



Vulnerability and resilience among farmers and market actors in local agri-food value chains in the face of COVID-19 disruptions: findings from Uganda and Kenya

Verena Bitzer^{1,2} · Froukje Kruijssen¹ · Johnny Mugisha³ · Lydia Waswa⁴ · Judith Aliso⁵ · Betty Nakazzi⁵

Received: 12 November 2022 / Accepted: 17 October 2023 / Published online: 10 January 2024
© The Author(s) 2024

Abstract

Countries which imposed strict containment measures in response to the COVID-19 pandemic are thought to have faced particular socio-economic challenges. This study assesses the implications of COVID-19 disruptions on local agri-food value chain actors in Kenya and Uganda, as both countries enacted strict lockdowns to limit the spread of the virus. Using survey data from 527 smallholder farmers and 107 small-scale market actors, the study analyses these actors' vulnerability and resilience. This is operationalised as (1) the exposure of respondents to COVID-19 containment measures, (2) effects of these measures as observed by respondents (e.g. on production or trade and income), and (3) (short-term) coping strategies used by respondents to deal with such impacts. Our results show how containment measures have restricted personal movement and transport options and have limited access to agricultural inputs and markets. This led to a decrease in agricultural production and local trading activities. While both farmers and market actors experienced massive negative income effects, market actors were being hit particularly hard as their livelihoods depend on free movement which was severely curtailed during the pandemic. Actors from both categories often tried to cope by selling livestock, using savings and lowering both food intake and food diversity. Coping strategies were thus short-term and further reduced actors' resilience by exhausting their buffering capacity and exposing them to the risk of food insecurity.

Keywords COVID-19 · Small-scale farmers · Small-scale market actors · Vulnerability · Resilience

1 Introduction

In response to the global pandemic of COVID-19 from 2020 to early 2022, governments across the world put in place measures to contain the spread of the virus through travel

restrictions, social distancing, lockdowns, and closure of businesses and educational institutions. These measures often came at high socio-economic costs. In sub-Saharan Africa, previous studies reported steep declines in incomes, loss of employment and exacerbated food insecurity due to a reduction or closure of business activities, cessation of remittances

✉ Verena Bitzer
v.bitzer@gmail.com

Froukje Kruijssen
fkruijssen@hotmail.com

Johnny Mugisha
johnnymugisha@gmail.com

Lydia Waswa
lwaswa@egerton.ac.ke

Judith Aliso
alisojudith@gmail.com

Betty Nakazzi
bettynakazzibn@gmail.com

² School of Business and Economics, Maastricht Sustainability Institute, Maastricht University, P.O. Box 616, 6200 MD Maastricht, the Netherlands

³ Department of Agribusiness and Natural Resource Economics, School of Agricultural Sciences, College of Agricultural and Environmental Sciences, Makerere University, P.O. Box 7062, Kampala, Uganda

⁴ Department of Human Nutrition, Egerton University, P.O. Box 536, Egerton -20115, Kenya

⁵ School of Agricultural Sciences, College of Agricultural and Environmental Sciences, Makerere University, P.O. Box 7062, Kampala, Uganda

¹ Sustainable Economic Development and Gender, KIT Royal Tropical Institute, P.O. Box 95001, 1090 HA Amsterdam, the Netherlands

and movement restrictions (Egger et al., 2021; Josephon et al., 2021; Kansime et al., 2021; Mahmud & Riley, 2021). Other research highlighted how rural livelihoods were massively impacted by low access to seeds, other inputs and hired labour as well as a shutdown of agricultural produce markets (Middendorf et al., 2021; Nchanji & Lutomia, 2021; Scoones, 2020). Trade in agricultural produce also declined due to lower volumes of sales, fewer customers, transport challenges and partially suspended trade activities (Nchanji et al., 2021; Ogada et al., 2021).

While much research has arguably been conducted on the socio-economic impact of COVID-19 and related containment measures, we observe the following conceptual and methodological research gaps. First, most previous studies investigated different socio-economic effects, but there is a need to understand the repercussions for rural vulnerability and resilience (Krauss et al., 2022). There is growing concern that households already struggling with precarious livelihoods prior to the pandemic, notably in rural areas, were pushed even further into poverty, as they were unable to absorb the stresses induced by COVID-19 policy measures (Kansime et al., 2021; Mahmud & Riley, 2021). Therefore, we explore the socio-economic effects of COVID-19 containment measures in light of rural actors' vulnerability and resilience. We do so based on the perceptions of farm households and market actors to estimate the extent of COVID-19 disruptions, with the concept of "perception" denoting how actors apprehend reality. The lens through which actors view reality is a powerful influencer for human behaviour and experience (Munhall, 2008) and is therefore a suitable concept to understand actors' experienced vulnerability and resilience.

Second, prior research observed how the pandemic led to widespread agri-food chain disruptions (Nchanji et al., 2021; Ogada et al., 2021). Yet, more distinction is in order, as not all types of agri-food chains were affected equally. Van Hoyweghen et al. (2021) discovered that traditional, often very localized, value chains were much more heavily affected by COVID-19 containment measures compared to modern international value chains. This is due to a low level of organisation and the informal nature of transactions in traditional agri-food chains, leading to a larger impact of mobility restrictions or closure of wet markets. Recent studies also suggested that different value chain actors were impacted differently by the pandemic (Alam & Khatun, 2021; Nchanji et al., 2021). Still, most extant research focused on challenges regarding agricultural supply and demand (Hammond et al., 2022; Kansime et al., 2021; Mahmud & Riley, 2021; Nchanji & Lutomia, 2021) whereas a more fine-grained analysis of how COVID-19 policy measures affected different stages of local value chains is largely missing (Morton, 2020). We therefore analyse and juxtapose the experiences of

small-scale farmers with those of small-scale market actors to capture at least parts of the "middle segments" of value chains (Bellemare et al., 2021). Small- (and micro-)scale traders help moving millions of tons of food from rural to urban areas through wholesale and retail markets, and therefore warrant specific attention when analysing the impacts of COVID-19 policies (Liverpool-Tasie et al., 2021).

Third, the stringency of COVID-19 policy measures matters for socio-economic effects. Not surprisingly, stricter containment measures are thought to have led to more severe impacts on households' income, food security and food production (Hammond et al., 2022). Further empirical research is needed on countries with high potential impact (Birner et al., 2021), which explains our choice of Uganda and Kenya as case studies. Both countries imposed strict lockdowns in 2020 and 2021, as based on the Oxford COVID-19 Government Response Tracker, which measured the extent of government action, such as school closures, travel restrictions and vaccination policy (Hale et al., 2021).

Finally, most previous research was based on phone surveys or online surveys due to travel and mobility restrictions at the time of COVID-19. This is often viewed critically, as such surveys can result in bias towards highly educated or wealthier people with access to the internet and smartphones (Egger et al., 2021; Kansime et al., 2021). By contrast, our study draws on face-to-face surveys to avoid unwanted selection bias.

The paper aims to answer the following research question: *To what extent did COVID-19 containment measures affect the vulnerability and resilience of small-scale producers versus small-scale market actors in Uganda and Kenya?*

2 COVID-19 and policy responses in Uganda and Kenya

Uganda and Kenya instituted similarly strict containment measures in response to the COVID-19 pandemic, with two lockdowns in each country in 2020 and 2021 (Mathieu et al., 2020).

In Uganda, the government implemented a series of precautionary measures to contain the spread of the virus, even before the first COVID-19 cases were confirmed in the country. A first lockdown started in March 2020 which included closing entry points into the country, banning public gatherings and the use of public and private transport, closing schools and imposing a nightly curfew. Although agricultural markets were not closed, the movement of buyers and sellers was restricted, and adherence to strict guidelines by the Ministry of Health was mandatory (e.g. physical distancing, wearing of masks). The lockdown was lifted in mid-May 2020, but some restrictions, including the nightly curfew, were extended.

When Uganda started experiencing a second wave of COVID-19 around May 2021, the government announced a second 42-day lockdown in early June 2021, banning all travel between districts, restricting gatherings and closing schools. Shops and markets were allowed to stay open, provided that they complied with public COVID-19 regulations. Agricultural activities were also allowed, prompting many who had lost their jobs or income due to the lockdown to return to their villages and start farming. In September 2021, the lockdown was partially lifted; however, the curfew remained in effect and use of public transport was minimized (e.g. motorcycle taxis had to stop operating by 18:00 and other public transport could only operate at 50% capacity). In January 2022, all remaining restrictions were lifted, including schools, which had been closed for nearly two years, being reopened.

