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BETWEEN COLLAPSE AND RESILIENCE: EMERGING EMPIRICAL EVIDENCE OF COVID-19 IMPACT ON FOOD SECURITY IN UGANDA AND ZIMBABWE

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ABSTRACT

There is widespread agreement that COVID-19 pandemic presents a significant challenge for food security in low-income countries. Strict lockdown rules to contain the spread of the virus have made food production, distribution and access difficult. However, the scarcity of consolidated data on COVID-19-induced food supply and demand interruptions in low-income countries exacerbates the challenge of effective short-term and long-term food security responses. This paper is among the first to present emerging empirical evidence of the food supply-side and demand-side impact of COVID-19 in low-income countries. We interviewed 36 food suppliers and public sector stakeholders involved in the COVID-19 response in Uganda and Zimbabwe and collected household survey data in Uganda's Central Region to analyse four food types, namely staple food with long shelf life, staple food with intermediate shelf life, perishable fruit and vegetables, and perishable animal products. We find a negative, albeit highly varied impact of COVID-19 on both food supply and household impact. Some food supply chains like matooke and fish in Uganda or tomatoes and lettuce in Zimbabwe have largely collapsed, and urban slum respondents in our sample report a reduction of average daily meals consumed from 2.4 to 1.3. At the same time, mediated by structural value chain differences, domestically produced staple crops, certain fresh vegetables, the Ugandan dairy value chain have been more resilient, the decrease in average number of daily meals consumed is limited for our rural household survey respondents. While there is an urgent need for short-term action to avert acute food insecurity in both countries, they offer lessons how long-term structural resilience against external shocks can be improved.

Keywords: Food insecurity, Coronavirus, sub-Saharan Africa, supply chain, food waste, malnutrition, hunger

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1. INTRODUCTION

The World Food Programme estimates that due to the COVID-19 pandemic, the number of people under severe threat of acute hunger will double to 265 million by the end of 2020 (World Food Programme 2020). In children, brief periods of food insecurity can lead to long-term negative effects on cognitive, physical and emotional development (Calder 2020; Dunn et al. 2020; Mehta 2020; Naja and Hamadeh 2020). Decreased access to food and healthcare through COVID-19-induced restrictions could result in over 1,000,000 additional child deaths and over 50,000 maternal deaths in the next 6 months (Dunn et al. 2020; Food Security Information Network (FSIN) 2020; Van Lancker and Parolin 2020; Robertson et al. 2020).

With respect to food supply, COVID-19-induced lockdowns disrupted input procurement for farms, food processing operations and distribution networks, resulting in increased wastage of perishable produce (Dihel and Rizwan 2020; FAO 2020a; Hobbs 2020; Torero 2020). The 2014 West African Ebola crisis has decreased rice production by 20%, coffee by 50%, cocoa by 30% and corn by 25% (Dihel and Rizwan 2020; Oxford Analytica 2020a). Lean sourcing principles have led to a shortage of high demand items during the lockdown (Dickinson 2020; Hobbs 2020; Power et al. 2020; Torero 2020). Finally, cross-border trade has been severely reduced, which can be highly damaging for countries with large food deficits (Dihel and Rizwan 2020; Franco 2020; Hobbs 2020; Laborde, Mamun, and Parent 2020). With respect to food demand, COVID-19 has been empirically linked to rising food insecurity in the US (Niles et al. 2020), an effect that is likely to continue in the COVID-19's aftermath (Bennett et al. 2020; Mukiibi 2020; Oxford Analytica 2020b).

The vast majority of these insights are based on historical examples of past crises or expert judgements. Not least due to disruptions in routine data collection (Unicef 2020), studies presenting empirical evidence on COVID-19 impact on food systems are rare, and where they exist, tend to focus on industrialised countries (Niles et al. 2020). There is thus a critical lack of nuance in understanding the COVID-19 and food nexus, especially in low-income countries. Critically, this exacerbates the implementation of food emergency relief programmes (Tranchant et al. 2019). The case-specific context of vulnerable households, such as access to local markets,

local food safety nets and households' adaptive capacities can determine which type of food aid delivery is adequate in times of crises (d'Errico, Romano, and Pietrelli 2018; Mango et al. 2014; Tandon and Vishwanath 2020; Timmer 2010). Understanding price sensitivities of poor households towards different types of food is key to anticipate changing food intake and malnutrition (Aurino and Morrow 2018; Timmer 2010). To improve our understanding of such individual-level effects, this preliminary Research Note is one of the first studies to present empirical evidence for COVID-19 effects on food supply chains, household food consumption and government responses in low-income countries.

2. DATA AND METHODS

We focus our analyses on Uganda and Zimbabwe, two low-income and landlocked countries in sub-Saharan Africa with close to 70% of the labour force employed in agriculture (The World Bank 2019). Before the COVID-19 pandemic, Uganda was facing Minimal (Integrated Food Security Phase Classification (IPC) 1) levels of acute food insecurity (USAID 2020a), while over a third of Zimbabwean's population were subject to Crisis (IPC 3) levels (USAID 2020b). Following the COVID-19 outbreak, both countries introduced strict lockdown rules prohibiting public and most forms of private transport, large gatherings and non-essential shops from opening.

