiratory disease, COVID-19, emerged in December 2019, with the first incidence reported in Wuhan city, Hubei province of China (Chakraborty & Maity, 2020). The COVID-19 pandemic ravaged humanity and brought the world economy to a standstill as had been warned by WHO that the pandemic was going to touch every sector (Aday & Aday, 2020). Zimbabwe as part of the global community was not spared, with the Government of Zimbabwe (GoZ), declaring the pandemic a national disaster, and a formidable epidemic disease on the 17th of March and 20 May 2020, respectively (Government of Zimbabwe, 2020). As of 17 January 2021, Zimbabwe had recorded cumulative totals in excess of 27,203 confirmed cases and at least 713 deaths, with typical daily new cases of up to 774 and with at least 3 deaths per day (WHO, 2021).

In response to the COVID-19 pandemic, the GoZ promulgated public health regulations in form of the Statutory Instrument 77 of 2020 in a bid to prevent and contain the spread of COVID-19 as recommended by WHO (Aday & Aday, 2020). Measures of containment and prevention of COVID-19 as stipulated in the Statutory Instrument 77 of 2020 included prohibition of gatherings for any purpose, restrictions on public traffic and movement of people in local authorities. Local authorities were mandated to close and demolish any premises which may likely favour the spread of COVID-19.

As much as this legal framework was a noble move in containing the spread of the disease, it negatively impacted on the food supply, access and stability, particularly agricultural inputs and outputs markets, and agricultural extension services. United Nations (UN) acknowledges that mitigatory measures to prevent and control COVID-19 outbreaks had already started to affect global food supply chains (UN, 2020). Agriculture is the backbone of Zimbabwe's economy (Maiyaki, 2010). The primary pillar for Zimbabwe's economic development is the agricultural sector and it is the major source of livelihoods for the majority (70%) of the country's population (Zimbabwe Agricultural Society, 2019). Most manufacturing industries rely more on raw materials and ingredients from the agricultural sector (Zimbabwe Agricultural Society, 2019). Prohibition on public gatherings hindered the provision of adequate agricultural extension services such as farmer trainings, agricultural input distribution, field visits, field schools and district agricultural shows. According to Maiyaki (2010), farmer trainings and agriculture extension services are critical in improving the quality and quantity of agricultural products. Mhlanga and n.d.lovu (2020) contend that the institution of national lockdowns, proved a great deal in curtailing the movement of people and flattening transmission curve of COVID-19. However, the restrictive measures, disturbed livelihoods of smallholder farmers through disruption of their social capital since it is no longer possible to work together to maximize productivity (Ndhlovu, 2018). The FAO (2020) reported that due to COVID-19 restrictions, the food and agriculture sector confront challenges in the value chain which include: provision of agricultural extension services, access to agricultural markets and labour deficits.

SI 77 of 2020 resulted in the closure and demolition of the major agricultural markets in urban areas and affected food supply and access of the majority of the populace who derive their source of livelihoods from vending. The restrictive measures have deprived most urban communities in the informal sector of their main source of livelihoods (Dzobo et al., 2020). The COVID-19 outbreak leaves the agriculture sector in an adverse food supply situation from 2020 and beyond (Parwada, 2020). Therefore, food security issues should be urgently addressed using appropriate alternative measures to ensure that as nations fight the COVID-19 pandemic, populations are not exposed to hunger as a result of lockdown restrictions. Thus the study will help to review food security issues which require urgent attention so as to minimize exposure of the general populace to hunger. Also possible remedial actions are suggested for future references as such kind of social ills like COVID-

19 are likely to keep on recurring going into the future. The overall objective of the study was to assess the impact of COVID-19 pandemic on agricultural extension, food supply, access and the effectiveness of the suggested coping strategies in Zimbabwe.

2. Methodology

2.1. Study site

The study was carried out in Zimbabwe. Zimbabwe consists of 10 provinces namely Harare metropolitan, Bulawayo metropolitan, Mashonaland Central, Mashonaland East, Mashonaland west, Masvingo, Midlands, Manicaland, Matebeleland North and Matebeleland South (Figure 1).

These provinces fall in different agro ecological regions. Masvingo and Matebeleland provinces are more into livestock production. The Mashonaland provinces are more into crops production.

2.2. Study design

The research used mixed research methodologies. Qualitative data on the impact of COVID-19 on agricultural extension services was gathered through key informant interviews using a key informant guide. An online structured questionnaire was used to gather quantitative data. Triangulating ensured validity and credibility of the data by cross verification (Honorene, 2017).