While these strict containment measures limited the spread of the virus, the consequences on the Ugandan economy were deleterious: GDP growth fell from a strong outlook of 6% for 2020 to an actual of 2.9% in 2020 and 2.6% in 2021 (Okumu et al., 2021; World Bank, 2021a). In turn, this had devastating impacts on people's livelihoods. The steep decline in the employment rate due to the lockdowns resulted in an increased number of people living below the poverty line by 2.6 million in the short-term (World Bank, 2021a). Combined with the long-term school closures, the distortionary effect of COVID-19 containment measures seems to have undone recent strides made in reducing vulnerability and poverty in the country (Okumu et al., 2021).

Compared to Uganda, Kenya took a slightly less restrictive approach to the pandemic, but still stricter than many neighbouring countries. The first COVID-19 case in the country was confirmed in March 2020, leading to a series of government measures, including a ban on international travel, school closures, curfew, work-from-home measures, and restrictions on public gatherings. In addition, movement of people and goods were severely limited and open-air markets were closed. While markets were re-opened after a few months, authorities sought to ensure strict adherence to health and safety guidelines.

Towards the end of 2020, when the number of COVID-19 cases started to drop, containment measures were eased, and schools were re-opened in January 2021. However, a resurgence in COVID-19 cases in early 2021 led to a second strict lockdown at the end of March 2021, announced for five counties, including the capital Nairobi. In addition to this localised lockdown, nationwide COVID-19 containment measures applied, including a nightly curfew, restrictions on the number of people allowed in public gatherings and limiting public transport to operate at 60% capacity. While the localised lockdown was lifted by June 2021, other containment measures remained in place until October 2021.

As a result of the lighter COVID-19 containment measures imposed in 2021 compared to 2020, the impact on economic activities manifested predominantly in 2020. Many households lost their income completely due to job loss or experienced a reduction in earnings occasioned by fewer working hours, lower pay, or absence due to illness (World Bank, 2021b). This resulted in an increased number of people living below the poverty line in the country by 7% (to 41% in total). Poverty levels declined again in 2021 as the economy and labour market recovered, but remained above pre-pandemic levels, especially in rural areas (World Bank, 2021c). Overall, the Kenyan economy was more resilient to the COVID-19 shock than the Ugandan economy, and GDP growth was expected at around 5% for 2022 (World Bank, 2021c).

3 Conceptual framework: Defining vulnerability and coping in times of COVID-19

Many studies illustrated the fragility of local and national food systems, including agri-food value chains, in the face of COVID-19. According to Béné (2020), much of this fragility is shaped by both structural issues (e.g. inadequate infrastructure, lack of access to inputs and services, etc.) and by shocks and stressors (e.g. COVID-19, but also drought, floods, insecurity, etc.), which affect how actors in agri-food value chains operate.

This links directly to the concepts of vulnerability and resilience. In the context of food systems, vulnerability is best understood and operationalized as a combination of three factors – (1) the exposure to shocks (stresses and stressors), (2) the degree to which a food system, value chain or specific population groups would be impacted by a given shock, and (3) the ability of a food system, value chain or population groups to recover from the shock (Moseley & Battersby, 2020). The latter is also referred to as resilience. More specifically, “resilience is about the capacities of households and communities, to deal with adverse events in a way that does not affect negatively their long-term wellbeing and/or functioning” (Béné, 2020, p. 806). As such, resilience is ‘inherently desirable’ and includes, applied to agri-food value chains, not only the continued provision of food products to consumers (notably in support of food security), but also the provision of livelihoods and numerous dimensions of wellbeing to actors at every node of the value chain (Bassett et al., 2022).

In the context of COVID-19, government responses, rather than the disease itself, acted as shocks and stressors which impacted on food systems and agri-food value chains, e.g. through lockdowns of agricultural produce markets (Morton, 2020). Small-scale actors were most impacted.

This is due to the small or micro-scale of their operations, the informal nature of the structure and contracting process, the lack of access to insurance and to sufficient cash flow, the economic marginalisation, and, in some cases, discrimination and harassment affecting these actors (Béné, 2020; Van Hoyweghen et al., 2021). For example, even when restrictions on formal-sector road transport are lifted, continuing restrictions on public transport might negatively affect small-scale farmers or market actors who transport produce and inputs by bus (Morton, 2020).

Research into COVID-19 effects in sub-Saharan Africa showed reduced incomes and crisis responses be required among vulnerable population groups (Hammond et al., 2022; Kansime et al., 2021). Such crisis responses are generally understood as coping strategies, i.e. short-term ways of dealing with stress. Adaptation mechanisms, by contrast, are thought of as longer-term adjustments involving support from governments or projects (Krauss et al., 2022). In the context of COVID-19, coping strategies often involved selling productive assets, using savings, reducing food consumption and borrowing money (Hammond et al., 2022). All of these strategies can be considered negative responses, as they reduce the buffering capacity of actors or households to deal with future shocks (Hammond et al., 2022). More positive responses would be those that help actors anticipate, better adapt or mitigate the impact of the shock (Béné, 2020). Examples include shifting to other (input) suppliers or buyers (or clients), finding substitute workers or increasing storage capacity to sell at a later stage.

4 Methodology

4.1 Survey design

Separate cross-sectional surveys were developed targeted at small-scale farm households and small-scale market actor households. These were designed by adapting the survey structure used by Hammond et al. (2022) to build on their call for corroboration of results. Surveys for farm households and market actors were similar, but targeted to the respective agricultural activities (production or trading/marketing). The surveys followed the conceptual thinking of vulnerability and resilience outlined above as (1) the exposure of respondents to COVID-19 containment measures, (2) effects of these measures as observed by respondents (e.g. on production or trade and income), and (3) (short-term) coping strategies used by respondents to deal with such impacts. As such, the first part of the survey asked respondents how disruptions related to COVID-19 measures affected them (e.g. mobility), with disruptions self-categorised as “mild”, “moderate” and “severe”. The second part of the survey focused on impacts on agricultural production (for farm households) or

agricultural trade (for market actors) and income (both). As in the survey by Hammond et al. (2022), respondents were asked to estimate the proportion of income lost, comparing the income over the previous month with the income before COVID-19. Part 1 and 2 of the survey thus captured the “vulnerability” component. The third part of the survey focused on respondents’ resilience, in particular the coping strategies applied by respondents to agricultural production or trade challenges, income shocks and food insecurity.

4.2 Study sites and data collection

The surveys were conducted face-to-face in eastern Uganda (Kapchorwa District, on the slopes of Mount Elgon) and western Kenya (Teso South Sub-County, Busia County bordering Uganda). Both study areas are characterised by rain-fed crop-livestock farming systems dominated by small-scale farmers. Maize, cassava, sorghum and finger millet are the main food crops in Teso South Sub-County (Kenya), while cash crops include sugar cane, cotton and tobacco. In Kapchorwa District (Uganda), coffee is the main cash crop, with maize, beans, cooking bananas and Irish potatoes being the main food crops.

Data collection took place in October 2021, and included 527 small-scale farm households and 107 small-scale market actor households. Data was collected using questionnaires administered on tablets using the ODK software system. Trained enumerators conducted the surveys through face-to-face interviews with the respondents at home or at market sites, using the local languages (Kupsabiny for Uganda and Teso or Swahili for Kenya). Questionnaires were pre-tested in the field, after which data collection started for a period of two weeks. Oral consent to participate in the surveys was sought from all respondents prior to any data collection. Ethical approval to conduct the study was obtained from the National Commission for Research and Technology (NACOSTI) in Kenya.

The timing of the survey in October 2021 was selected to take into consideration the COVID-19-related situations in both Uganda and Kenya. The surveys were carried out directly after the main 2021 lockdowns, i.e. in a situation of waning containment measures, which enabled face-to-face interviews to be carried out, but still allowed for recent recall questions.

4.3 Sampling

4.3.1 Farm households

In Uganda, a total of 260 small-scale farm households were interviewed, spread across 20 villages (11–15 surveys per village; average of 13) and covering all parishes of Kapchorwa District and therefore all four agro-ecological zones

Table 1 Sample size

Respondents	Farm households Uganda	Farm households Kenya	Market actors Uganda	Market actors Kenya
Female	160	186	23	43
Male	100	81	33	9
Total	260	267	55	52

of Kapchorwa (lower, lower-middle, upper-middle and upper zone). In Kenya, a total of 267 farm households were surveyed in 24 villages and covered 8–13 farm households per village in all wards of Teso South Sub-County (Table 1).

In both countries, farm households were sampled using transect walks in each village whereby every 5th household was selected. Only heads of household or their spouses were interviewed resulting in 160 female and 100 male respondents in Uganda, and 186 female and 81 male respondents in Kenya. The dominance of female respondents in the household surveys can be explained by the timing of the interviews (during the day), which meant that more often the female adult in the household was present.

