


Article

COVID-19 and Urban Food Security in Ghana during the Third Wave

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Abstract: While the effects of the COVID-19 pandemic on household food security have been documented, the intensity and forms of food insecurity in urban households in the Global South have not been adequately explored. This is despite the emerging consensus that impacts of the pandemic were more severe in urban than rural Africa. This paper addresses this knowledge gap by examining the relationship between pandemic precarity and food insecurity in Ghana's urban areas during the COVID-19 pandemic in 2020. This study is based on the World Bank (WB) and Ghana Statistical Service (GSS) COVID-19 High-Frequency Phone Survey. Using a sub-sample of 1423 urban households, the paper evaluates household experiences of the pandemic. Our findings show that household demographic characteristics are not a major predictor of food insecurity. Economic factors, especially the impact of the pandemic on wage income and total household income, were far more important, with those most affected being most food insecure. Additionally, food-insecure households were most aware of and were affected by food-price increases during the pandemic. These findings are important in planning the post-pandemic recovery initiatives and in addressing current and future emergencies and shocks to urban food systems.

Keywords: COVID-19 pandemic; food insecurity; pandemic precarity; Ghana; urban household; coping mechanism



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1. Introduction

Prior to the onset of the COVID-19 pandemic in 2020, households in African cities were struggling with unemployment, poverty, and difficulty accessing proper health care, food, and nutrition [1]. The emergence and spread of Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) led to a rapid and massive mobilization by governments to contain the virus by imposing stringent restrictions on the mobility of citizens within urban areas and between town and countryside [2]. However, these containment strategies by governments and public health authorities in Africa took a heavy additional social and economic toll on poor and marginalized urban households across the continent [3]. Lock-downs and restrictions on personal mobility also had a major impact on the food security of urban households and vulnerable populations [4]. Studies in African countries including Kenya, Mali, Nigeria, Uganda, and South Africa all reported heightened food insecurity, worsened dietary diversity, and income shocks as a direct result of the pandemic [5–11].

A recent global assessment of the impact of the pandemic on food security concluded that “while the overall detrimental effect of COVID-19 on different aspects of people’s food security is unquestionable, the intensity and forms that this food insecurity takes is more difficult to establish precisely” [12]. Because urban households in Africa purchase most of their food, the COVID-19 shock with its disruption of food-supply chains, curtailment

of daily access to formal and informal food retailers, and sudden food-price increases exercised a major negative impact on household food security. In many African countries, there are few or no social protection structures such as food banks and social-assistance programs to cushion the impact of the COVID-19 pandemic.

Studies of pandemic precarity suggest that pre-pandemic social and economic inequalities had a marked impact on the degree of vulnerability of different population groups to infection, hospitalization, and death [13,14]. A similar argument can be made in relation to the way in which pre-existing social and economic conditions had an uneven impact on the food security of the African urban population during the pandemic. Using data from 11 countries and six survey rounds, one study showed that households that were female-headed, less-educated, poor, or without access to savings were more likely to suffer from food insecurity during the pandemic. [15]. There is an emerging consensus that like COVID-19 itself, the food-security impacts of the pandemic were more severe in urban than rural Africa. However, more research is needed on variations within urban areas and the role of pandemic precarity in producing uneven food-security outcomes [16].

Prior to 2020, many households in African cities experienced high levels of chronic food insecurity that intensified during sudden shocks such as political unrest, droughts and floods, supply-chain disruptions, and food-price spikes [17–19]. Surveys of the urban poor in 10 major Southern African cities in eight countries by the African Food Security Urban Network (AFSUN), for example, found that over 75% of households were food insecure [20,21]. High levels of pre-pandemic food insecurity were reported from household surveys in numerous cities in East and West Africa, including in Kenya, Ethiopia, Nigeria, Burkina Faso, and Ghana [22–27]. In the West African region, of over 58 million people who were underweight, 22 million (38%) lived in cities, and another 52 million were overweight or obese, most of whom were adult urban dwellers [28]. Prior to the COVID-19 pandemic, about 1.2 million people in Ghana were classified as food insecure, and an additional 2 million were considered vulnerable to food insecurity [29]. In the capital city of Ghana, Accra, one study reported that 70% of middle- and low-income households were food insecure in 2017 [27].

This paper aims to contribute to the rapidly growing literature on the impact of COVID-19 in Ghana by examining the relationship between pandemic precarity and food insecurity in urban areas during the first wave of the pandemic in 2020. Although there is a growing body of research on the impact of the pandemic in urban Ghana, much of it is based on small population samples and does not address the relationship between COVID-19 and food security in the cities. By contrast, the originality of this paper is both methodological and substantive. First, the paper analyses data collected from over 1400 urban households collected during the third wave of the pandemic using descriptive statistics and regression modelling. Second, it identifies the levels of food insecurity during the pandemic in urban Ghana and models the relationship between food insecurity and independent variables including household characteristics, pandemic experiences, and pandemic shocks.

The first section of the paper provides a contextual overview of the pandemic in Ghana, drawing on the existing literature to demonstrate the current state of knowledge about pandemic precarity in the country. The second section discusses the source of the data on the food-security impact of COVID-19 in urban areas, which is followed by a presentation and discussion of the results. The conclusion summarizes the main findings and identifies future research priorities for understanding the pandemic precarity–food insecurity nexus.

2. COVID-19 in Ghana

The first confirmed cases of COVID-19 in Ghana occurred on 12 March 2020. At latest count (31 December 2022), the country had recorded 171,048 confirmed cases and 1461 deaths. Both figures are probable under-counts due to limited testing capacity, asymptomatic spread, and excess mortality. Data from sero-epidemiological sample surveys indicate much higher levels of SARS-CoV-2 antibodies in various urban populations in

Ghana, including 40% seroprevalence in both Accra and Kumasi in mid-2021 [30,31]. Data on confirmed cases shows that there have been five distinct waves of infection since the beginning of the pandemic in March 2020 (Figure 1).