As consolidated data on food supply effects of COVID-19 are absent in both countries, we collect qualitative interview and household survey data to study the emerging impact of and resilience to COVID-19 with respect to food supply, demand and emergency relief governance in Uganda and Zimbabwe. We conducted 36 semi-structured interviews with food producers, traders and public sector stakeholders in Uganda and Zimbabwe between late April and mid-May 2020 (Table 1). We collected insights on 13 different food items, classified in four categories regarding how quickly they perish, namely (1) staple food with long shelf life (e.g. maize flour, dried beans, rice), (2) semi-perishable staple food with intermediate shelf life (e.g. Irish potatoes, sweet potatoes, cassava), (3) perishable fresh fruit and vegetables (e.g. mangos, watermelon, East African

Highland bananas (known in Uganda as matooke), lettuce, cabbage, tomatoes), and (4) perishable animal products which require cooling or quick processing (e.g. milk, meat, fish). We study relative effects, i.e. compare the situation before and during the COVID-19-induced lockdown, rather than analysing general circumstances such as the well-described food insecurity in Zimbabwe (Mango et al. 2014; Tawodzera 2011; Tawodzera and Zanamwe 2016; USAID 2020b). Interviews with public sector stakeholders focused on the type of government response to the COVID-19 threats, and the challenges in implementing this response.

To validate and complement our interview data, we collected quantitative household survey data to study demand-side impacts from a preliminary set of 99 Ugandan households. They are located in eight randomly selected rural districts of Central Region of Uganda (Kalungu, Lwengo, Butambala, Kyotera, Rakai, Bukomansimbi, Masaka) and four randomly selected urban slum areas in Uganda's capital city Kampala (Nakulabye, Mulago, Katanga, Bwaise). All respondents in these areas were randomly selected. Aside from basic individual-level characteristics, respondents were asked to compare the current number of meals consumed, the types of food consumed, food prices they had to pay and ease of access to before the COVID-19-induced lockdown (Table 2). Data collection was conducted with the explicit support from local authorities, and all government regulations on COVID-19 response were adhered to. We analyse the survey data both descriptively and through econometric ordinary least squares analyses with the delta in estimated average number of meals consumed before and during the pandemic as the dependent variable. As early qualitative and survey results indicated a large impact of COVID-19 on food security in urban slum areas, we deliberately collected more data in different slum areas in Kampala compared to rural areas for this preliminary paper.

Table 1: Overview of semi-structure interviews used in this study

No.	Interviewee type	Country	Interviewee code
1	Fish trader	Uganda	UI01
2	Fish trader	Uganda	UI02
3	Fish trader	Uganda	UI03
4	Fish trader	Uganda	UI04
5	Ice trader	Uganda	UI05
6	Dairy farmer / Dairy cooperative leader	Uganda	UI06
7	Dairy farmer	Uganda	UI07
8	Milk trader	Uganda	UI08
9	Milk trader	Uganda	UI09
10	Staple food / vegetables farmer	Uganda	UI10
11	Staple food / vegetables farmer	Uganda	UI11
12	Vegetables / fruit aggregator / trader	Uganda	UI12
13	Vegetables / fruit aggregator / trader	Uganda	UI13
14	Staple food aggregator / trader	Uganda	UI14
15	Staple food aggregator / trader	Uganda	UI15
16	Staple food aggregator / trader	Uganda	UI16
17	Staple food aggregator / trader	Uganda	UI17
18	Staple food aggregator / trader	Uganda	UI18
19	Vegetables / fruit producer	Uganda	UI19
20	Staple food aggregator / trader	Uganda	UI20
21	Local-level government official	Uganda	UI21
22	Local-level government official	Uganda	UI22
23	Local-level government official	Uganda	UI23
24	Staple food / vegetables farmer	Zimbabwe	ZI01
25	Staple food / vegetables / meat farmer	Zimbabwe	ZI02
26	Staple food / vegetables / meat farmer	Zimbabwe	ZI03
27	Staple food / vegetables / fruit farmer	Zimbabwe	ZI04
28	Staple food / vegetables / fruit / meat farmer	Zimbabwe	ZI05
29	Staple food / vegetables / fruit / meat farmer	Zimbabwe	ZI06
30	Public Sector Dept of Social Welfare	Zimbabwe	ZI07
31	Local agriculture NGO	Zimbabwe	ZI08
32	Local agriculture NGO	Zimbabwe	ZI09
33	Official from the Ministry of Women Affairs, Community, Small and Medium Enterprises	Zimbabwe	ZI09
34	Local-level government official	Zimbabwe	ZI10

35	Official from the Ministry of Health and Child Care	Zimbabwe	ZI11
36	Official from the Ministry of Agriculture	Zimbabwe	ZI12

Table 2: Descriptive statistics of selected Ugandan household survey variables

Variable	Observations	Mean	Standard deviation	Range
Age [years]	99	40.93	12.35	20 – 80
Male	99	0.49	0.50	0 – 1
Urban slum	99	0.73	0.45	0 – 1
Education	99	2.31	1.20	1 – 4
Earning	99	4.82	0.61	2 – 5
No. meals before COVID-19	99	2.43	0.51	1 – 3
No. meals during COVID-19	99	1.53	0.73	1 – 3

Notes: *Age* is the respondent's age in years at the time of taking the survey. Variables *Male* and *Urban slum* are binary variables which are equal to 1 if the respondent is male and lives in an urban slum, respectively. *Education* is a categorical variable (1 = no formal education, 2 = primary education, 3 = secondary education, 4 = tertiary education). *Earning* asked respondents to assess on a 5-point Likert scale whether they were earning "much more" (=1) to "much less" (=5) during the COVID-19-induced lockdown compared to before. Finally, *No. meals before COVID-19* and *No. meals during COVID-19* records how many meals people ate on average per day before and during the COVID-19-induced lockdown, respectively (answers are multiples of 0.5).