4.3.2 Market actors

The category of small-scale market actors was comprised of village shop owners (who buy and retail agricultural produce within the village), local traders (who buy agricultural produce at the farm gate and sell to other traders or consumers at nearby markets), and market vendors (who buy agricultural produce from traders or other retailers and sell to consumers at nearby markets). ‘Nearby’ markets included markets in villages, towns and at road sides within a radius of approximately 15–20 km. All market actors were engaged in local agri-food value chains, with locally sourced and locally sold produce. Since all actors were part of the informal sector undertaking small-scale ‘petty trade’, we subsumed them under one category.

In Uganda, 55 market actors were interviewed, of which 19 were village shop owners, 14 sold at small-scale village (or road side) markets, and 14 at a large-scale town market. Twenty-three market actors were female and 33 were male. In Kenya, 52 small-scale market actors were interviewed, of which 21 were interviewed at two large-scale town markets, 14 were interviewed at four smaller-scale village markets and 17 were village shop owners, respectively. The majority of market actors (43 out of 52) were women (Table 1).

Market actors were sampled as follows. First, in each village visited for the household survey, one market actor was purposively selected from the local trading centre (noting that some villages did not have one). Smaller villages usually only had one market actor (shop owner). In larger villages,

a list of market actors was obtained from the local leader and one market actor was randomly selected. Second, all larger wet markets in the study site were visited and traders were randomly sampled through transect walks where every 5th trader (or market vendor) was selected. In Teso South (Kenya), we visited six wet markets – two large-scale town markets and four smaller village markets, hence covering all relevant wet markets in the county. In Kapchorwa District (Uganda), the only relevant wet market is in Kapchorwa town. Hence, we complemented the sample with interviews with roadside traders when going to the villages for household surveys (random sampling).

4.4 Data analysis

Data analysis was predominantly conducted using STATA for descriptive statistics.

5 Results

5.1 Exposure to COVID-19 policy restrictions

The majority of respondents experienced disruptions from COVID-19 containment measures and felt adversely affected (Fig. 1). These perceptions were more common in Uganda than in Kenya, which reflects the higher stringency of government measures in Uganda. In Kenya, the second lockdown was also only partial and therefore may have influenced that respondents felt relatively less affected by policy measures than in Uganda.

Respondents particularly experienced restrictions on movement. More than 90% of Ugandan farm households and of market actors from both countries reported that their mobility was curtailed during the pandemic, as public (and private) transport options were constrained, curfews were enacted and people feared contracting the virus. Movement and travel restrictions were notably associated with reduced access to markets. Farm households also struggled with reduced access to agricultural inputs and extension. Market actors reported a relatively higher exposure to COVID-19 restrictions than farm households, which can be explained by the severe implications of mobility and market access restrictions for trading agricultural produce.

5.2 Effects of increased vulnerability

5.2.1 Effects on agricultural production and agricultural trade

Farmers identified a variety of challenges resulting from the COVID-19-related disruptions. Particularly the mobility

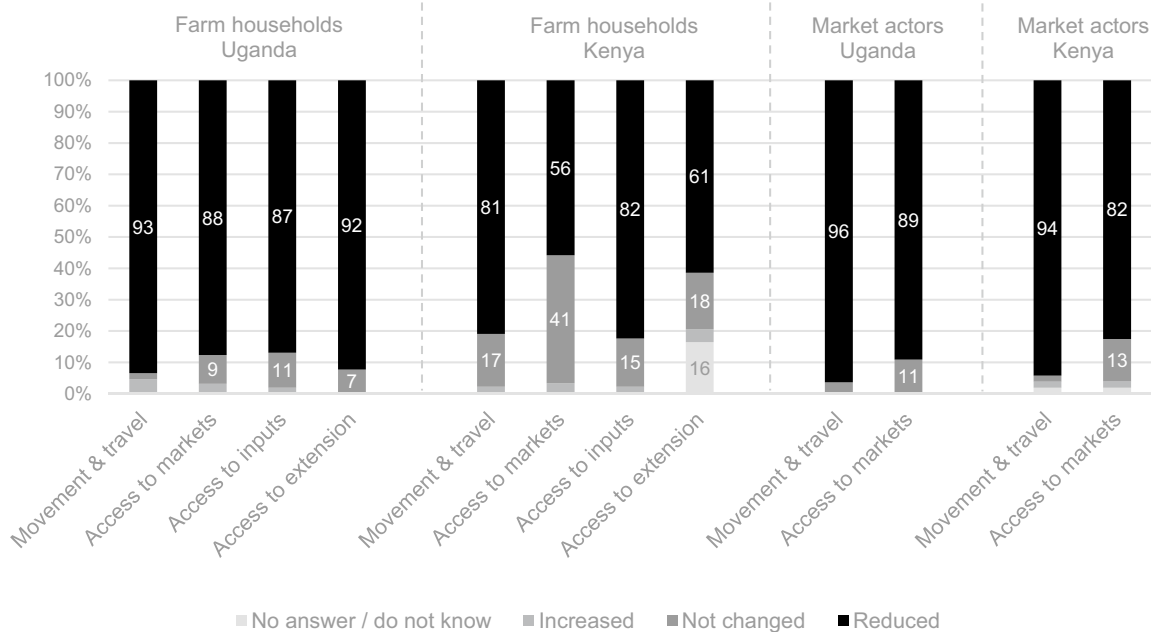


Fig. 1 Main disruptions due to COVID-19 containment measures experienced by farm households and market actors (in % of all respondents)

and travel restrictions were viewed to have led to difficulties in reaching their fields, limited access to and high costs of agricultural inputs (particularly seed and fertiliser), shortages and high costs of labour, and high uncertainty of market demand and market prices. A majority of farm households therefore reported a reduction in the land area for at least one of their most important crops grown (62% for Uganda and 52% for Kenya). In Kenya, around 45% of farmers reduced the land area for maize, tubers and legumes, and 32% of farmers decreased the crop area for leafy vegetable production (Fig. 2). In Uganda, there was a more marked difference between crops, with the highest share of farmers reducing

their area for maize (60%), followed by bush beans and Irish potatoes (55% each). Some farmers also reduced the crop area for cooking bananas and coffee, but there were even more respondents who indicated to not have changed the area for these two crops. As a result of the reduced farmed area, farming output decreased: nearly three-quarters of surveyed farm households in both countries reported lower agricultural production due to COVID-19 restrictions. While our results do not say anything about the magnitude of reduced production, decreased farming output would be consistent with the reduced crop area and limited access to agricultural inputs.

Fig. 2 Changes in crop area of major crops produced (in % of farm households producing a crop)

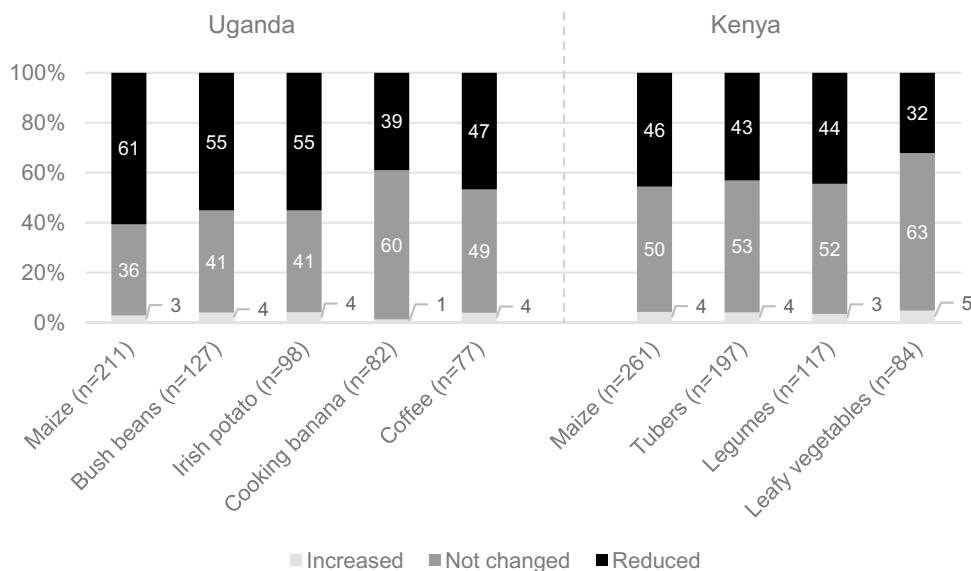
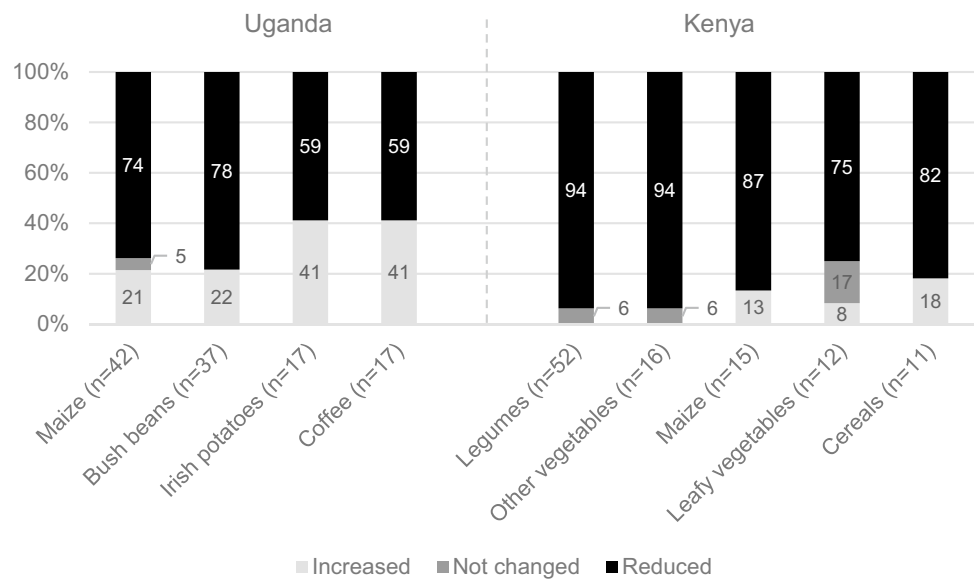