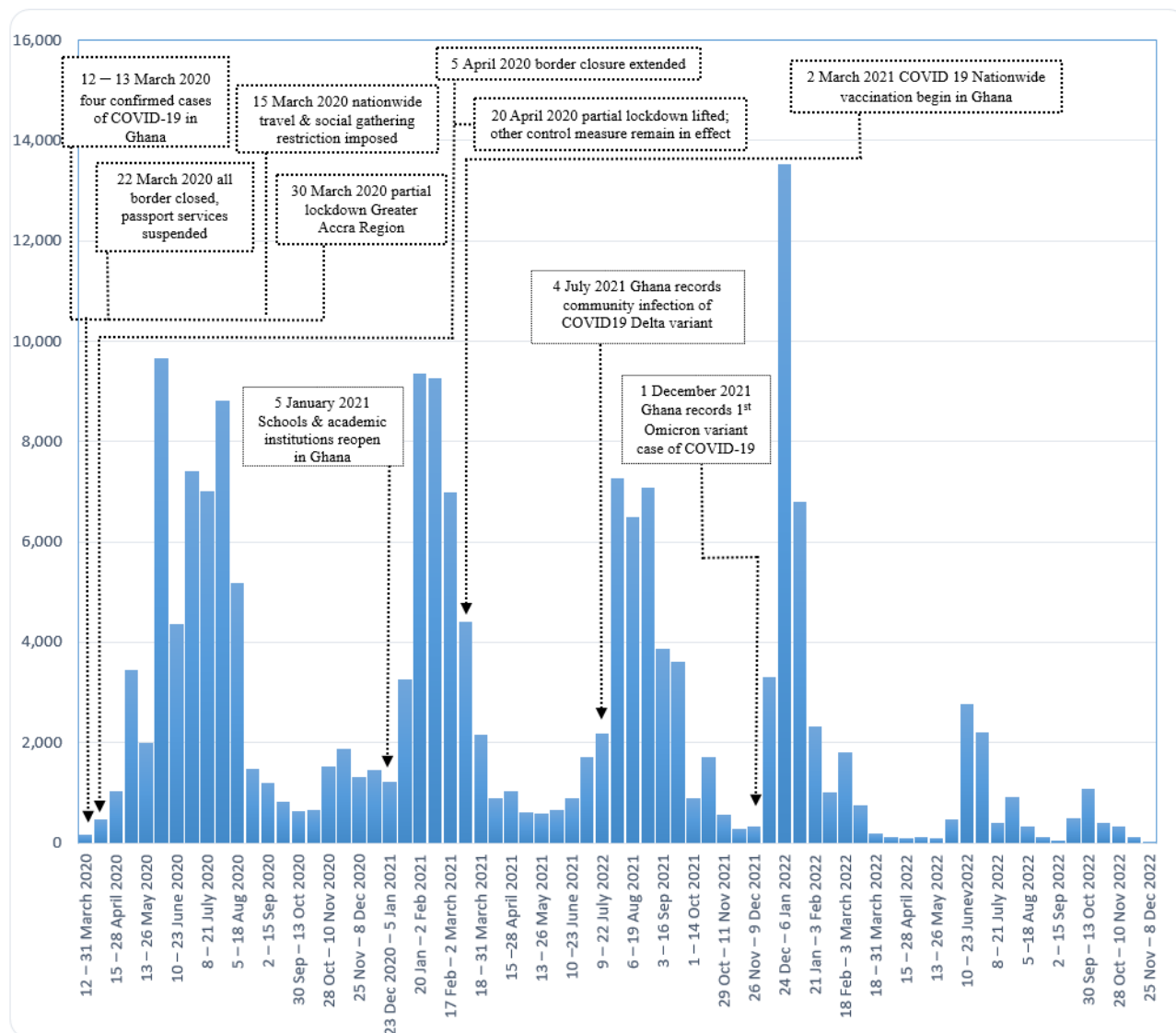


Figure 1. Biweekly total number of COVID-19 cases in Ghana from March 2020–December 2022 and various responses.

The figure also captures the policy-response measures implemented by the government during the first wave of the pandemic from mid-March to mid-June 2020. A COVID-19 inter-ministerial presidential task force chaired by the President of Ghana was constituted and the Parliament of Ghana quickly passed the Imposition of Restrictions Bill on 21 March 2020, which imposed nationwide travel restrictions, border closures, and a ban on social gatherings. Partial lockdowns were imposed in Greater Accra and Greater Kumasi from 30 March, a clear recognition of the vulnerability to COVID-19 of residents of Ghana's two largest city-regions, with a combined population of over 9 million (or nearly 20% of the country's total population). The lockdown was lifted on 20 April 2020, but other restrictions remained in place for several more months. A COVID-19 Alleviation Program (CAP), implemented at the height of the pandemic, provided free water and electricity to citizens and support for micro and medium enterprises.

The Ghanaian government's COVID-19 policies have been hailed as a resounding success by international organizations and a number of scholars [32–37]. However, others have stressed that it had “a significant adverse impact on the various communities within the catchment areas of the country” [38]. One commentary argues that the lockdowns prompted a “toxic mix” of police violence and mass defiance because most urbanites were trapped in precarious low-income jobs in poorly serviced and overcrowded neighbourhoods, and therefore could not lock down. [39]. One recent analysis, for example, concluded that the lockdowns in Accra and Kumasi “distressed those with few resources, particularly residents of the urban slums; halted activities of the informal sector, the largest sector and source of employment, and the major contributor to the national income; and slowed socioeconomic activities in major cities” [40]. Another assessment of the adequacy of pre-pandemic social protection programs and the CAP concluded that the government's response to COVID-19 and the lockdown “was devoid of any organizational framework and thus became a classic case of crisis management” [41]. The lockdown, coupled with the fact that the CAP provided no support for micro-enterprises in the informal sector or those working in formal employment who were laid off, led to business failure and hardship for women market traders [42].

The general economic shock of COVID-19 to the Ghanaian economy is indisputable [43]. The pandemic had direct and indirect impacts on the livelihoods, trade, employment, and income of people involved in the urban formal and informal sectors, entrenching the incidence of poverty and food insecurity. The urban lockdown alone was responsible for an estimated 28% drop in GDP and descent into temporary poverty for nearly 4 million Ghanaians. [44]. Surveys by the Statistical Service Ghana (SSG) during the first wave of the pandemic reported that 72% of local businesses saw reductions in production and 90% reductions in sales. [45]. A total of 37% of businesses had closed and 46% had reduced wages for an estimated 770,000 workers [46]. In the lockdown cities, 52% and 55% of enterprises had shut down in Accra and Kumasi, respectively. Nationally, more than three quarters of Ghanaian households reported a decline in income after the imposition of COVID-19 restrictions, a figure that rose to 83% for households that received income from a family business (compared to 55% of households receiving wage income) [47]. A number of research studies have shown that informal-sector enterprises and employees, internal migrants, and the urban poor were particularly badly impacted by the official pandemic response [32,40,48–52].