3. RESULTS

3.1 Food supply and COVID-19 in Uganda and Zimbabwe

3.1.1 Sales and food waste impact

Our interview data point to negative overall impacts of COVID-19 on supplied and distributed food. However, the impact appears to vary within and between the four food types we study in this paper (section 2). First, in Uganda and Zimbabwe, traders in our sample initially sold more **staple food with long shelf life** as affluent urban households stocked up (UI10, UI11, UI17, ZI01). While some logistical disruptions were reported, the ability to commercially transport food has not been greatly affected by the lockdown for the staple food traders in our sample (UI10, UI11, UI13 – UI15, ZI01 – ZI04). Maize flour sales were additionally boosted by governmental food emergency relief efforts (UI22, UI23, ZI07). UI17's maize flour sales for example increased eightfold in the early days of the lockdown, depleting his stock. UI18 points to a temporary 50% price jump for beans (UI18) in times of season-specific bean shortages (UI14). While Uganda has benefited from domestic production of its staple foods, Zimbabwe's staple food supply, which heavily depends on international imports to meet the country's food deficit, has suffered from international import disruptions, causing price hikes (ZI08). Interviewees indicated that due to

increased sales and low perishability, there were no notable rises in food waste in non-perishable staple foods (ZI01, ZI03, ZI05, UI10, UI11, UI15, UI17).

Second, we find evidence of sales reduction for **semi-perishable crops**. For example, the demand of cassava in Uganda, a tuber crop mostly eaten as a fried snack on the streets and in schools, dropped significantly following the closure of schools and workplaces. As a result, food traders significantly attenuated purchases from producers (UI021), with UI021 estimating a 75% reduction of his cassava sales. Interviewees indicated that cassava food waste spiked initially, but then recovered to normal levels as some root and tuber crops can like cassava can be left in the ground for several months following maturity (UI11).

Third, interviewees consistently estimate that sales of **perishable vegetables and fruit** have decreased especially in urban areas as access to fresh produce markets has been exacerbated (ZI01 – ZI03, ZI05, ZI06, UI09, UI10, UI12, UI13). However, the scale of this decrease has varied significantly: While food sales plummeted where restaurants are key off-takers, such as lettuce in Zimbabwe or matooke in Uganda, interviewees reported constant sales for fresh fruit and vegetables sold predominantly to households, such as okra and cabbages in Zimbabwe and mangoes in Uganda (ZI06, UI09, UI10, UI13). For instance, UI12 estimates an 85% reduction of his matooke sales, UI13 notes that the sales price reduced from 12,000UGX for one bunch of matooke to 8,000UGX (also UI09, UI10). This has led to a considerable increase in matooke food waste (UI10, UI11). Farmers in Zimbabwe estimate high food waste of lettuce and tomatoes of up to 80% (ZI01 – ZI03, ZI05), but report price increases of okra and cabbages by up to 50% with very little wastage.

Fourth, the impact on **animal products which require cooling** can be highly food-specific: Ugandan interviewees indicate that the milk value chain has been considerably less affected than the fish value chain (UI01, UI02, UI03, UI06 – UI08). Milk supply has been largely uninterrupted, sales and price drop for milk were limited to around 20%. By contrast, fish sales from Uganda's main source Lake Victoria have plummeted, with estimates of over 50% reduction. The lockdown-induced ban of public and most private travel caused a large-scale distribution disruption for the fish industry which largely depends on small-scale buyers and direct distribution (UI01, UI02).

The slump in sales channels caused fishermen to receive less money per kilogram of fish, with their revenue decreasing by up to 70% (UI03). Food wastage from fish has soared (UI03, UI04), while wastage of dairy products has largely stayed unaffected (UI07, UI08). Meat production has been significantly reduced, with cattle acting as monetary insurance for times of economic crises (ZI02, ZI03).

3.1.2 Supply chain preparedness and resilience

The considerable variance in the findings within and between the four food types (section 3.1.1) suggests different levels of supply chain resilience. Interviewees point to several pre-existing food value chain features critical for COVID-19 preparedness in Uganda and Zimbabwe along the four food value chain elements food production, storage, processing and distribution (Table 3).

Being able to rely on domestic food production is critical for resilience as international trade and markets have been severely disrupted (ZI08). Furthermore, product diversification helped Zimbabwean farmers in our sample to balance different price and sales effects, reducing their overall economic losses (ZI02, ZI03, ZI05), for instance by complementing food sold to restaurants such as lettuce with those sold primarily to households such as okra and cabbages (ZI06). Including root and tuber crops with flexible harvesting times allows for rapid reactions to shocks (UI11).

Furthermore, the ability to safely store food is a key lever to balance supply and demand disruptions. High levels of aggregation, such as in Uganda's dairy industry, and driven by bottom-up farmer cooperatives, have been key to react to decentralised supply fluctuations (UI08, ZI08). By contrast, the low levels of aggregation, such as in the heavily affected fish supply chain in Uganda, imply limited potential for buffering (UI1, UI02). What is more, the implicit economies of scale of aggregation have enabled dairy cooperatives and large-scale milk traders to invest in a well-developed network of small and large-scale cold storage facilities in Uganda to prevent quick perishing (UI07, UI08). In the fish value chain, however, the small-scale traders have not invested

in large-scale fish cooling or processing plants, and few dedicated fish transporting vehicles exist which would have been allowed to travel under Uganda’s lockdown rules (UI06). Some traders buy loose ice to preserve fish (UI04), but due to the wide-ranging restrictions of public and private motorised transport in Uganda during the lockdown, the most crucial means of fish transport to consumers has become unavailable. The demand for ice has reduced substantially as a result (UI04).