Fig. 3 Changes in major crops traded (in % of market actors trading a crop)



In both countries, farm households increased the consumption of their own produce and reduced their food purchases considerably – by nearly 92% in Uganda and 72% in Kenya, mostly due to increased food prices (in both countries), closure of markets and shops (in Uganda), and lack of cash for food purchases (in Kenya).

A large majority of farm households in Uganda (78%) also observed an increase in post-harvest losses. This was mostly because farmers found it difficult to find remunerative market outlets. They reported price reductions for their crops, fewer buyers available and difficulties in physically accessing markets, as a result of which more crops were left unsold (for a longer period of time). In Kenya, post-harvest losses largely remained the same as during pre-COVID-19 season, although around one-third of respondents noted increased losses due to limited access to storage facilities and difficulties in finding profitable market opportunities.

Reduced agricultural production and increased own consumption by farm households quickly led to a reduction in trade. According to the surveyed market actors, difficulties in sourcing produce due to lower production and restrictions on movement, reduced openness of markets as well as lower consumer demand were mentioned as the main driving forces for reduced trade and low stock turnover. Market actors adjusted their time allocation accordingly: in Uganda, they scaled down their trading activities from six to five days per week, on average, while in Kenya the mean decrease was from five to four days per week.

In Kenya, between 75 and 95% of surveyed market actors reported a decrease in trade in legumes, leafy vegetables, other vegetables, maize and cereals (Fig. 3). This was similar in Uganda, where between 59 and 74% of market actors reported reduced trade for their main crops

traded (maize, bush beans, Irish potatoes and coffee), although around 40% of the respondents saw an increase in trade in coffee and potatoes. This aligns with the slightly more limited reduction in production area of these two crops reported by farm households (Fig. 2).

Market actors also observed increased food losses during trading; more so in Uganda (78% of respondents) than in Kenya (62%). In both countries, this was largely due to problems finding customers, reduced openness of produce markets and inability to physically access markets, which meant that products stayed in storage longer than usual. Market actors also mentioned limited storage facilities as a factor contributing to food losses. This can be considered a pre-existing weakness, which, due to slower produce turnaround, was exposed more intensely during COVID-19.

5.2.2 Effects on household income

Nearly all respondents reported a negative impact of COVID-19 containment measures on their income. Many of the reported causes match with the disruptions experienced during the pandemic (Fig. 1).

In Kenya, most surveyed farm households estimated their income losses at 10–40% or 40–60% for both farm income and off-farm household income sources (Table 2). Around one-third did not have any off-farm income sources, indicating a particularly high vulnerability of these households. In Uganda, income losses were even more pronounced, and most respondents reported losses between 40–60% or between 60–90% for crop sales and off-farm work. Close to 20% of farm households in Uganda did not have any income from off-farm sources.

Table 2 Scope of income losses estimated by farm households during the last month, compared to pre-COVID-19 (in % of all respondents; highest % in bold)

	Farm sales Uganda	Farm sales Kenya	Off-farm work Uganda	Off-farm work Kenya
All or nearly all lost (90–100%)	10	6	7	3
More than half lost (60–90%)	33	17	19	16
About half lost (40–60%)	27	26	22	22
Less than half lost (10–40%)	18	24	13	17
A small amount lost (1–10%)	11	4	11	3
No reduction (0%)	0	4	7	6
Not applicable	1	17	19	30

Farm households attributed the reduced income from crop sales to low selling prices, but also to lacking demand for their produce, closed markets and transport restrictions (Fig. 4). Off-farm income declined due to a lack of opportunities to work and reduced mobility or enforced shutdown measures. In Uganda, increased care duties due to COVID-19, either of children or sick people, also acted as a barrier for respondents to gain an income from off-farm work.

Market actors reported even greater income losses than farm households (Table 3). Most Kenyan market actors suffered income losses from trading in the range of 60–90% (36% of respondents) or 40–60% (28%). Income from other work was not applicable in most cases, revealing a high dependency on income from trading. In Uganda, around one-third of market actors estimated their income losses from trading at 40–60%, and another 30% suggested losses as high as 60–90%. Many respondents (44%) reported that additional income from other sources, including farming, decreased by 40–60%.

Market actors identified lower consumer demand during the pandemic and restrictions on movement and marketing as the main causes for reduced trade and hence, reduced income from trading (Fig. 5). Limited mobility was also the main cause of reduced income from other work, next to fewer work opportunities available.

5.3 Resilience and coping strategies

Support from the government (or other sources) was rarely received and respondents were largely left to rely on their own coping strategies. Only relatively few respondents had received food donations (16% and 9% of farm households in Kenya and Uganda, respectively) or cash support (8% and 15% of market actors in Kenya and Uganda, respectively, and 7% of farm households in Kenya). Around 8% of farm households in Uganda received free agricultural input.

Fig. 4 Causes of reduced income for farm households (in % of respondents who experienced income losses; multiple answers were recorded)

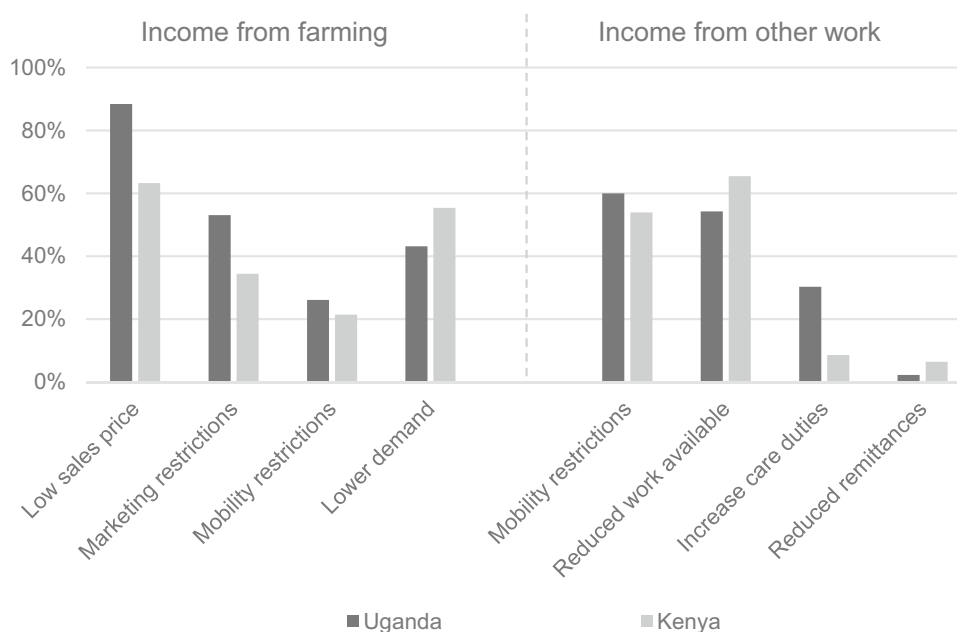


Table 3 Scope of income losses estimated by market actors during the last month, compared to pre-COVID-19 (in % of all respondents; highest % in bold)

	Agricultural trade Uganda	Agricultural trade Kenya	Other work Uganda	Other work Kenya
All or nearly all lost (90–100%)	12	11	6	2
More than half lost (60–90%)	29	36	6	2
About half lost (40–60%)	35	28	44	2
Less than half lost (10–40%)	6	26	17	0
A small amount lost (1–10%)	18	0	28	0
No reduction (0%)	0	0	0	0
Not applicable	0	0	0	94

5.3.1 Coping strategies for challenges in agricultural production or trade

Farmers indicated a variety of challenges due to COVID-19 disruptions (see Sect. 5.2), which prompted many of them to adopt different strategies to reduce the negative impact. As farm households struggled particularly with reduced access to (affordable) seed, the use of local, often farm-saved seed, was a popular coping strategy (Fig. 6). Several respondents grew fewer crops, borrowed money from friends and family, and sourced input from alternative means (e.g. through barter trade with neighbours). Many respondents stated not having done anything in response to the agricultural challenges experienced, which indicates a limited ability to resort to a specific coping strategy. Ugandan farm households used fewer coping strategies, on average (1.28), than Kenyan farmers (1.46).