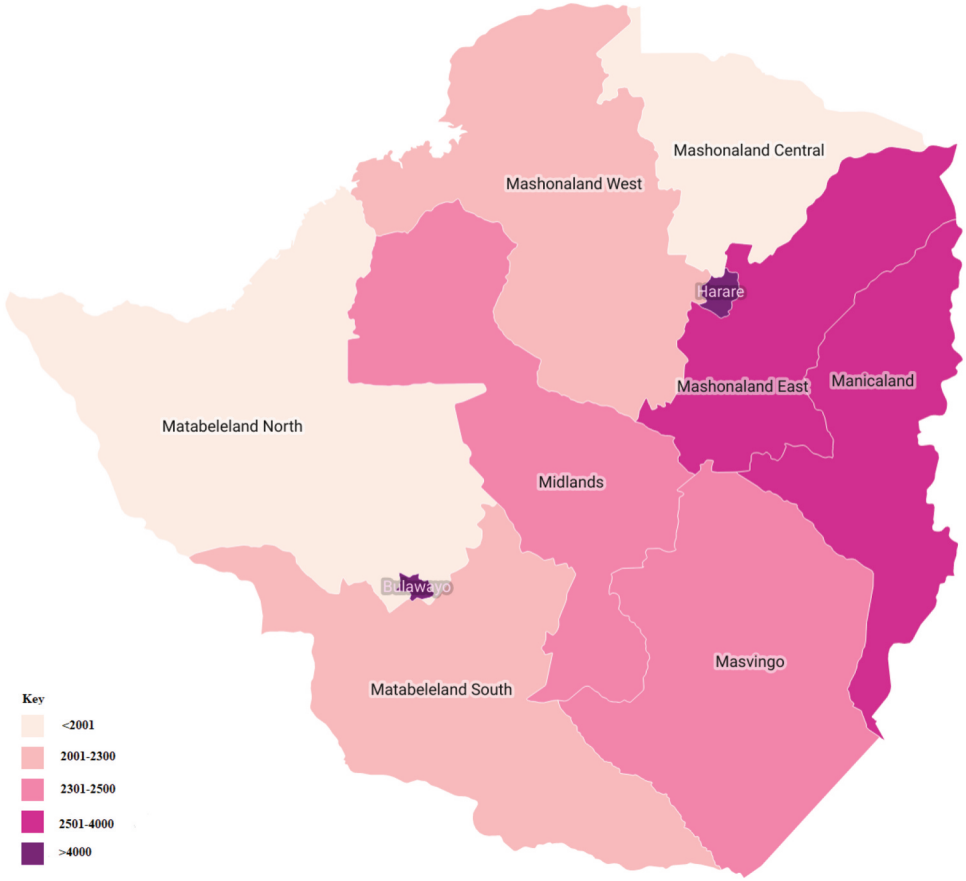

Figure 1. Cumulative cases of COVID-19 in the ten provinces of Zimbabwe as at 29 March 2021.

2.3. Target population

The study targeted a population of extension officers within the ten provinces of Zimbabwe. These extension officers are responsible for agricultural activities in their respective areas of operation and always have up-to-date records of agricultural activities hence they were targeted.

2.3.1. Sampling procedure

Cluster sampling technique was applied in which each province was regarded as a cluster. In each cluster, 10 agriculture extension workers were randomly selected for questionnaire administration. A total of 100 extension workers were selected for the research. Mazowe district was purposefully selected for key informant interviews (farmer unions, champion farmers, traditional leaders, local leadership, agro dealers, vendors, farmers). The district was selected basing on high levels of crop production, diversity of crop and livestock enterprises, proximity to many urban and peri-urban centres (Harare, Bindura, Mvurwi, Nzvimbo, Mazowe, Christonbank, Concession, Glendale and Mt Pleasant Heights). A list of key informants was obtained from the district Agriculture Technical and Extension Services (AGRITEX). A systematic random sampling technique was then used to select 30 key informants.

2.4. Data collection methods

A structured questionnaire was administered through phone interviews in adherence to the COVID-19 regulations of minimizing close contact to reduce transmission. Using a key informant guide, key informant interviews were conducted through phone calls and emails where applicable.