The impact of COVID-19-related travel restrictions, disrupted supply chains, city lockdowns, job losses, income decline, and rising food prices on the food security of households in Ghana has emerged as an important new research frontier [53–56]. A national survey by GSS in June 2020 found that in the previous month, 45% of households were worried about not having enough food to eat, 41% were unable to eat healthy and nutritious or preferred foods, 39% were skipping meals, 31% had run out of food, and 9% had gone a whole day without eating anything [47]. A second online and telephone survey of nearly 4000 households in May 2020 found that 58% had several or many times gone without enough food to eat in the previous two months due to COVID-19 and 49% said their food situation was worse than before the pandemic [57]. The study also found that female-headed households and households that had COVID-19 cases were more likely to be food insecure, and that the food insecurity status of urban households was “substantially higher” than rural households. However, APRA found that rural households in western Ghana still experienced increased food insecurity, primarily because their ability to market agricultural produce was curtailed [58]. Finally, a 2020 phone survey of 423 urban consumers by IFPRI Ghana found that food availability was not a significant problem but that decreased income meant food was less accessible and that the consumption of many foods declined [59].

3. Methods and Materials

The data used in this study were collected by the World Bank (WB) and Ghana Statistical Service (GSS) COVID-19 High-Frequency Phone Survey. The households in the

High-Frequency Phone Survey were selected from the respondents to the Ghana Living Standards Survey Round Seven, which had the phone number of the head of household or their representative. For this analysis, we extracted the data for Ghanaian households located in urban areas from the most recent Wave 3 Survey, which was conducted from 1 December to 13 December 2021 and covered all 16 regions in Ghana. The total sample size of urban households from around the country was 1423.

The outcome variable in the analysis was self-reported household food insecurity. Respondents were asked a series of eight standardized questions to explore their experiences of food insecurity in the 30 days before the survey. The questions are based on the FAO Food Insecurity Experience Scale (FIES), measured as binary yes/no responses to each question (FAO, 2015) (see Appendix A). We used the responses to generate a score for each household between 0 and 8, with each affirmative (yes) response = 1. We divided the food-insecurity experience into three categories: (1) food secure (FIES = 0), (2) mild/moderate food insecurity (FIES = 1–4), and (3) severe food-insecurity (FIES = 5–8).

We selected the following independent variables available in the survey design: (a) household characteristics, (b) pandemic experiences (since the beginning of the pandemic in March 2020), (c) pandemic shocks, and (d) household coping strategies (since the beginning of the pandemic in March 2020). Based on the literature on the impacts of COVID-19, all four groups were hypothesized to have a significant relationship with food insecurity at the household level during the pandemic.

Household characteristics in the analysis included household size and specific characteristics of household members, including the age of the household and the sex of the caregiver for children under the age of 18. The variables of the pandemic experience included the ease of community testing, payment for COVID-19 testing, knowledge of someone who tested positive for the virus, access to the vaccine, satisfaction with the government response, change in income, and work conditions. Pandemic shocks included theft of crops, livestock, or property, illness of an income-earner, and food price increases; illness of an income-earning family member; and increase in the price of major food items. With the reduction in income and the increase in food insecurity, many households resorted to one or more coping strategies. The fourth group of variables were coping strategies used since the onset of the pandemic including the sale of household assets, borrowing from friends, credit purchases, delayed payment obligations, selling of harvest in advance, and reduced consumption of food and non-food items. All covariates were categorical and are listed in Appendix A.

The data were analysed using SPSS version 28 (IMB Statistics 28). The analysis included both descriptive and analytical modelling using a generalised linear model (GLM) to conduct logistic regression with a multinomial cumulative complementary log-log function given the multivariate nature of the outcome variable. To investigate the relationship between the outcome variable and the independent variables, we first performed a descriptive cross-tabulation to determine within-group distributions. This was then followed by a logistic-regression analysis to determine which household characteristics, COVID-19 pandemic experiences, pandemic shocks, and household coping strategies were associated with household food insecurity. The results of all models are presented using proportions, predictive odds ratios (OR), and 95% confidence intervals (CI). The significance level of the findings was set at a *p*-value less than or equal to 0.005.

4. Results

4.1. Household Characteristics

Table 1 presents the descriptive statistics for the dependent and independent variables. Nearly two-thirds of the urban households surveyed in Ghana had four or more members (62%), with nearly one in 10 (12%) being single-member occupants. Most household heads were of working age, between 25 and 34 years (60%) and 35 and 44 years (34%). Only 5% were over the age of 45 years. More women than men were primary caregivers in the household (73% versus 27%). The sex difference in caregiving is largely because of

Ghanaian society's gender-defined roles, where women are tasked with the preparation of food and providing care to their household.

Table 1. Descriptive characteristics of outcome and independent variables.

Key Variables	Coded	Frequency (%)
Food Insecurity Experience Score (FIES)		
Food secure	0	514 (36.1)
Mild/moderate food insecurity	1	444 (31.2)
Severe food insecurity	2	465 (32.7)
Household Characteristics		
Household size		
1 person	0	169 (11.9)
2–3 persons	1	368 (25.9)
4–5 persons	2	483 (33.9)
6+ persons	3	403 (28.3)
Age of household head		
16–24 years	0	11 (0.8)
25–34 years	1	853 (59.9)
35–44 years	2	489 (34.4)
45–54 years	3	70 (4.9)
Sex of caregiver for children under 18		
Male	0	272 (27.3)
Female	1	725 (72.7)
Pandemic Experiences		
Household head knowledge about COVID-19		
Low	0	378 (26.6)
Moderate	1	732 (51.4)
High	2	313 (22.0)
Ease of COVID-19 testing in community		
Very difficult	0	253 (17.8)
Somewhat difficult	1	233 (16.4)
Neither easy nor difficult	2	309 (21.7)
Somewhat easy	3	311 (21.9)
Very easy	4	317 (22.3)
Ever had COVID-19		
Yes, I received a positive test	0	13 (0.9)
Yes, but never tested	1	31 (2.2)
No	2	1323 (93.0)
Received COVID-19 vaccine		
No	0	657 (46.2)
Yes	1	766 (53.8)