Market actors were similarly confronted with various COVID-19-related challenges, which impacted on their trading activities (see Sect. 5.2). In response, many of them avoided restocking products which were low in demand

(Fig. 7). In Kenya, respondents also tried to source produce from diverse suppliers to minimise the risk of supplier failure and reduced the volume of crops sourced in view of low consumer demand and potential food losses. Both strategies were not very common in Uganda. By contrast, nearly one-quarter of surveyed market actors in Uganda indicated doing nothing, compared to 15% in Kenya, which may suggest limited options for them to deal with trade challenges. Accordingly, the mean number of trade-related coping strategies used per market actor was 1.33 for Kenya versus 1.09 for Uganda.

5.3.2 Coping strategies for reduced income

To deal with COVID-19-induced income shocks, the majority of surveyed farm households resorted to selling livestock – mostly chicken, but also goats and cattle in the case of Ugandan farm households (Fig. 8). In Kenya, many households additionally used savings, sold crops intended for storage and bought fewer farm inputs. The mean number of

Fig. 5 Causes of reduced income for market actors (in % of respondents who experienced income losses; multiple answers were recorded)

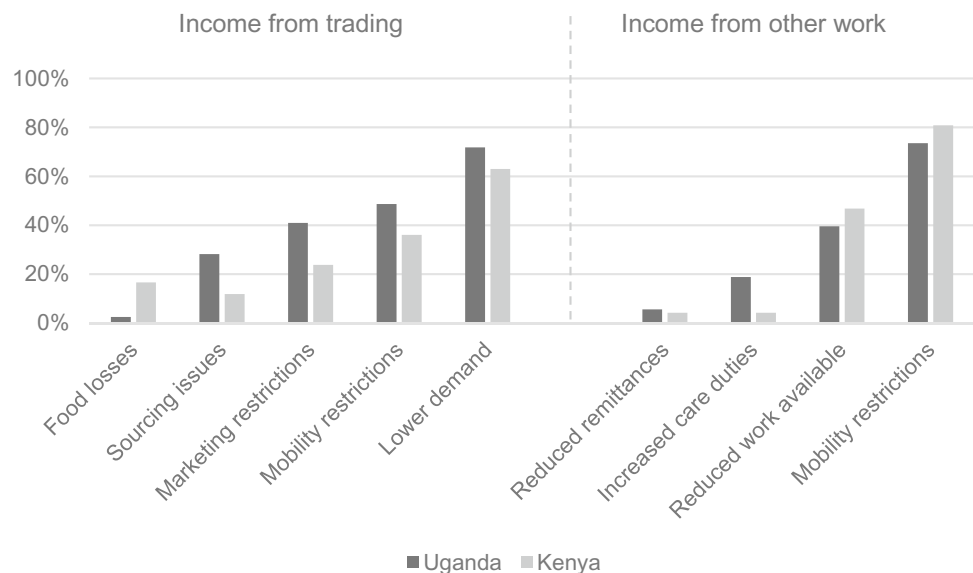
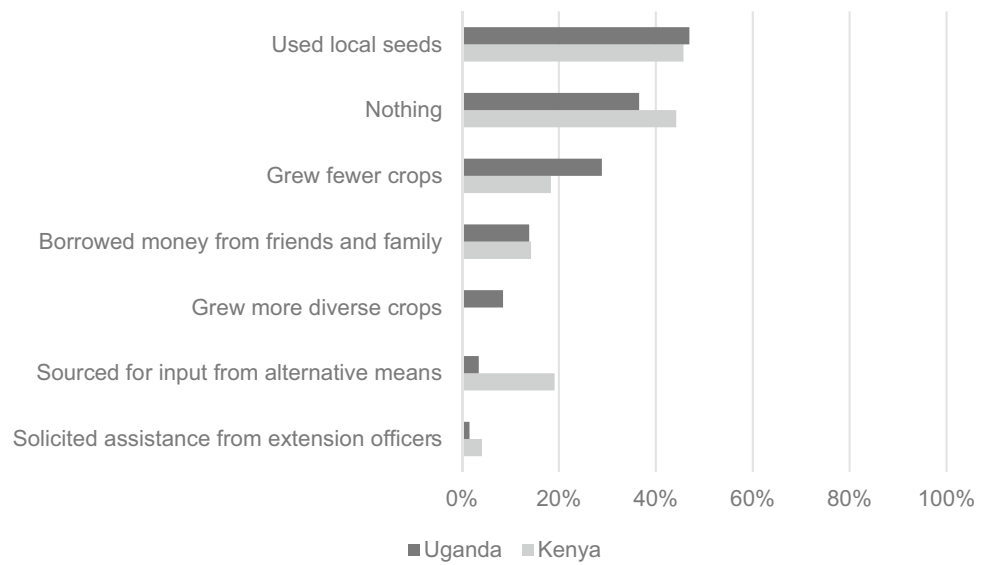


Fig. 6 Coping strategies by farm households to deal with production-related challenges during the pandemic (in % of all respondents; multiple answers were recorded)



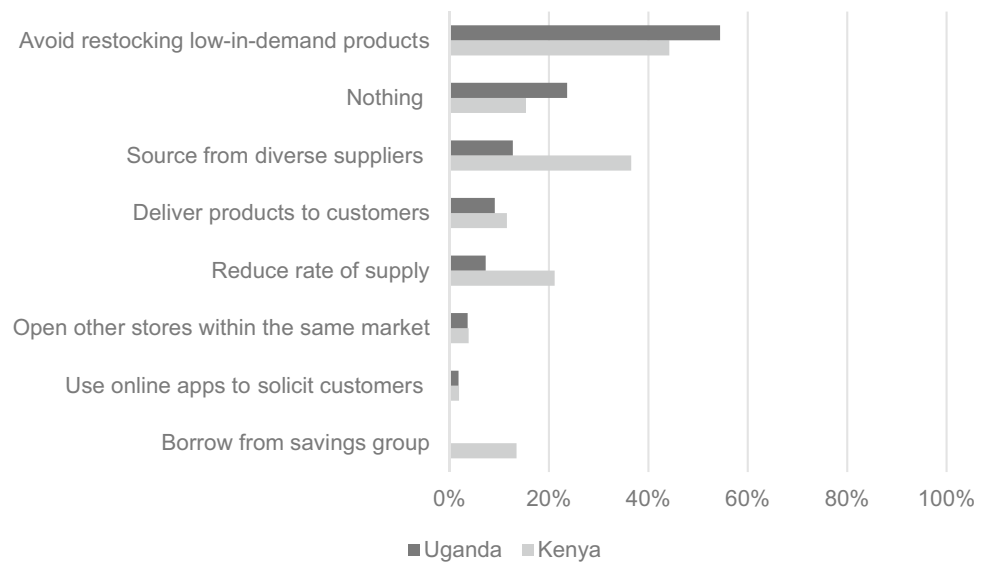
income-related coping strategies used per farm household respondent was 2.91 in Kenya, compared to 1.94 in Uganda.

Market actors in both countries relied on depleting savings as the main coping strategy, while also selling livestock, but to a lesser extent than farm households. In Kenya, this was limited to selling chicken, but in Uganda market actors mostly sold cattle and goats. Kenyan market actors further restocked fewer products for sale and took out risky loans that they were not certain they could pay back on time. In Kenya, market actors used 2.75 income-related coping strategies, on average, whereas in Uganda the average number was 1.71 strategies.