2.5. Data analysis

Data was entered on Microsoft excel, and then exported to Statistical Package for Social Sciences (SPSS) version 21 for analysis. Graphical presentations were generated using Microsoft excel. Frequencies on challenges faced by farmers, agricultural extension workers, vendors and agro dealers were generated on SPSS. Key informant interviews generated qualitative data, which were transcribed and translated. The numerical findings from questionnaire administration were enhanced with rich information obtained from key informants. Quotes, tables and graphs were used to present the research findings.

2.6. Ethical considerations

Permission to execute the research was sought by the Department of Agriculture Technical and Extension Services (AGRITEX). The researcher adhered to ethical research principles such as voluntary participation. Consent to participate was granted verbally after explaining the objectives of the study.

3. Results and discussion

3.1. Demographic and social characteristics of agriculture extension officers

Most extension staff (73%) are based in rural areas (Table 1). This reflects location of the majority of farmers who are served by the extension staff and distance which those farmers had to transport their produce to the market, which is usually in towns. The longer the distance from the market, the higher the number of law enforcement agents check points which one has to go through. Consequently, earnings of the rural majority are negatively affected by restricted movements implemented as a result of COVID-19.

COVID-19 knows no race or boundaries, all religions the country over are affected. Farmers, consumers and middle man were all affected. Restrictions stipulated in statutory instrument 77 of 2020 affect agricultural production as movement of personnel responsible for agricultural sector productivity will be hampered. Even though the agricultural sector was later categorized as essential, the extension staff were fearing for their lives thus hampering effective delivery of their services. Also, as revealed by key informants, from the formal sector only 5% of the

employees were permitted to come to work during the lockdown period leading to reduced service delivery in all sectors including the agriculture sector.

3.2. Impacts on food supply from the vendor's view point

Vendors were unable to carry out day-to-day businesses of hoarding and selling agricultural products among other items. One of key informants (vendor) described the COVID-19 pandemic as a major hindrance to any developmental intervention. She revealed that most vendors rely on hoarding food stuffs from local farmers and sell the products at designated market places. Due to the COVID-19 lockdown, vendors were unable to travel to the farms where they obtain agricultural produce for reselling. This forced consumers to buy their daily requirements from supermarkets which were allowed to operate for a restricted time period per day. For low resource consumers, this move may disrupt food access and stability further and compromise dietary diversity as they try to shift to survival meals. COVID-19 impacted on all actors in the food system in which small and medium agribusiness enterprises were confronted with limited cash flows in the value chain due to reduced production capacity and market access challenges (UN, 2020). Another key informant highlighted that, besides travel restrictions, our common market place was demolished and we were advised to vacate the place since it was perceived to be a hot spot area for COVID-19. Thus, as has been noted by Devereux et al. (2020), the stability of food availability and access is affected by COVID-19 related restrictions on movement and closure of informal food markets.

3.3. Impacts on food supply from the farmer's view point

A farmer in ward 35, who was also a representative of women in agriculture, reported that she lost 200 heads of cabbages and failed to timeously sell her pigs due to reduced number of customers during the COVID-19 lockdown. She asserted that:

> *"I had planted 1000 heads of cabbages but 200 heads lost quality. I normally sell my pigs at 16 weeks. Right now we are at week 20 and I haven't sold them. I am making a lot of losses mainly in terms of feed."*

Perishable agricultural products such as milk, fruits and cabbages also contributed huge losses to the majority of the farmers. Due to technological advancements, social media spread news, good or bad, very fast. Consumers will be fearing to move out and buy agricultural produce. Aday and Aday (2020) reported that in a study in the USA, 70% of consumers reduced the frequency of shopping. This resulted in those farmers into perishable agricultural produce production making losses as the market was performing below the expected due to prohibition of common market place. Parwada (2020) reported highest (>35%) horticultural surpluses at the markets and spoilages during the lockdown.

The Chairperson of the farmer groups in Mazowe aver that:

> *"Most farmers are making losses mainly of perishable products during this lockdown period. I export my oranges to nearby countries but because of travel restrictions, I have lost a lot."*

These qualitative sentiments make it clear that extended lockdowns are unbearable in Zimbabwe, as previously reported by Dzobo et al. (2020) due to the fact that perishables largely depend on a vibrant marketing system.