Table 1. *Cont.*

Key Variables	Coded	Frequency (%)
Household expenditure on PPE in previous 7 days		
GHS >25	0	236 (16.6)
GHS 25–49	1	36 (2.5)
GHS 50–74	2	112 (7.9)
GHS \geq 75	3	1039 (73.0)
Satisfied by Government response since January 2021		
No	0	151 (10.6)
Yes	1	1272 (89.4)
Change in work conditions with restrictions		
Yes, because of COVID	0	348 (25.8)
Yes, but not because of COVID	1	35 (2.6)
No	2	968 (71.7)
Change in wage income due to COVID-19 compared to before March 2020		
Reduced more than half	0	136 (23.4)
Reduced, but less than half	1	163 (28.0)
Stayed about the same	2	251 (43.1)
Increased by less than half	3	25 (4.3)
Increased by more than half	4	7 (1.2)
Change in total income compared to before March 2020		
Reduced more than half	0	479 (33.7)
Reduced, but less than half	1	498 (35.0)
Stayed about the same	2	368 (25.9)
Increased by less than half	3	62 (4.4)
Increased by more than half	4	16 (1.1)
Severity of household being affected by COVID-19 since March 2020		
Not severely at all	0	93 (6.5)
Not severely	1	273 (19.2)
Neither	2	224 (15.7)
Severely	3	494 (34.7)
Very severely	4	339 (23.8)
Shocks Experienced by Household Since March 2020		
Theft of crops, livestock, property		
No	0	1305 (91.7)
Yes	1	118 (8.3)
Illness of income-earning household member		
No	0	1333 (93.7)
Yes	1	90 (6.3)

Table 1. Cont.

Key Variables	Coded	Frequency (%)
Increase in price of major food items		
No	0	815 (57.3)
Yes	1	608 (42.7)
Coping Strategies since March 2020		
Sale of assets		
No	0	1264 (88.8)
Yes	1	159 (11.2)
Borrowed from friends and family		
No	0	1149 (80.7)
Yes	1	274 (19.3)
Purchases on credit		
No	0	1168 (82.1)
Yes	1	255 (17.9)
Delayed payment obligations		
No	0	1263 (88.8)
Yes	1	160 (11.2)
Sold harvest in advance		
No	0	1337 (94.0)
Yes	1	86 (6.0)
Reduced consumption of food		
No	0	824 (57.9)
Yes	1	599 (42.1)
Reduced non-food consumption		
No	0	931 (65.4)
Yes	1	492 (34.6)
Received assistance from NGO		
No	0	1415 (99.4)
Yes	1	8 (0.6)
Received assistance from government		
No	0	1363 (95.8)
Yes	1	60 (4.2)

4.2. Pandemic Experiences

Since the start of the pandemic in Ghana in March 2020, almost 60% of urban households in Ghana had been “severely affected” (35%) or “very severely affected” by COVID-19. About three quarters of the household heads exhibited moderate to high knowledge levels of the virus (with most reporting that television and radio were the main and most reliable source of information). Just over one third said that access to COVID-19 testing was difficult. Low testing rates and asymptomatic spread meant that less than 1% of the respondents had tested positive for COVID-19 and 93% said they had never been infected. Over half of the respondents (54%) had received at least one COVID-19 vaccine. Most households had spent some of their income on personal protection equipment (PPE), including masks and sanitizers, with three-quarters spending more than GHS 75 (USD 7.50) in the week prior

to the interview. Most respondents (89%) said they were satisfied with the government's response to the pandemic, with only 11% reporting dissatisfaction. This contrasts with the findings from the first year of the pandemic that showed that most Ghanaians blamed the government for the spread of COVID-19 cases [60–62].

4.3. Household Shocks

The survey questioned households about three pandemic-related shocks experienced since March 2020: (a) theft of crops, livestock, or property, (b) illness of an income-earning household member, and (c) increase in the price of major food items. Less than 10% of households had experienced either of the first two shocks. However, just over 40% had been affected by the increased cost of the food items.

4.4. Coping Strategies

Most of the coping strategies included in the survey instrument were implemented by fewer than 20% of households. These included borrowing from friends and family (19%), buying on credit (18%), selling assets (11%), delaying repayment obligations (11%), and selling agricultural produce (from urban agriculture or rural–urban food remittances) before harvest (6%). Only 4% said they had received government assistance and less than 1% had received help from an NGO, an indication of the limited pandemic-related social-welfare support within urban Ghana. However, 35% of households reported a reduction in their non-food consumption, and 42% said they had reduced their food consumption, clearly affecting their overall food security.

4.5. Household Food Security

In late 2021, only 36% of urban households were food secure on the FIES (Table 1). All remaining households had a degree of food insecurity, with 33% severely food insecure and 31% mildly/moderately food insecure. An important question is whether levels of food security had recovered to pre-pandemic levels and whether they had improved since the early months of the pandemic. In fact, the opposite was true, with Wave 3 respondents reporting higher levels of food insecurity than Wave 1 respondents. Table 2, for example, compares the responses on the FIES variables for the two time periods. On every component, Wave 3 scores were higher than Wave 1 scores. More households were now worried about their food supply (an increase in WORRIED from 42% to 45%), but the largest increases were in the households running out of food (a 10% increase in RANOUT to 35%), consuming only a few kinds of foods (a 9.5% increase in FEWFOODS to 47%), and eating less (a 9.4% increase in ATELESS to 43%).

Table 2. Levels of urban household food insecurity in Waves 1 and 3.