5.3.3 Coping strategies for reduced food availability

Respondents adopted different strategies to cope with reduced food availability (Fig. 9). In Uganda, farm households often harvested immature crops, consumed crops intended for sale and reduced food diversity, using an average of 2.48 food-related coping strategies per respondent. In Kenya, a majority of farm households felt compelled to lower the number of daily meals, reduce dietary diversity and reduce food quality. They used slightly more food-related coping strategies on average (2.77 per respondent).

Fig. 7 Coping strategies by market actors to deal with trade-related challenges during the pandemic (in % of all respondents; multiple answers were recorded)



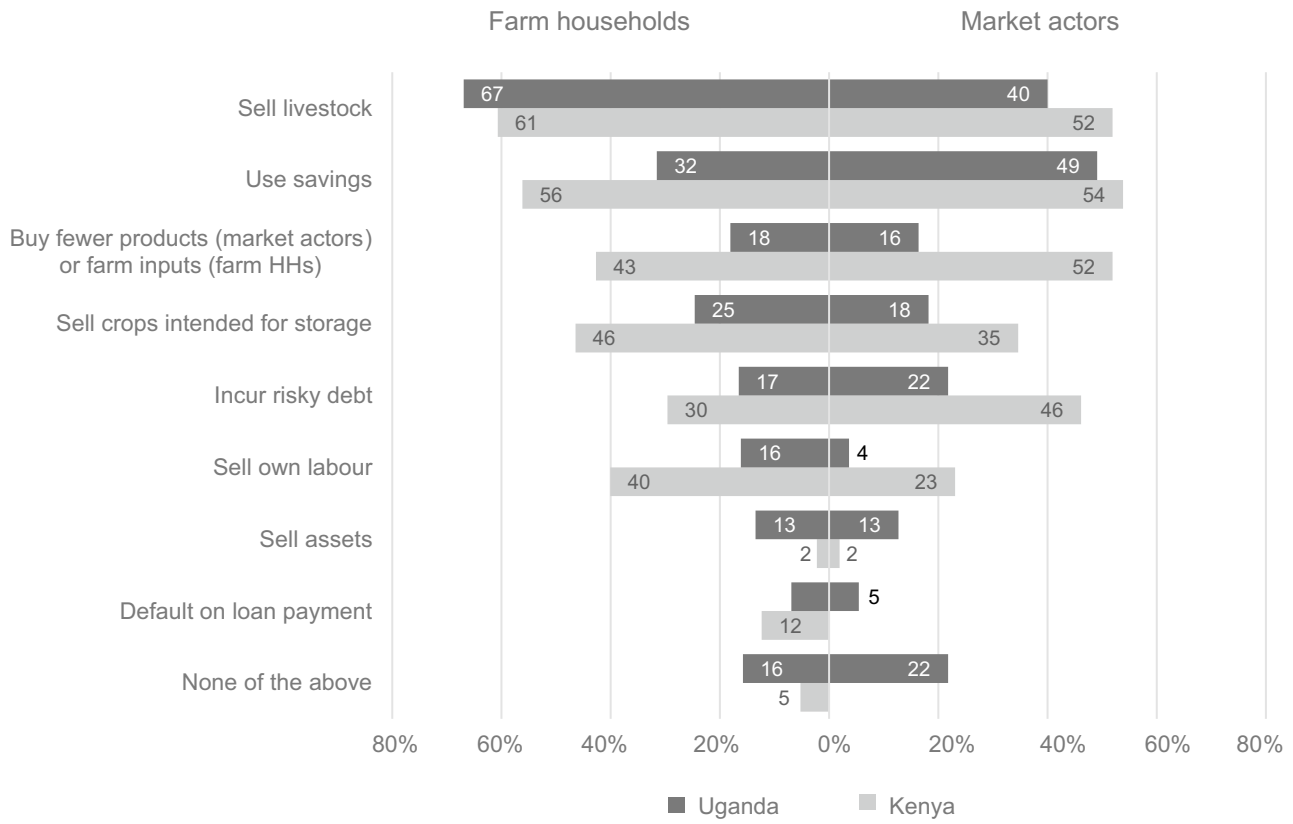


Fig. 8 Coping strategies to deal with reduced income during the pandemic (in % of all respondents; multiple answers were recorded)

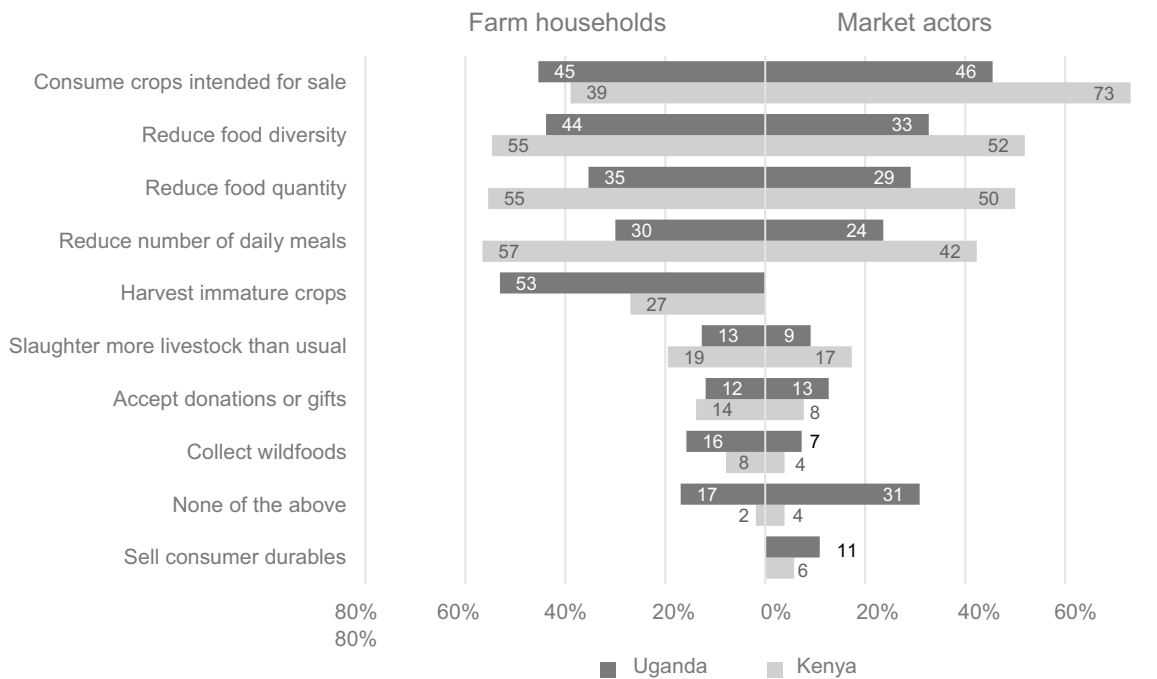


Fig. 9 Coping strategies to deal with reduced food availability during the pandemic (in % of all respondents; multiple answers were recorded)

Similarly, market actors in both countries consumed crops intended for sale (or trading), and reduced food quantity as well as food diversity. In Kenya, more than 40% of market actors also reduced the number of daily meals, which was only done by a quarter of surveyed market actors in Uganda. Again, the results indicate a higher number of food-related coping strategies used by Kenyan market actors (2.52 on average) than by Ugandan market actors (1.71 on average).

6 Discussion

Both the Ugandan and Kenyan governments declared agriculture as ‘essential’ during the pandemic. However, findings from this survey suggest that policy measures to contain the spread of COVID-19 significantly impacted actors in local agri-food value chains – more so in Uganda where policy measures were particularly strict, but also in Kenya.

Disturbances in terms of transport and travel restrictions and difficulties in accessing inputs, extension and markets led to decreasing farm output in key crops grown in both survey sites. While our study cannot estimate the magnitude of decreased production beyond indications of reduced area for key crops grown, our results are in line with other studies for Uganda and Kenya, which found reduced production in key crops, such as maize (Nabwire et al., 2022) and bush beans (Nchanji & Lutomia, 2021). However, it is important to note that the COVID-19 pandemic coincided with other concurrent crises, such as high global fertiliser prices, increase in fuel prices and the desert locust plague. While we did try to separate general challenges (e.g. pests and diseases) from COVID-19-specific challenges (e.g. lower market demand), our study cannot fully distinguish the effect of policy containment measures from other external shocks on agricultural production. Yet, as exposure levels of farm households to COVID-19 measures were high, a causal effect seems likely.