One of the farmers highlighted that in order to travel from one place to another; a travelling letter from the Ministry of Agriculture was required which was not easy to obtain from responsible authorities. However, the farmers were of the opinion that since they own offer letters, it could be easy and less costly to use them as travel documents. This is in agreement with Mhlanga and n.d. lovu (2020) who suggested that disruption of social networks through lockdowns, quarantines, and

Table 1. Percentage distribution of the demographic and social characteristics of agriculture extension officers

Characteristic	Percentage
Gender Male Female	51 49
Total	100
Highest educational qualification attained Certificate Diploma Bachelors' degree Masters' degree Doctorate degree	2 39 53 6 0
Total	100
Religion Traditional Roman Catholic Protestant Pentecostal Apostolic Sect Other Christian Muslim None Other	4 58 9 20 7 2 0 0 0
Total	100
Usual place of residence Urban Peri-urban Rural	17 10 73
Total	100

n = 100

Table 2. Percentage distribution of the main reason for loss of agricultural produce

Reason	Percentage
Travel restrictions and bans	52
Shortage of agricultural labour force	2
Demolition or prohibition of common market places	46
Lockdown induced curfew	0
Other	0

n = 46

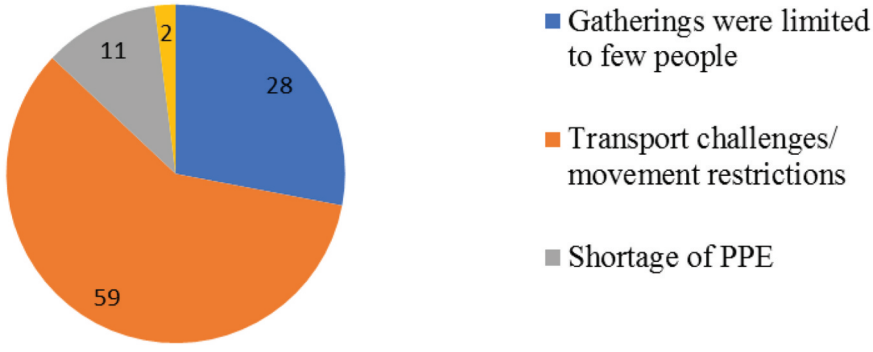

Figure 2. Main challenges faced in carrying out physical or direct farmer training during COVID-19 induced lockdown (n =100). PPE-Personal Protective Equipment.

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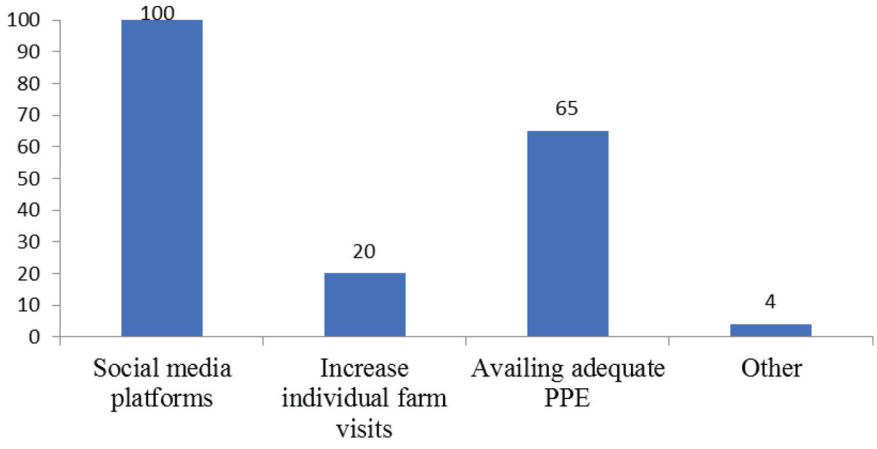

Figure 3. Percentage distribution on suggested solutions to improve farmer training sessions during COVID-19 induced lockdowns (multiple response).

restrictions of movement due to the global pandemic COVID-19 renders communities vulnerable to hunger due to poor agricultural production and disturbances of their main source of livelihoods.

Farmers lost their Agricultural produce as the lockdown measures just came without considering stage of maturity of farm produce. Perishable produce was lost due to a number of reasons (Table 2).

Most farm produce are sold at farmer market places, such as Mbare Musika, which requires farmers to move from their area of produce to the market. This is the reason why travel restrictions and bans ended up being the major contributors to the loss of agricultural produce as they adversely affected food access and stability on the market. Demolition and prohibition of common market places (46%) significantly affected the food supply chain. Seizure and demolition of peasant wares in Mutare disrupted the food value chain (Mhlanga & Ndlovu, 2020). Although movement permits were later granted, delivery of produce was slowed down and there was limited market accessibility to consumers as also noted by Parwada (2020). Lockdown induced curfews had no effect since farmers travel during the day to the market.