	Wave 1 Survey (June 2020) (% of Households)	Wave 3 Survey (December 2021) (% of Households)	Difference between Waves 1 and 3 (%)
WORRIED	42.1	45.4	+3.3
HEALTHY	36.1	42.4	+6.3
FEWFOODS	37.6	47.1	+9.5
SKIPPED	32.6	39.6	+7.0
ATELESS	33.8	43.2	+9.4
RANOUT	24.6	34.7	+10.1
HUNGRY	20.4	24.3	+3.9
WHOLEDAY	5.3	10.0	+4.7

Table 3 cross-tabulates the three FIES food-security categories with the three groups of independent variables and indicates a number of suggestive relationships. With respect

to food security and household characteristics, there were slight variations within each group, but the between-group differences did not reveal statistically significant values (at p -value = 0.05). In other words, neither household size, nor the age of the household head, nor the sex of the caregiver had a strong relationship with levels of food insecurity. Pandemic experience variables with a statistically significant relationship with food insecurity included knowledge about COVID-19, expenditure on PPE, level of satisfaction with the government's pandemic policies, change in working conditions, and household income status. For example, whereas 17% of food-secure households reported a change in work conditions, this rose to 34% among severely food-insecure households. Similarly, whereas 36% of food-secure households experienced reduced wage income from household heads, this figure was as high as 71% for severely food-insecure households. The equivalent figures for total household income were 54% (for food-secure households) and 81% (for severely food-insecure households). Overall, 39% of food-secure households had been severely affected by COVID-19, compared with 70% of severely food-insecure households. Of the various pandemic shocks, food-price increases had the strongest relationship with food insecurity. Although as many as two-thirds of food secure and mild/moderately food-insecure households had been negatively affected by pandemic-related food-price shocks, the proportion of severely food-insecure households affected was as high as 81%. In relation to coping strategies, reduced consumption of food was most significant. Only 16% of food-secure households had reduced food consumption, compared with 43% of mild/moderately food-insecure households, and 71% of severely food-insecure households.

Table 3. Relationship between household food insecurity and independent variables.

	Coded	Food Secure (%)	Mild/Moderate Food Insecurity (%)	Severe Food Insecurity (%)	p -Value
Sample Size		514 (36.1)	444 (31.2)	=465 (32.7)	
Household Characteristics					
Household size					
1 person	0	79 (15.4)	38 (8.6)	52 (11.2)	0.064
2–3 persons	1	132 (25.7)	121 (27.3)	115 (24.7)	
4–5 persons	2	165 (32.1)	159 (35.8)	159 (34.2)	
6+ persons	3	138 (26.8)	126 (28.4)	139 (29.9)	
Age of household head					
16–24 years	0	2 (0.4)	4 (0.9)	5 (1.1)	0.058
25–34 years	1	289 (56.2)	262 (59.0)	302 (64.9)	
35–44 years	2	195 (37.9)	152 (34.2)	142 (30.5)	
45–54 years	3	28 (5.4)	26 (5.9)	16 (3.4)	
Sex of caregiver for children under 18					
Male	0	92 (27.5)	77 (23.9)	103 (30.3)	0.182
Female	1	243 (72.5)	245 (76.1)	237 (69.7)	
Pandemic Experiences					
Household head knowledge of COVID-19					

Table 3. Cont.

	Coded	Food Secure (%)	Mild/Moderate Food Insecurity (%)	Severe Food Insecurity (%)	<i>p</i> -Value
Low	0	120 (23.3)	112 (25.2)	146 (31.4)	<0.001
Moderate	1	252 (49.0)	239 (53.8)	241 (51.8)	
High	2	142 (27.6)	93 (20.9)	78 (16.8)	
Ease of COVID-19 testing in community					
Very difficult	0	82 (16.0)	86 (19.4)	85 (18.3)	0.260
Somewhat difficult	1	79 (15.4)	73 (16.4)	81 (17.4)	
Neither easy nor difficult	2	113 (22.0)	96 (21.6)	100 (21.5)	
Somewhat easy	3	108 (21.0)	108 (24.3)	95 (20.4)	
Very easy	4	132 (25.7)	81 (18.2)	104 (22.4)	
Ever had COVID-19					
Yes, I received a positive test	0	9 (1.8)	1 (0.2)	3 (0.7)	0.231
Yes, but never tested	1	10 (2.0)	10 (2.3)	11 (2.4)	
No	2	417 (96.1)	417 (97.5)	435 (96.9)	
Received COVID-19 vaccine					
No	0	242 (47.1)	205 (46.2)	210 (45.2)	0.834
Yes	1	272 (52.9)	239 (53.8)	255 (54.8)	
Household expenditure on PPE in previous 7 days					
GHS >25	0	96 (18.7)	64 (14.4)	76 (16.3)	0.032
GHS 25–49	1	11 (2.1)	8 (1.8)	17 (3.7)	
GHS 50–74	2	52 (10.1)	28 (6.3)	32 (6.9)	
GHS ≥5	3	355 (69.1)	344 (77.5)	340 (73.1)	
Satisfied by government response since January 2021					
No	0	34 (6.6)	46 (10.4)	71 (15.30)	<0.001
Yes	1	480 (93.4)	398 (89.6)	394 (84.7)	
Change in work conditions with restrictions					
Yes, because of COVID-19	0	85 (17.4)	117 (27.4)	146 (33.6)	<0.001
Yes, but not because of COVID-19	1	9 (1.8)	12 (2.8)	14 (3.2)	
No	2	395 (80.8)	298 (69.8)	275 (63.2)	

Table 3. Cont.

	Coded	Food Secure (%)	Mild/Moderate Food Insecurity (%)	Severe Food Insecurity (%)	p-Value
Change in wage income due to COVID-19 compared to before March 2020					
Reduced more than half	0	35 (13.9)	41 (22.9)	60 (39.5)	
Reduced, but less than half	1	57 (22.7)	58 (32.4)	48 (31.6)	
Stayed about the same	2	144 (57.4)	71 (39.7)	36 (23.7)	<0.001
Increased by less than half	3	11 (4.4)	7 (3.9)	7 (4.6)	
Increased by more than half	4	4 (1.6)	2 (1.1)	1 (0.7)	
Change in total income compared to before March 2020					
Reduced more than half	0	107 (20.8)	140 (31.5)	232 (49.9)	
Reduced, but less than half	1	171 (33.3)	183 (41.2)	144 (31.0)	
Stayed about the same	2	198 (38.5)	106 (23.9)	64 (13.8)	<0.001
Increased by less than half	3	32 (6.2)	13 (2.9)	17 (3.7)	
Increased by more than half	4	6 (1.2)	2 (0.5)	8 (1.7)	
Severity of household being affected by COVID-19 since March 2020					
Not severely at all	0	36 (7.0)	30 (6.8)	27 (5.8)	
Not severely	1	123 (23.9)	85 (19.1)	65 (14.0)	
Neither	2	104 (20.2)	71 (16.0)	49 (10.5)	<0.001
Severely	3	188 (36.6)	154 (34.7)	152 (32.7)	
Very severely	4	63 (12.3)	104 (23.4)	172 (37.0)	
Shocks experienced by household since March 2020					
Theft of crops, livestock, property					
No	0	490 (95.3)	414 (93.2)	401 (86.2)	<0.001
Yes	1	24 (4.7)	30 (6.8)	64 (13.8)	
Illness of income-earning household member					
No	0	491 (95.5)	413 (93.0)	429 (92.3)	0.088
Yes	1	23 (4.5)	31 (7.0)	36 (7.7)	

Table 3. Cont.