Food processing offers additional ways of increasing the shelf life of food. Demand decreases motivated ZI02, ZI03 and ZI05 to significantly increase tomatoes drying for preservation. The dairy value chain in Uganda has heavily invested in factories converting milk into powder or milk-containing products with longer shelf life (UI09), which has helped to turn a highly perishable good in a country with an electrification rate of below 25% (Trotter and Maconachie 2018) into a key ingredient into the government’s COVID-19 food aid basket. The absence of such processing in the fish industry in Uganda, such as canning or drying, has implied higher vulnerability to the COVID-19 shock.

Finally, in both Zimbabwe and Uganda, the number of traders directly supplying households rather than markets has greatly increased during both countries’ lockdown, especially for fresh produce which would have perished in the market, but does not require cooling to be distributed to households (ZI01, ZI02). According to ZI02, an increasing number of people in the informal economy in Harare have switched their old jobs to sell fresh produce directly to households. Conversely, however, fresh produce farmers far removed from major concentration of households have incurred significant losses (ZI01, ZI02).

Table 3: Indication of existing evidence for the relevance of resilience levers for across different food value chains towards COVID-19 in Uganda and Zimbabwe

Value chain element	Levers for resilience	Food types considered in this paper ¹			
		Staple food with long shelf life	Semi-perishable staple food	Perishable fruits and vegetables	Animal products requiring cooling
Production	Diversification of food production	✓	✓	✓	
	Domestic food production	✓	✓	✓	✓

Storage	Aggregation of food	✓	✓	✓	✓
	Cooling infrastructure			✓	✓
Processing	Preservation diversification			✓	✓
Distribution	Direct distribution to households	✓	✓	✓	✓

¹ Staple food with long shelf life in Uganda and Zambia include maize flour, dried beans, rice, groundnuts, etc. Semi-perishable staple food with intermediate shelf life include root and tuber vegetables such as Irish potatoes, sweet potatoes, and cassava. Perishable fresh fruit and vegetables include mangos, watermelon, East African Highland bananas (known in Uganda as matooke), lettuce, tomatoes, etc. Perishable animal products which require cooling include milk, meat and fish.

3.2 Distribution and demand-side of COVID-19 in Uganda

Our Ugandan household survey results indicate a substantial impact of COVID-19 on the number of daily meals consumed, on the sources of food supplies, and on the types of food as well as the price households had to pay for them. The average number of meals consumed per day has dropped by over one full meal from 2.4 to 1.3 in our urban slum sample in Kampala (Figure 1A) despite free food handouts (UI22, UI23) which reached almost 60% of the urban slum respondents in our sample. Rural respondents indicate a limited reduction of 0.3 average meals per day from 2.5 to 2.2 (Figure 1B). The econometric analyses in Table 4 suggest a large and strongly statistically significant positive association between the difference in daily meals consumed and living in urban slums. In the multivariate model (6), all other explanatory variables are either not statistically significant (age, higher levels of education and earning decreases due to COVID-19), or weakly statistically significant, noteworthily being female as well as having no formal education.

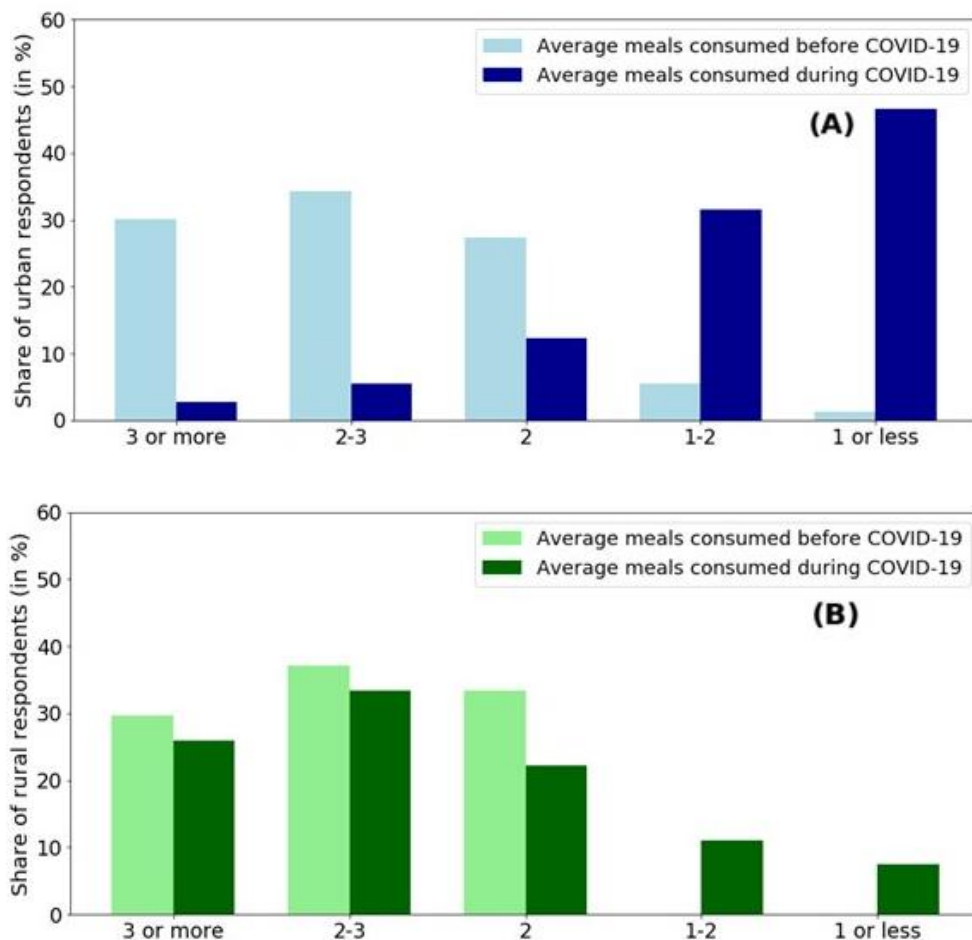


Figure 1: Average number of meals consumed before and during COVID-19 lockdown in Uganda (N = 99) in (A) urban slum and (B) rural areas