Trade in agricultural produce was disrupted as sourcing became more difficult, markets or shops were closed down or had to operate at reduced capacity, and consumer demand dropped. Surveyed farm households reduced their food purchases by as much as 92% (in Uganda; compared to 72% in Kenya), citing increased food prices as a key barrier. Other studies confirm a decline in effective demand for food (Nechifor et al., 2021) – not only because of reduced income of individual households available for food expenditure (Mahmud & Riley, 2021), but also because demand from schools, hotels/lodges and restaurants all but collapsed (Fowler, 2020; Nabwire et al., 2022). In line with extant research on Uganda and Kenya, our results confirm that trade in major crops decreased, including maize, cereals and legumes (FAO, 2020; Nabwire et al., 2022). This also

resonates with market actors’ attempt to restock fewer products in response to lower consumer demand.

Increases in trade were observed for only few products by some respondents, including coffee in Uganda. While 59% of Ugandan market actors reported declining trade in coffee, 41% experienced a growth in trade. In fact, coffee yields in 2020 were considered high, while rising and relatively stable prices and demand at a global level contributed to a relatively resilient coffee sector in Uganda (Manwaring & Morjaria, 2021).

In view of agricultural production and trade challenges, both farm households and market actors suffered significant income losses – often by as much as half (40–60%) or even higher, compared to pre-COVID-19. Already vulnerable actors were thus made even more vulnerable. Similar declines in income and reductions in household welfare were reported by multiple other studies featuring Uganda and Kenya (Hammond et al., 2022; Nabwire et al., 2022; Odhiambo et al., 2021). Market actors were particularly impacted by income losses in light of mobility restrictions and reduced access to markets. Around 10% of market actors reported to have lost (nearly) their entire income from trading; and another 30–36% indicated that they lost 60–90% of their income. As such, their livelihoods of vending and trading were severely diminished or even eliminated.

This also suggests that market actors were more vulnerable to shock exposure and more negatively affected by COVID-19 policies than farm households. As mid-chain actors, they were caught between the consequences of farm households’ struggles resulting in reduced production and limited consumer demand for agricultural produce. Kenyan market actors, in particular, reported that they had no income from other (non-trading) sources, which made them extremely vulnerable to external shocks, such as COVID-19. Our results resemble the findings of Liverpool-Tasie et al. (2021) who showed that lockdown policies severely disrupted food markets in Nigeria, as markets became too congested to do business in view of limited opening times, nightly curfews constrained food flows, policy measures were implemented without warning, and market actors’ challenges were compounded by low consumer demand and low sales prices. Liverpool-Tasie et al. (2021, p. 221) concluded that “peril was indeed produced not just by COVID-19 but by policies that largely shut down urban wholesale markets and retail wet markets”. The outcomes of our market actor survey in Kenya and Uganda would seem to echo this conclusion.

Support from governments or other sources to buffer the negative effects of COVID-19 measures were limited. Only relatively few respondents benefitted from food donations, cash support or free agricultural inputs. Households thus had to resort to individually available coping strategies.

Income shocks provoked two main responses: selling live-stock and depleting savings (see Kansime et al., 2021; Mahmud & Riley, 2021; and Hammond et al., 2022 for similar findings). Whereas the majority of respondents sold small livestock (chicken and goats), in Uganda farm households and market actors, in particular, also sold cattle. Selling cattle is commonly considered a ‘last resort’ in coping strategies, as cattle constitutes an investment asset and a source of socio-cultural wealth, and it requires a positive stock to maintain productivity of the herd (Acosta et al., 2021). Selling cattle can thus be viewed as a clear sign of distress, where a trade-off can be observed between using assets to smoothen the effects of a shock and future income generation capacity (Acosta et al., 2021). Studies also caution that households selling livestock in a hurry obtain a reduced price (Fafchamps et al., 1998). Both selling livestock and using savings effectively deplete the asset base of households, which can create long-lasting wealth shocks pushing vulnerable households further into poverty (Boansi et al., 2023). In Kenya, many respondents also indicated that they took out risky loans to cover for urgent cash needs. All of these strategies exhaust the buffering capacity of households and are negative short-term strategies, which could hinder households from bouncing back quickly after the pandemic. More positive coping strategies, e.g. short-term employment in non-agriculture sectors, were generally unavailable during COVID-19 in view of massive job loss in Uganda and Kenya and lacking transport opportunities. Not only did households’ income decline, they also felt compelled to reduce food quantity and diversity, and lower the number of daily meals. This could lead to greater food insecurity of households and put particularly children at risk (Nechifor et al., 2021).

Overall, the use of coping strategies for reduced income and reduced food availability is higher for respondents in Kenya than in Uganda, which contrasts the earlier finding that the severity of disruptions experienced was higher in Uganda compared to Kenya. This suggests that respondents in Uganda, both farm households and market actors, had fewer coping strategies at their disposal, whereas their counterparts in Kenya were in a position to use more diverse coping strategies, ultimately indicating a higher resilience to shocks in the short-term.

7 Conclusion

This study assessed the implications of COVID-19 policy measures for small-scale farm households and small-scale market actors in Uganda and Kenya, as both countries experienced relatively strict government-imposed measures to prevent the spread of the virus.

Our results show how containment measures restricted personal movement and transport options and limited access to agricultural inputs and markets. This led to a decrease in agricultural production and local trading activities. While

both farmers and market actors experienced massive negative income effects, market actors were hit particularly hard as their livelihoods depend on free movement which was severely curtailed during the pandemic. Actors from both categories often tried to cope by selling livestock, using savings and lowering both food intake and food diversity. Coping strategies were thus short-term and further reduced actors’ resilience by exhausting their buffering capacity and exposing them to the risk of food insecurity.

While the data for this research are based on respondents’ perceptions and not objective measures, studies like ours can serve as guidelines for future policy choices between minimising public health risks versus socio-economic challenges. At the same time, it is important to acknowledge that our study cannot attribute the observed outcomes to specific national policy measures and does not differentiate between the 2020 and 2021 lockdowns. The study also cannot isolate specific confounding effects, such as market failures or climate effects. Moreover, the results of the study cannot be generalised for the entire populations of small-scale farm households and small-scale market actors in Uganda and Kenya. At the same time, seeing the country-wide exposure to policy measures in Uganda and the varying exposure levels in Kenya (some areas were impacted even more heavily than our study site of Teso South), it is reasonable to expect similarly heightened vulnerability and limited resilience across other locations. Finally, using quantitative methods alone is unable to reveal the context of local agri-food value chains. Qualitative data, e.g. from in-depth interviews, could have added a better understanding of how macro-level events and policy decisions affected individuals and households.

Going forward, as many of the negative consequences found in this study seem to be grounded in government-imposed restrictions which have meanwhile been lifted, future studies should examine possible longer-term effects of the COVID-19 pandemic and associated measures on local agri-food value chains and small-scale actors. Specifically, the resilience of these actors, and to what extent they have recovered or bounced back from the different disruptions, warrant further research. Are the negative consequences of COVID-19 and related policy responses lasting or merely temporary? Where can signs of recovery be seen and which disruptions are enduring? Longitudinal studies comparing data collected during and post-COVID-19 are needed to shed further light on the longer-term vulnerability and resilience of small-scale farm households and small-scale market actors from shocks.

Acknowledgements The authors would like to thank the teams of enumerators, specifically Ms Annet Itaru, collecting survey data in Kapchorwa, Uganda, and Teso South, Kenya.

Funding The research leading to these results was conducted in the project “Education and Training for Sustainable Agriculture and

Nutrition in East Africa”, funded by the Long Term EU-Africa research and innovation Partnership on food and nutrition security and sustainable Agriculture (LEAP-Agri). This specific study received funding from the Dutch Research Council (NWO) under Grant Agreement No W 09.03.102, and from the Government of Uganda.

Declarations

Conflicts of interest/Competing interests The authors declare that there are no conflicts of interests.