	Coded	Food Secure (%)	Mild/Moderate Food Insecurity (%)	Severe Food Insecurity (%)	p-Value
Increase in price of major food items					
No	0	176 (34.2)	144 (32.4)	89 (19.1)	<0.001
Yes	1	338 (65.8)	300 (67.6)	376 (80.9)	
Coping Strategies since March 2020					
Sale of assets					
No	0	488 (94.9)	402 (90.5)	374 (80.4)	<0.001
Yes	1	26 (5.1)	42 (9.5)	91 (19.6)	
Borrowed from friends and family					
No	0	459 (89.3)	377 (84.9)	313 (67.3)	<0.001
Yes	1	55 (10.7)	67 (15.1)	152 (32.7)	
Purchases on credit					
No	0	456 (88.7)	387 (87.2)	325 (69.9)	<0.001
Yes	1	58 (11.3)	57 (12.8)	140 (30.1)	
Delayed payment obligations					
No	0	488 (94.9)	402 (90.5)	373 (80.2)	<0.001
Yes	1	26 (5.1)	42 (9.5)	92 (19.8)	
Sold harvest in advance					
No	0	496 (96.1)	415 (93.5)	428 (92.0)	0.025
Yes	1	20 (3.9)	29 (6.5)	37 (8.0)	
Reduced consumption of food					
No	0	434 (84.4)	253 (57.0)	137 (29.5)	<0.001
Yes	1	80 (15.6)	191 (43.0)	328 (70.5)	
Reduced non-food consumption					
No	0	414 (80.5)	295 (66.4)	222 (47.7)	<0.001
Yes	1	100 (19.5)	149 (33.6)	243 (52.3)	

4.6. Multinomial Regression Analysis Results

To determine the strength of the relationship between levels of household food insecurity and household characteristics, pandemic experiences, shocks, and coping strategies, this section shows the results of the multinomial logistic regression using a generalised linear model and cumulative complementary log-log analysis. In the model, severe food insecurity was set as the reference and the odds ratio (OR) was calculated for each independent variable (Table 4). None of the household characteristics had a strong association with severe insecurity, although larger households were marginally more likely to experience severe food insecurity (OR = 1.14). Similarly, households with heads with low knowledge of COVID-19, a COVID-19 infection, and dissatisfaction with the government response were all marginally more likely to experience severe food insecurity. Contrary to expectations,

there was an inverse relationship between vaccine status and severe food insecurity (OR = 0.75). However, heads of households with a low opinion of the government response were more likely to be severely food insecure (OR = 0.75).

Table 4. Odds ratios of experiencing severe food insecurity.

Dependent Variable	FIES-Categorical (<i>n</i> = 1423)
Independent Variables	OR [95% CI]
Household size (Ref.: 6+ persons)	
1 person	1.023 (0.661–1.583)
2–3 persons	1.135 (0.838–1.537)
4–5 persons	1.136 (0.858–1.504)
Age of household head (Ref.: 45–54 years)	
16–24 years	1.741 (0.812–3.734)
25–34 years	0.854 (0.564–1.294)
35–44 years	0.776 (0.497–1.213)
Sex of caregiver (Ref.: Female)	
Male	1.126 (0.810–1.566)
Household head knowledge of COVID-19 (Ref.: High)	
Low	1.195 (0.873–1.693)
Moderate	1.181 (0.911–1.595)
Ease of testing in community (Ref.: very Easy)	
Very difficult	0.610 (0.258–1.440)
Somewhat difficult	1.396 (0.509–3.825)
Neither easy nor difficult	0.979 (0.545–1.757)
Ever had COVID-19 (Ref.: No)	
Yes, I received a positive test	1.145 (0.526–2.496)
Yes, but never tested	1.353 (0.805–2.275)
Received COVID-19 vaccine (Ref.: Yes)	
No	0.751 (0.608–0.927) **
Household expenditure on PPE in previous 7 days (Ref.: GHS ≥75)	
GHS >25	0.759 (0.555–1.037) *
GHS 25–49	1.357 (0.489–3.768)
GHS 50–74	1.068 (0.717–1.592)
Satisfied by government response since January 2021 (Ref.: Yes)	
No	1.206 (0.856–1.700)
Change in work conditions with restrictions (Ref.: No)	
Yes, because of COVID-19	1.027 (0.795–1.327)
Yes, but not because of COVID-19	1.211 (0.685–2.143)
Change in wage income due to COVID-19 compared to before COVID-19 (Ref.: Increased by more than half)	
Reduced more than half	1.520 (0.569–4.057)
Reduced, but less than half	1.760 (0.669–4.631)
Stayed about the same	1.113 (0.429–2.888)

Table 4. Cont.

Dependent Variable	FIES-Categorical (<i>n</i> = 1423)
Independent Variables	OR [95% CI]
Total income changed compared to before COVID-19 (Ref.: Increased by more than half)	
Reduced more than half	1.511 (0.513–4.452)
Reduced, but less than half	1.220 (0.423–3.518)
Stayed about the same	1.043 (0.357–3.043)
Increased by less than half	0.921 (0.304–2.790)
Severity of household being affected by COVID since March 2020 (Ref.: Very severely)	
Not severely at all	0.684 (0.414–1.130)
Not severely	0.570 (0.398–0.816) ***
Severely	0.770 (0.571–1.039) *
Theft of crops, livestock, and property (Ref.: Yes)	
No	0.800 (0.497–1.287)
Illness of income-earning HH member (Ref.: Yes)	
No	1.625 (1.030–2.556) **
Increase in price of major food items (Ref.: Yes)	
No	0.908 (0.719–1.145)
Sale of assets (Ref.: Yes)	
No	0.680 (0.458–1.010) *
Borrowed from friends and family (Ref.: Yes)	
No	0.653 (0.480–0.888) **
Credit purchases (Ref.: Yes)	
No	0.916 (0.652–1.286)
Delayed payment obligations (Ref.: Yes)	
No	0.839 (0.575–1.225)
Sold harvest in advance (Ref.: Yes)	
No	1.452 (0.913–2.308)
Reduced consumption (Ref.: Yes)	
No	0.318 (0.239–0.423) ****
Reduced non-food consumption (Ref.: Yes)	
No	1.145 (0.848–1.544) *

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$; **** $p \leq 0.0001$.