Table 4: Preliminary OLS regression results (dependent variable: Difference in average number of daily meals before and during COVID-19 crisis)

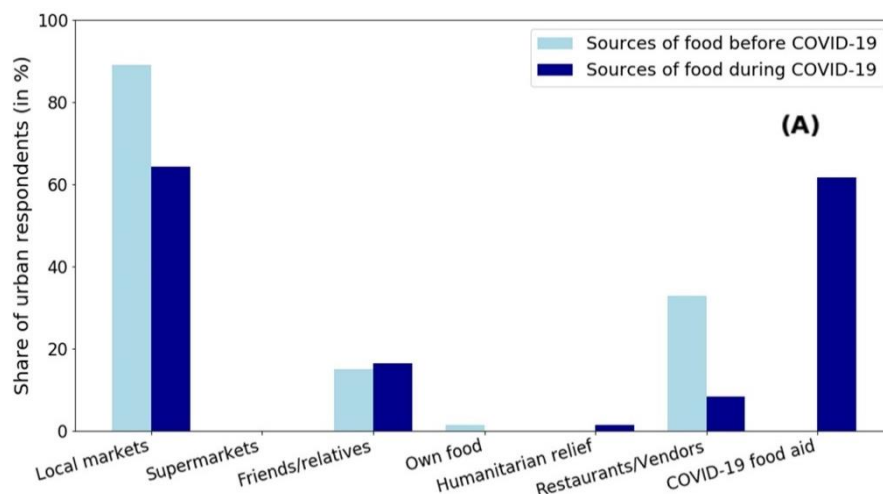
	(1)	(2)	(3)	(4)	(5)	(6)
Age	-0.014** (0.005)					-0.001 (0.005)
Male		-0.57*** (0.125)				-0.245* (0.125)
Urban slum			0.829*** (0.13)			0.585*** (0.173)
No education				0.989*** (0.376)		0.697* (0.36)
Primary				0.5 (0.338)		0.458 (0.324)
Secondary				0.227 (0.336)		0.288 (0.322)
Earning					-0.386*** (0.114)	-0.134 (0.112)

const.	1.341***	1.07***	0.185*	0.375	-1.047*	-0.493
	(0.232)	(0.088)	(0.111)	(0.322)	(0.548)	(0.53)
Observations	99	99	99	99	99	99
R ²	0.06	0.177	0.296	0.135	0.105	0.407
Adjusted R ²	0.05	0.168	0.289	0.108	0.096	0.362

Notes: The dependent variable, namely the difference between average number of meals consumed before and during the COVID-19 lockdown in Uganda is calculated as the difference between variables *No. meals before COVID-19* and *No. meals during COVID-19*. Statistical significance is indicated as follows: *p<0.1; **p<0.05; ***p<0.01.

While urban respondents indicated that food access from local markets and restaurants has become more difficult, the sources of food access were narrower yet unchanged for rural households in our sample (Figure 2). Rural respondents had the resources to produce parts of their own diet, a food source which continued to be crucial during the lockdown. The results furthermore suggest that not all households in urban slum areas have received food aid.

It is critical to note that while we did not collect survey data from respondents in Zimbabwe for this paper, several interview partners in Zimbabwe have pointed out that the picture in Zimbabwe is likely to differ from Uganda, given the significant food shortage in rural areas even before COVID-19 (ZI07, ZI11, ZI12).



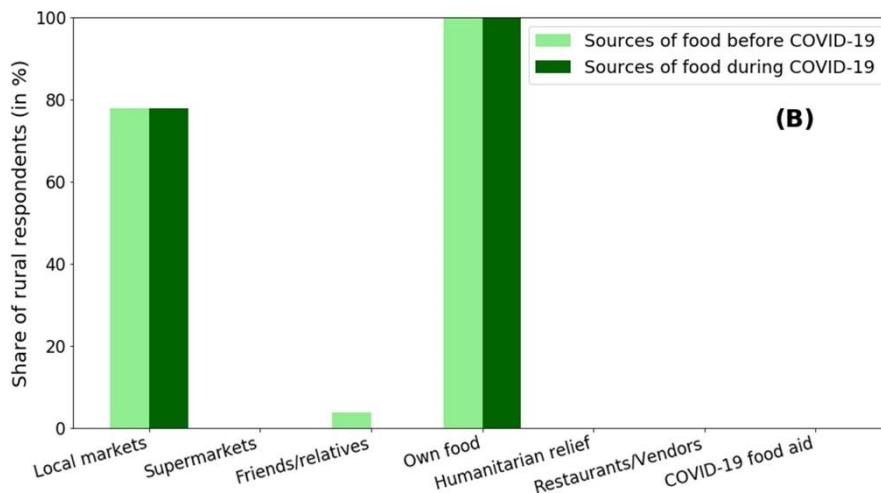


Figure 2: Sources of food before and during COVID-19 lockdown in Uganda (N = 99) in (A) urban slum and (B) rural areas

Detailed survey results for changes in consumption and retail price of different types of food reveal, among others, four emerging insights (Figure 3). First, consistent with our qualitative supply-side findings, the effect of COVID-19 on consumption is negative overall (especially for urban areas), but varies considerably within and between food types. For instance, albeit to different degrees, staple food with long shelf life has been in high demand and has generally become more expensive, while fresh produce has become cheaper. Milk consumption and price has been considerably less affected than fish and meat. We furthermore find a noteworthy level of variance for several food crops especially in rural areas. When clustered by district, the standard deviation reduces markedly, suggesting the relevance of context-specific agricultural conditions in the sampled communities.