3.4. Challenges faced by extension workers

Figure 2 illustrates the major challenges faced by extension workers and farmers during lockdown.

Transport availability proved to be the major stumbling block (Figure 2) during lockdowns. This was worsened by curfews and stringent penalty measures for those who breached the law pertaining to COVID-19 control. General transport challenges affects the agri-food supply chain in Zimbabwe as was reported by Talukdah et al. (2021) in Bangladesh. The agri-food supply chain is an inter-linked system of stakeholders in the agricultural sector: farmers, consumers, middle man,[1] agricultural inputs, crop and food processing and storage, transportation and marketing services. This chain has been crippled by COVID-19 as a result of population's fear of infection by the COVID-

Table 3. Percentage distribution on suggested solutions to improve farmer training sessions during COVID-19 induced lockdowns (*multiple response*)

Solution	Percentage
Use of social media platforms in marketing	98
Secure travelling documents in compliance to COVID-19 regulations	82
Other	14

19 virus, social distancing and self-isolation, and the impacts of public health interventions like lockdowns and travel restrictions.

In many cases extension workers can not move around and reach out to farmers for agricultural advice. Farmers also on the other hand, can not sale their products to buyers after harvest (Talukdah et al., 2021) thus the whole food system is affected by COVID-19 (Workie et al., 2020). COVID-19 has also reduced food access for the urban low resource consumers as staple food prices have increased and these urban poor got their farm produce from the market place such as Mbare musika in Harare which was shut down in efforts to contain the pandemic.

A ban on travelling and limited mobility within areas reduced farmer's access to agricultural inputs such as fertilizers, seeds, and farm equipment. This will deter agricultural productivity and subsequently farmer's livelihoods. The same trend has been reported in Bangladesh, South Africa, India and Finland (FAO, 2020a). Therefore, COVID-19 fuel food insecurity through food supply chain distortions, loss of revenue and purchasing power, and increase in many food prices.

3.5. Suggested solutions to minimize impacts of COVID-19

In view of the challenges faced, participants suggested solutions to combat COVID-19 induced challenges as illustrated in Figure 3.

Use of social media platforms and securing travelling documents in compliance to COVID-19 regulations were noted as remedial actions during lockdowns (Table 3).

Use of social media was viewed as the most preferred means of communication during national lockdowns. However, costs associated with data and network coverage may leave out some farmers due to natural geographic distribution differences. There is a need for telecommunication companies to reasonably cut data charges and make efforts to put infrastructure to cover the remaining unreachable areas.

In addition to the suggested solutions from extension personnel, we concur with Ji-kun (2020), that community home delivery could mitigate negative effects from lockdowns, especially in urban areas where population sizes are high. However, the community must pay the extra transportation cost associated with home deliveries.

On losses related to perishables, there is a need to promote the role of agricultural insurance for farmers especially those into horticulture and dairy production. This will enable farmers to remain sustainable during pandemics. The government should also invest in value addition equipment and infrastructure as a means of preserving the value of perishables for a prolonged shelf life. Also, as noted by Yamano et al. (2020) there is need to ease loan repayment for those farmers who had borrowed money from landing institutions. The government should keep on supporting farmers to ensure effective supply of critical inputs, as noted by Ali and Khan (2020), otherwise the country will be in double trouble, COVID-19 plus serious hunger.

4. Conclusion and recommendations

The findings revealed that extended services and food supply were adversely affected by the outbreak of COVID-19. It was universal among the key informants that travel restrictions reduced farmer-extension worker physical interaction and farmer trainings. This will consequently hamper productivity and increase proneness to hunger as food supply reduces. People need to comply with COVID-19 regulations to flatten the COVID-19 transmission curve. The use of social groups for communication during lockdown helps to reduce the spread of COVID-19. Researchers recommend the development of online marketing strategies where people can make orders of various produce and become booked for purchases or deliveries during a specified time range. This will go a long way in minimizing people coming together in large numbers and risk contracting COVID-19.

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Note
1. Middle man: people who buy farm produce from farmers and sale them to consumers.

Disclosure Statement
The author(s) did not report any conflict of interest.

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