As with the descriptive statistics, the strongest association with severe food insecurity was with the economic variables. A reduction in overall household income by more than half increased the odds of being severely food insecure (OR = 1.51). A reduction in the wage income of the household head by more than half had a similar effect (OR = 1.52). As the overall severity of the pandemic impact on the household declined, so did the odds of being severely food insecure.

5. Discussion

There is a growing body of evidence from different African countries that the COVID-19 pandemic has had a major negative impact on food security across the continent. The

World Bank's High-Frequency Surveys have played a key role in generating real-time data on household food security in a number of countries, including in Ghana (where the Ghana Statistical Services played a key role). Ghana experienced three major waves of COVID-19 in early 2020, early 2021, and late 2021. Overall, nearly two years into the pandemic 70% of urban households reported that COVID-19 had a severe impact on the household (with only 6% reporting little impact). At the same time, surprisingly few reported COVID-19-related illness or mortality. Thus, we are forced to turn to other factors to explain the severity of the reported general impact.

Before drawing any definitive conclusions about pandemic impacts on urban food security, we need to discuss the limitations of the dataset used in the paper. First, the types and range of data available for the analysis were heavily reliant on the survey design. For example, the survey collected a limited set of data on household characteristics. Therefore, we were not able to ascertain whether female-centred households were more severely affected, as seems likely. Data on food consumption by individual members of the household including children were also not available, which means that possible variations in the food insecurity experience within household were not captured. Second, food security is a complex issue and there is vigorous debate about how to measure it. As a result, there are numerous alternative metrics available, of which the FIES scale is only one. The FIES is cross-sectional with a short-term recall period and focuses on food accessibility. It is of much less value for capturing other dimensions of food security, including availability, utilization, and stability over time, for which additional metrics are available. Finally, the data are not geocoded, so we are not in a position to analyse inter- or intra-city variability in the levels and determinants of food insecurity.

Despite these methodological issues, the high-frequency data do allow us to analyse certain key aspects of food insecurity and draw conclusions about variations in the food-security experience of urban-based households as a whole during the pandemic in Ghana. For the analysis in this paper, we used data generated in the survey in late 2021 rather than the initial wave in early 2020. The Wave 1 data did clearly show that food insecurity was a major challenge in Ghanaian towns and cities during the first months of the pandemic, when economic impacts and public health restrictions were at their most severe. By late 2021, with the vacation roll-out gathering pace and the economy beginning to recover from the pandemic shock, we hypothesized that there had probably been a partial recovery and falling off of food insecurity. In other words, did the pandemic have lasting effects on the food insecurity of urban households or had they managed to recuperate from the initial shock of the pandemic in early 2020? However, the data showed that despite the fact that most urban household heads were gainfully (re)employed by late 2021, levels of food insecurity were actually worse in late 2021 than in early 2020. Food insecurity had increased by up to 10% on every single FIES measure between Wave 1 and Wave 3. Because the food security shock of the Russian invasion of Ukraine was not felt until 2022, we can be reasonably confident that we are looking at the ongoing and longer-term food insecurity consequences of the pandemic in the Wave 3 data.

The analysis of the urban household data showed that 58% of mild or moderately food insecure households and 70% of extremely food-insecure households said that the overall impact had been severe. This suggests a close connection between food insecurity and perception of the overall severity of the impact of COVID-19 on the household. Given this conclusion, we built a profile of food insecure households in urban Ghana in late 2021 using descriptive statistics and regression modelling to determine which household variables were significantly associated with food insecurity. The Results section shows that household characteristics proved to be weak predictors of levels of food insecurity. However, as noted above, this may well be a function of the limited number of variables captured by the survey and the real possibility that other characteristics (such as household headship) may have been more important. In terms of pandemic experiences and attitudes, the level of knowledge of COVID-19 of the household head and their satisfaction or dissatisfaction with government policies both had a significant relationship with levels of household food

insecurity. Therefore, the greater the head's knowledge, the lower the risk of food insecurity. In addition, the greater the dissatisfaction with government pandemic policy, the higher the risk of food insecurity. In late 2021, however, only 11% were dissatisfied with government policy, a figure that was higher during the early weeks of the pandemic in 2020.

The results of the analysis in the previous section demonstrate that household economic factors, and especially the impact of the pandemic on wage income and total household income, were the most significant predictors of food insecurity, with those least affected being the most food secure. Three quarters of household heads had worked for pay in the week prior to the survey, and only a quarter reported that the restrictions of COVID-19 had impacted their working conditions. However, many more had experienced a reduction in income compared to their pre-pandemic situation. Just over half had seen a reduction in wage income, and almost three-quarters said that total household income had fallen. As many as a third of the households had experienced an income decline of more than half. In relation to the economic impacts of the pandemic on food accessibility, the main shock was an increase in the price of the main items of food. In terms of overall impact of the pandemic on the household, nearly 60% said that it had been severe or very severe. Although food is not the only component of severity of impact, it clearly plays a significant part. Of the three potential household shocks, the increase in food prices had a statistically significant relationship with level of food insecurity. In general, food price shocks do tend to have a disproportionate impact on poorer and more vulnerable households, with a high proportion of household income spent on food [63,64].

Urban households were not passive victims of the pandemic but exercised considerable agency in responding to the economic and food insecurity challenges. The final finding of relevance, therefore, pertains to the use of coping strategies adopted by households to weather the pandemic. Of the various strategies captured by the survey, reduced consumption of food and non-food items and purchasing food on credit were the most common. However, these and other strategies such as the sale of assets, purchasing on credit, and delaying payment obligations were significantly more common in severely food insecure households than in food secure households. In an all cash urban environment, it is unsurprising that economic disruption played the strongest role in determining levels of food insecurity during the pandemic and that household strategies to cope with reduced income and rising prices involved adjustments to household expenditure and consumption patterns, including on food.