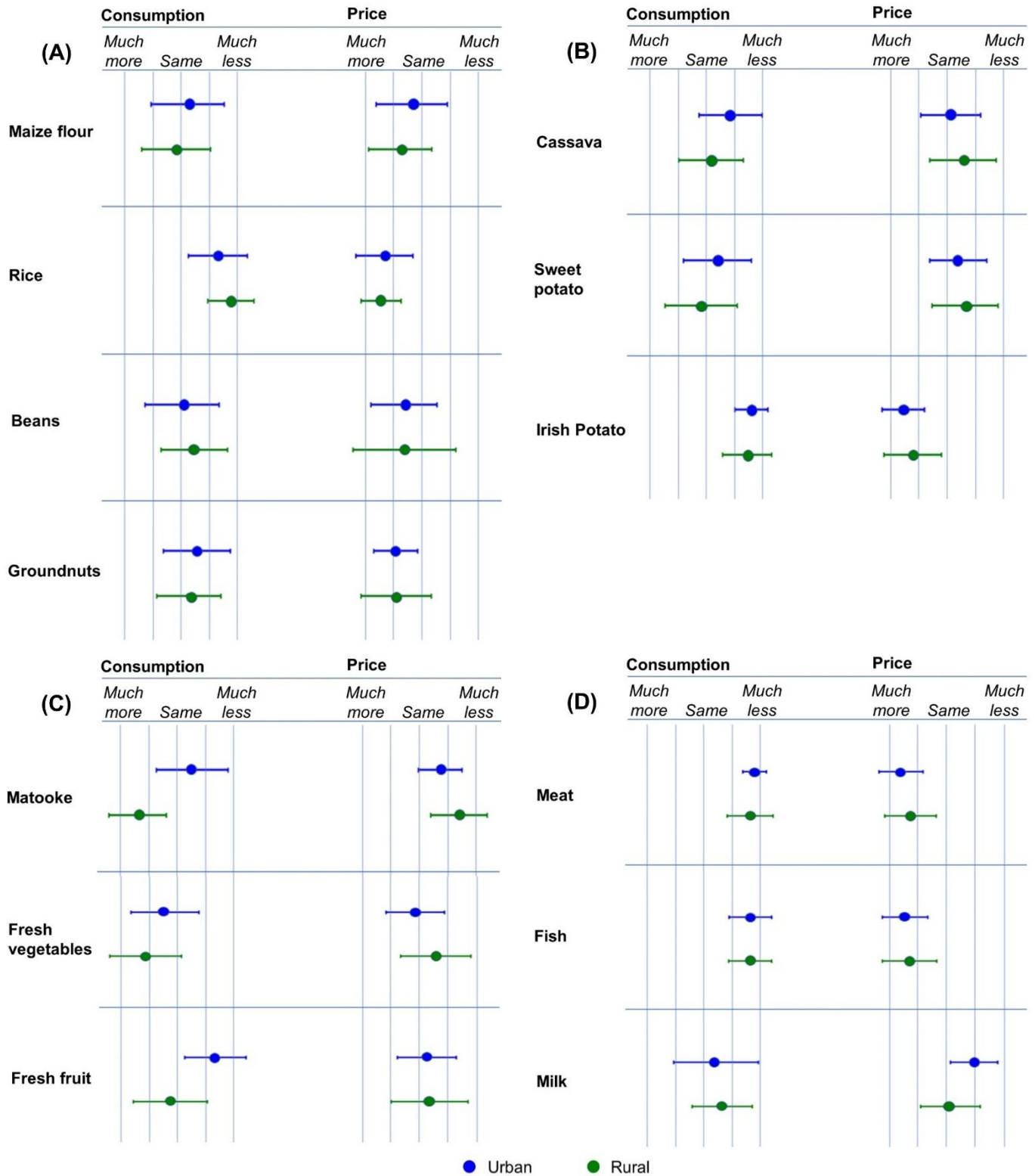


Figure 3: Consumption and price change estimations of (A) staple food with long shelf, (B) semi-perishable staple food with intermediate shelf life, (C) perishable fresh fruit and vegetables, and (D) perishable animal products which require cooling, before and during COVID-19 lockdown in Uganda (N = 99) in urban slum and rural areas

Second, the effect of a narrowing diet is most pronounced in urban slums. The survey results indicate reduction in the consumption of staple food, root and tuber vegetables, fresh fruit and animal products. By contrast, with the exception of meat, fish, rice and Irish potatoes, there has been limited average impact on food consumption and price for rural respondents in our sample. Third, both urban and rural households have been highly price sensitive in their COVID-19 response. With the exception of staple foods maize and beans, an increase in price has led to a decrease in consumption and, notably, vice versa, especially for fresh produce. Fourth, and similarly consistent with supply-side findings on levers for resilience, the fresh vegetable and milk supply chains, in contrast to fish and meat, have shown notable adaptability towards the COVID-19 shock, with limited impact on consumption and price despite obvious challenges of perishability.

3.3 Government food aid response

We find evidence for supply-side, demand-side and governance enablers and challenges of government COVID-19 food aid programmes in Uganda and Zimbabwe (Table 5). Appendix A and B describe the Ugandan and Zimbabwean government response, respectively. Regarding supply, preparedness through anticipation of food shortages has enabled rapid response in Uganda by storing revolving stocks of long-lasting food ready for quick deployment (Uganda Media Centre 2020, IP25). The Zimbabwean response was aided by building on effective partnerships for funding and distribution of food (ZI07). However, an insufficient volume and variety of deployable non-perishable food, as well as insufficient food quality controls have been exacerbating the response (ZI07 – ZI09, UI22, UI23). On the demand-side, considerable logistical difficulties in identifying and supplying vulnerable households exist (UI22, UI23, ZI08). Interviewees pointed to the digitalisation of both cash distribution and food demand planning as drivers of rapid and more targeted responses (UI22, ZI08, ZI09). Institutionally, we find evidence for the crisis nature of COVID-19 relief making acts of corruption more feasible in both countries (Uganda Media Centre 2020, ZW02). Finally, the existence of a cross-cutting department or task force with a clear response leadership mandate, pre-defined crisis response processes and

partnering with decentralised public or non-governmental implementation organisations can help to overcome issues regarding relief coordination (ZI07, ZI08, ZI10, UI22, UI23).

Table 5: Evidence of supply-side, demand-side and governance enablers and challenges of efficacious government responses to COVID-19 impact on food security (Source: interviewees IP24 – IP26, ZW01 – ZW07, Uganda Media Centre (2020), see also Appendix A, Appendix B)(Source: interviewees UI21 – UI23, ZI07 – ZI12, Uganda Media Centre (2020), see also Appendix A, Appendix B)

	Supply-side	Demand-side	Governance
Enablers of efficacious government response	<ul style="list-style-type: none"> • Stock of long-lasting staple food from government-supported farmers ready to be deployed in case of crisis • Building on existing networks of development partners for funding, provision and distribution of additional food 	<ul style="list-style-type: none"> • Large-scale availability of mobile money even among vulnerable households for rapid distribution of cash support • Availability of up-to-date and detailed data on the population's food demand and customs 	<ul style="list-style-type: none"> • Existence of special department of disaster preparedness with pre-existing food shock response processes • Deep community-level government representation to identify needs and implement food distribution
Challenges of efficacious government response	<ul style="list-style-type: none"> • Significant shortage of food aid: Amount and variety of food provided have been limited • Ensuring sufficient food quality controls before distribution 	<ul style="list-style-type: none"> • Intransparency of location of vulnerable households • Logistical difficulties of moving food to vulnerable people 	<ul style="list-style-type: none"> • Misappropriation of response funds by people involved in food procurement and delivery • Low levels of coordination between different Ministries involved

4. DISCUSSION AND CONCLUSION

This paper has indicated significant albeit varied impacts of the COVID-19 outbreak on food security in Uganda and Zimbabwe. Interviewee evidence suggests that staple food, meat and fish price increases, lower availability of perishable food and international trade disruptions are threatening food supply for vulnerable households. Survey evidence from urban slums in Uganda indicates a stark reduction in amount and variety of food consumed, largely irrespective of individual-level features. Our results hint at current food aid supplied in Uganda and Zimbabwe may neither be sufficient in amount nor in variety to fully address the COVID-19-induced food insecurity crisis.

There are numerous implications for short-term relief and long-term food value chain resilience. Short-term interventions can build on context-specific food supply chains which have shown resilience to the crisis, such as vegetable farmers close to cities or the milk value chain in Uganda. This needs to be complemented with rapid international aid to supply micronutrient-rich

food to vulnerable households, mothers and children (FAO 2020c; The World Bank 2020a). Partnerships with multilateral agencies, the private sector and NGOs are critical for targeting interventions (FAO 2020b; Torero 2020) and for food aid production and distribution (Kalu 2020; Mukiibi 2020). Lessons from the 2007-2008 food price crisis suggest that keeping trade avoids export restrictions (Barichello 2020; The World Bank 2020b; Torero 2020). On the demand-side, given the strong price sensitivity evident in our household results, cash transfers can be an effective lever for rapid relief where food is still widely available and where mobile money is widely used such as in Kampala or Harare. Taxes for staple foods and commodities could be waived (Dihel and Rizwan 2020; Naja and Hamadeh 2020).

While past studies have emphasised individual household attributes for food crisis resilience in Uganda and Zimbabwe (d'Errico et al. 2018; Mango et al. 2014), we find evidence for added food value chain resilience when addressing structural issues in the long-term, namely domestic food production, food storage, processing and digital infrastructures. Complementing domestic food production with adequate food storage gives government a means to rapidly deploy food aid. The milk case in Uganda suggests that investing in food processing infrastructure can turn perishable food into nutritious elements of government food aid baskets. Extending digital food data capturing allows targeting interventions at critically required food types. Supporting sustained mobile phone ownership for vulnerable households enables cash distribution as a considerably quicker way of distributing aid than sending food items (for every 100 citizens, Uganda had 57 and Zimbabwe 89 mobile phone subscriptions in the country in 2018 (The World Bank 2019)).

This study has several important limitations which imply that all results in this paper ought to be treated as being preliminary and indicative. The most notable limitations concern the small sample size of the household survey in Uganda, the current absence of survey data from Zimbabwe as well as the absence of large-scale, consolidated data on food supply and demand impact of COVID-19 in either country. More empirical research is urgently needed to better inform context-specific responses to COVID-19-induced food insecurity in low-income countries.