6. Conclusions

The drivers of high levels of food insecurity in rapidly urbanising Africa have emerged as a major research field in the last decade [20,21]. National and city governments are also increasingly recognising the need to develop food security and food system governance strategies that go well beyond the tired mantra of urban agriculture. Both processes—research on urban food security and policy responses to growing food insecurity—have been disrupted by the COVID-19 pandemic and created a new and still evolving research and policy environment. The urgent need for relevant information on the impact of the pandemic on food security in urban populations has prompted the increasing adoption of rapid-response survey data using CAT. Rapid-response surveys by the World Bank, national governments, and others have generated a wealth of data in open repositories that is still largely unmined. Drawing on one of these rapid-response datasets for Ghana, this article demonstrates the potential of high-frequency rapid-response surveys conducted during the third wave of the pandemic for understanding its enduring impact on food security in cities.

The analysis has several general policy implications. The initial shock of the pandemic in early 2020 drove panicked governments and public health authorities to impose often draconian restrictions on the mobility, employment, and social lives of urban dwellers up and down the African continent. Ghana was no exception. Unsurprisingly, in retrospect, policies to contain the spread of the virus had a profound disruptive impact on global and national food supply chains, food prices, and food accessibility in the country. The

inevitable consequence was a sharp increase in food insecurity throughout the country, but especially in large cities such as Accra and Kumasi. However, as we demonstrate in the paper, although restrictions continued to ease and were less severe in subsequent waves of COVID-19, the negative impact on food security was more enduring, especially for certain types of urban household.

Two main policy implications follow. First, food insecurity has traditionally been seen as a rural rather than urban policy challenge in Africa [20,21]. The COVID-19 pandemic has shone a spotlight on the neglected phenomenon of urban food insecurity and the need for proactive policies to address a growing problem that preceded the pandemic and will persist after the pandemic recedes. Second, there is a need to revisit earlier disaster management policies and frameworks through an urban food security lens. A recent analysis of pre-pandemic responses to sudden shocks in Nairobi, Kenya, clearly identified which types of households were most vulnerable, which would be most likely to be affected by COVID-19, and which should be targeted for future pandemic support and relief by the government [19]. Disaster preparedness and management is emerging as an increasingly important component of food security planning in Africa but still tends to have a predominantly rural focus on drought and flooding. As Ghana revisits its national disaster management strategy in the wake of COVID-19, it is now clear that disaster-related increases in urban food security need to be anticipated and planned for going forward [65].

This is the first systematic analysis of the impact of COVID-19 on the food security of households across urban Ghana that we are aware of. However, as noted in the Introduction, it is not the first use of this data source for assessing urban food security impacts in other countries. Most studies agree that the food security impacts of COVID-19 were far more severe in urban than rural settings, which provides an important rationale for focusing in more detail on the experience of residents of towns and cities [5,66]. Most of the existing uses of the data focus on the earliest wave of the pandemic, and it is clear that COVID-19 had similar negative impacts in Ghanaian urban centres as elsewhere in Africa [6–12]. An interesting question is whether the food security consequences of the initial shock of the pandemic were short-term or enduring. Here the comparative literature is sparser. One study in urban Mozambique (with very regular high-frequency surveys) shows that there was a slight fall in several food insecurity measures after the first wave but that levels of food insecurity have remained high and stable in the months and years since [67]. By comparison, this paper suggests that in urban Ghana, the food insecurity impact of the pandemic is both long-lasting and has intensified over time.

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Appendix A

Table A1. FIES binary-response questions.

During the last 30 days, was there a time when you, any other adults, or any children above 15 years old in your household, because of lack of money or other resources ($n = 0$, $Y = 1$):		
1	Worried you would not have enough to eat?	WORRIED
2	Were unable to eat healthy and nutritious/preferred foods?	HEALTHY
3	Ate only a few kinds of foods?	FEWFOODS
4	Had to skip a meal?	SKIPPED
5	Ate less than you thought you should?	ATELESS
6	Ran out of food in your household?	RANOUT
7	Were hungry but did not eat?	HUNGRY
8	Went without eating for a whole day?	WHOLEDAY

Table A2. Outcome and independent variables.

Outcome Variables	Codes
Food Insecurity Experience Score (FIES)	
Food secure	0
Mild/moderate food insecurity	1
Severe food insecurity	2
Independent Variables	
Household Characteristics	
Household size	
1 person	0
2–3 persons	1
4–5 persons	2
6+ persons	3
Age of household head	
16–24 years	0
25–34 years	1
35–44 years	2
45–54 years	3
Sex of caregiver for children under 18	
Male	0
Female	1
Pandemic Experiences	
Household head knowledge of COVID-19	
Low	0
Moderate	1
High	2
Ease of COVID-19 testing in community	
Very difficult	0

Table A2. Cont.

Outcome Variables	Codes
Somewhat difficult	1
Neither easy nor difficult	2
Somewhat easy	3
Very easy	4
Ever had COVID-19	
Yes, I received a positive test	0
Yes, but never tested	1
No	2
Received COVID-19 vaccine	
No	0
Yes	1
Household expenditure on PPE in previous 7 days	
GHS >25	0
GHS 25–49	1
GHS 50–74	2
GHS \geq 75	3
Satisfied by government response since January 2021	
No	1
Yes	2
Change in work conditions with restrictions	
Yes, because of COVID	0
Yes, but not because of COVID	1
No	2
Change in wage income due to COVID-19 compared to before March 2020	
Reduced more than half	0
Reduced, but less than half	1
Stayed about the same	2
Increased by less than half	3
Increased by more than half	4
Change in total income compared to before March 2020	
Reduced more than half	0
Reduced, but less than half	1
Stayed about the same	2
Increased by less than half	3
Increased by more than half	4
Severity of household being affected by COVID-19 since March 2020	
Not severely at all	0
Not severely	1

Table A2. *Cont.*

Outcome Variables	Codes
Neither	2
Severely	3
Very severely	4
Shocks experienced by household since March 2020	
Theft of crops, livestock, property	
No	0
Yes	1
Illness of income-earning household member	
No	0
Yes	1
Increase in price of major food items	
No	0
Yes	1
Coping Strategies Since March 2020	
Sale of assets	
No	0
Yes	1
Borrowed from friends and family	
No	0
Yes	1
Purchases on credit	
No	0
Yes	1
Delayed payment obligations	
No	0
Yes	1
Sold harvest in advance	
No	0
Yes	1
Reduced consumption of food	
No	0
Yes	1
Reduced non-food consumption	
No	0
Yes	1
Received assistance from NGO	
No	0
Yes	1
Received assistance from government	
No	0
Yes	1

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