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7. APPENDIX

Appendix A: The Ugandan government's food COVID-19 relief response

The Ugandan government imposed strict lockdown measures on March 22, 2020 as an immediate response to the first COVID-19 case being confirmed in the country. The government established the National COVID Taskforce, which implemented a food distribution programme targeting vulnerable households that have been severely affected by the lockdown (Uganda Media Centre 2020). The Prime Minister office and specifically its pre-existing Department of

Disaster Preparedness supported the taskforce in coordinating the procurement process of food supplies. Local council (LC) chairpersons were responsible for the identification of vulnerable households, whereas the military, the police, the red cross society and the LC chairpersons organised and carried out distribution of food (UI21). Following a decision in Cabinet, each member within vulnerable households had been eligible for a one-off delivery of six kilograms of maize flour and three kilograms of beans (equating to roughly 35,000 calories) and a sachet of salt (UI21), a food supply that is insufficient to meet basic nutritional requirements during lockdown measures which have been going on for . In addition, breastfeeding mothers, pregnant women, as well as elderly and sick household members were also entitled to receiving powdered milk (UI21). The government has prioritised urban slum areas for food aid deliveries (UI21).

Uganda's response offers insights into enablers and challenges of rapid response. In terms of enablers, government benefitted from their past experience of responding to disasters such as influx of refugees, and populations displaced by floods (Uganda Media Centre 2020). In particular, the Department of Disaster Preparedness has been able to quickly activate established food procurement process that ensured the required food supplies were acquired very quickly. This included a number of specifically designated public food suppliers which are ordered to stockpile long-lasting food to be used in case of emergency (UI22). What is more, Uganda's decentral LC system allows government to have a high presence in local-level communities, which has facilitated relatively easy identification of households vulnerable to food shortage and subsequent access to government food emergency relief (Uganda Media Centre 2020). Uganda's Bureau of Statistics collects comparably rich data on food supply and demand in Uganda, creating a critical evidence base for effective response.

Our interview partners identify four critical challenges. First, there was limited data on which households were vulnerable and which were not. According to UI21, officials in charge of food distribution programme decided to use "rules of thumb" approaches in identifying and reaching vulnerable households. Consequently, procurement of supplies were based on estimations rather than accurate representation of the vulnerable groups, and some of the most vulnerable households did not manage to receive food.

Second, the response programme has opened up avenues of corruption. In a high-profile case, six government officials from the Office of the Prime Minister including the Permanent Secretary, Accounting Officer and the Commissioner of Relief have been arrested for allegedly teaming up with established emergence food suppliers to inflate prices and share the profits (Uganda Media Centre 2020).

Third, the distribution of food has also been problematic. Many of the residents of the urban slums live in semi-permanent structures which can be difficult to access for food aid distributors (UI21). High levels of homelessness further exacerbate the coordination of food aid supply and demand. Fourth, interviewees involved with local-level food distribution complained about the low quality of the distributed maize flour and beans, as well as insufficient amount of powdered milk for lactating mothers and elderly people (UI22 and UI23). Limited quality standards and quality control was mentioned as a key cause.

Appendix B: The Zimbabwean government's food COVID-19 relief response

Zimbabwe has implemented a COVID-19 response package budgeted at 18 billion Zimbabwe dollars. Roughly 6.1 billion of which was allocated to the Department of Agriculture for food supply measures, while 2.8 billion was distributed to vulnerable households to combat food insecurity (ZI07). At the time of writing, the government of Zimbabwe through the Department of Social Welfare, a total of 670,000 vulnerable households have benefited from the government's relief programme, with 60 percent of these households based in rural areas (ZI07, ZI11). The programme differs for urban and rural households. Rural households have received 50kg maize flour per month, regardless of the family size (equating to roughly 200,000 calories). Food aid has been complemented by international development partners who had been working on food emergency relief in Zimbabwe prior to the COVID-19 crisis, providing beans, sweet potatoes and Irish potatoes (ZI10, ZI11). In urban areas, by contrast, government relief was distributed not in the form of food but via cash transfers. These amounted to 100 Z\$ for a one-member household, 150 Z\$ for two-member household, 200 Z\$ for three-member households, and 250 Z\$ for four-or-more-member households. In addition, a share of the vulnerable population has received an

extra monthly payment to compensate for income losses in the informal economy, or for people unable to work due to health conditions.

The Zimbabwean case offers several lessons for enablers and challenges of an effective response to the COVID-19 pandemic. Zimbabwean emergency legislation allowed the Department of Social Welfare to set aside regular criteria for identifying and assisting vulnerable households and instead depends on the communities themselves to identify people and families in need of assistance (ZI08). The traditional leadership and its institutions play a critical role in this regard (ZI10). Furthermore, Zimbabwe was able to quickly leverage existing network of international development partners who have donated to food aid efforts both in cash and kind (ZI07).

In terms of challenges, Zimbabwe's poor infrastructure greatly exacerbated the COVID-19 response (ZI08). This issue ranges from poor roads, weak food cold chain infrastructure and poor mobile phone network connectivity causing some delays in cash payments (ZI08, ZI09). Furthermore, there has been poor coordination among the various institutions involved in the process of dealing with COVID-19, with unclear distribution of roles and responsibilities (ZI07, ZI08). The Department of Social Welfare had to coordinate with various Ministries and implementation organisation without the existence of an institutional organisation with executive oversight over the various Ministries and Departments involved. Finally, the response has been exacerbated by poor quantitative data on Zimbabwe's food system in general, making it difficult to base the COVID-19 food response on empirical evidence of food and/or nutrition shortage hotspots (ZI08).