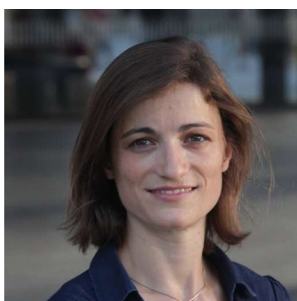
Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article’s Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Acosta, A., Nicolli, F., & Karfakis, P. (2021). Coping with climate shocks: The complex role of livestock portfolios. *World Development*, *146*, 105546.
- Alam, G. M. M., & Khatun, M. N. (2021). Impact of COVID-19 on vegetable supply chain and food security: Empirical evidence from Bangladesh. *PLoS ONE*, *16*(3), e0248120.
- Bassett, H. R., Sharan, S., Suri, S. K., Advani, S., & Giordano, C. (2022). A comparative study of small-scale fishery supply chains’ vulnerability and resilience to COVID-19. *Maritime Studies*, *21*, 173–192.
- Bellemare, M.F., Bloem, J.R. & Lim, S. (2021). Producers, consumers, and value chains in low-and middle-income countries. In Barrett, C.B. & Just, C.R., *Handbook of Agricultural Economics*, Volume 6. Elsevier: Amsterdam and Oxford, pp. 4933–4996.
- Béné, C. (2020). Resilience of local food systems and links to food security – A review of some important concepts in the context of COVID-19 and other shocks. *Food Security*, *12*, 805–822.
- Birner, R., Blaschke, N., Bosch, C., Daum, T., Graf, S., Güttler, D., Heni, J., Kariuki, J., Katusiime, R., Seidel, A., Senon, Z. N., & Woode, G. (2021). ‘We would rather die from Covid-19 than from hunger’ – Exploring lockdown stringencies in five African countries. *Global Food Security*, *31*, 100571.
- Boansi, D., Owusu, V., Tham-Agyekum, E.K., Wongnaa, C.A., et al. (2023). Responding to harvest failure: Understanding farmers coping strategies in the semi-arid Northern Ghana. *PLoS ONE*, published 14 April 2023. <https://doi.org/10.1371/journal.pone.0284328>
- Egger, D., Miguel, E., Warren, S. S., Shenoy, A., Collins, E., Karlan, D., & Vernot, C. (2021). Falling living standards during the COVID-19 crisis: Quantitative evidence from nine developing countries. *Science Advances*, *7*(6), eabe0997.
- Fafchamps, M., Udry, C., & Czukas, K. (1998). Drought and saving in west africa: are livestock a buffer stock? *Journal of Development Economics*, *55*(2), 273–305.
- FAO (2020). National agrifood systems and COVID-19 in Kenya. Effects, policy responses and long-term implications. *Food and Agriculture Organization of the United Nations*. Retrieved 14/4/2023 from <https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1329896/>
- Fowler, M. (2020). The impact of the COVID-19 pandemic on Uganda’s agricultural sector. Retrieved 14/4/2023 from https://www.theigc.org/sites/default/files/2020/09/3_3_Fowler-Impact-of-COVID-19-on-Ugandas-agricultural-sector.pdf
- Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., Webster, S., Cameron-Blake, E., Hallas, L., Majumdar, S., & Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nature Human Behaviour*, *5*, 529–538.
- Hammond, J., Siegal, K., Milner, D., Elimu, E., Vail, T., Cathala, P., & van Wijk, M. (2022). Perceived effects of COVID-19 restrictions on smallholder farmers: Evidence from seven lower-and middle-income countries. *Agricultural Systems*, *198*, 103367.
- Josephon, A., Kilic, T., & Michler, J. D. (2021). Socioeconomic impacts of COVID-19 in low-income countries. *Nature Human Behaviour*, *5*, 557–565.
- Kansiime, M. K., Tambo, J. A., Mugambi, I., Bundi, M., Kara, A., & Owuor, C. (2021). COVID-19 implications on household income and food security in Kenya and Uganda: Findings from a rapid assessment. *World Development*, *137*, 105199.
- Krauss, J.E., Artur, L., Brockington, D., Castro, E. Jr., Fernando, J. Jr., Fisher, J., & Zimudzi, C. (2022). ‘To prevent this disease, we have to stay at home, but if we stay at home, we die of hunger’ – Livelihoods, vulnerability and coping with Covid-19 in rural Mozambique. *World Development*, *151*, 105757.
- Liverpool-Tasie, L. S. O., Reardon, T., & Belton, B. (2021). “Essential non-essentials”: COVID-19 policy missteps in Nigeria rooted in persistent myths about African food supply chains. *Applied Economic Perspectives and Policy*, *43*(1), 205–224.
- Mahmud, M., & Riley, E. (2021). Household response to an extreme shock: Evidence on the immediate impact of the Covid-19 lockdown on economic outcomes and well-being in rural Uganda. *World Development*, *140*, 105318.
- Manwaring, P. & Morjaria, A. (2021). Understanding the impact of COVID-19 on coffee exports in Uganda. Policy Brief January 2021, International Growth Centre, London School of Economics, London, UK. Retrieved 14/4/2023 from <https://www.theigc.org/sites/default/files/2021/05/Manwaring-et-al-January-2021-Policy-brief.pdf>
- Mathieu, E., Ritchie, H., Rodés-Guirao, L., Appel, C., Giattino, C., Hasell, J., Macdonald, B., Saloni Dattani, S., Beltekian, D., Ortiz-Ospina, E., & Roser, M. (2020). Coronavirus Pandemic (COVID-19). Published online at OurWorldInData.org. Retrieved 21/3/2022 from: <https://ourworldindata.org/coronavirus>
- Middendorf, B. J., Faye, A., Middendorf, G., Stewart, Z. P., Jha, P. K., & Prasad, P. V. (2021). Smallholder farmer perceptions about the impact of COVID-19 on agriculture and livelihoods in Senegal. *Agricultural Systems*, *190*, 103108.
- Morton, J. (2020). On the susceptibility and vulnerability of agricultural value chains to COVID-19. *World Development*, *136*, 105132.
- Moseley, W. G., & Battersby, J. (2020). The vulnerability and resilience of african food systems, food security, and nutrition in the context of the COVID-19 Pandemic. *African Studies Review*, *63*(3), 449–461.
- Munhall, P. L. (2008). Perception. In L. M. Given (Ed.), *The SAGE Encyclopaedia of Qualitative Research Methods* (pp. 606–607). SAGE Publications.
- Nabwire, L., van Campenhout, B., Minot, N., Kabir, R., Vos, R., Narayanan, S., Rice, B., & Aredo, S.D. (2022). Impact of COVID-19 on food value chains in Uganda: Results of surveys of farmers, traders, and processors. Working Paper, January 2022, International Food Policy Research Institute (IFPRI), Washington, DC.
- Nchanji, E. B., Lutomia, C. K., Chirwa, R., Templer, N., Rubyogo, J. C., & Onyango, P. (2021). Immediate impacts of COVID-19 pandemic

on bean value chain in selected countries in sub-Saharan Africa. *Agricultural Systems*, 188, 103034.

- Nchanji, E.B. & Lutomia, C.K. (2021). Regional impact of COVID-19 on the production and food security of common bean smallholder farmers in Sub-Saharan Africa: Implication for SDG's. *Global Food Security*, 29, <https://doi.org/10.1016/j.gfs.2021.100524>
- Nechifor, V., Ramos, M. P., Ferrari, E., Laichena, J., Kihiu, E., Omanyo, D., Musamali, R., & Kiriga, B. (2021). Food security and welfare changes under COVID-19 in Sub-Saharan Africa: Impacts and responses in Kenya. *Global Food Security*, 28, 100514. <https://doi.org/10.1016/j.gfs.2021.100514>
- Odhambo, K., Lewis, J., Tefera, N., Thomas, A., Meroni, M., Dimou, M., & Rembold, F. (2021). Impacts of COVID-19 and other stressors on Smallholder Farmers' Food Systems and Value Chains in Kenya. Report 3, Period March-June 2021. Publications Office of the European Union, Luxembourg, 2022. <https://doi.org/10.2760/18961>, JRC128890.
- Ogada, M. J., Justus, O., Paul, M., Omondi, S. G., Juma, A. N., Taracha, E., & Ahmed, H. (2021). Impact of COVID-19 pandemic on African indigenous vegetables value chain in Kenya. *Agriculture & Food Security*, 10(1), 1–10.
- Okumu, I.M., Kavuma, S.N., & Bogere, G. (2021). Efficacy of COVID-19 Macroeconomic Policy Responses in Uganda. COVID-19 Macroeconomic Policy Responses in Africa, no. 6. Retrieved 21/3/2022 from: <https://www.acode-u.org/uploadedFiles/CoMPRA-06-okumu-kavuma-bogere.pdf>
- Scoones, I. (2020). Surviving COVID-19 : fragility, resilience and inequality in Zimbabwe, African arguments, PASTRES Project. Retrieved 14/4/2023 from <https://hdl.handle.net/1814/66918>
- Von Hoyweghen, K., Fabry, A., Feyaerts, H., Wade, I., & Maertens, M. (2021). Resilience of global and local value chains to the Covid-19 pandemic: Survey evidence from vegetable value chains in Senegal. *Agricultural Economics*, 52, 423–440.
- World Bank. (2021a). Uganda Economic Update: From Crisis to Green Resilient Growth: Investing in Sustainable Land Management and Climate Smart Agriculture. June 2021, edition 17. Retrieved 16/4/2022 from: <https://documents1.worldbank.org/curated/en/265371623083730798/pdf/Uganda-Economic-Update-17th-Edition-From-Crisis-to-Green-Resilient-Growth-Investing-in-Sustainable-Land-Management-and-Climate-Smart-Agriculture.pdf>
- World Bank. (2021b). How COVID-10 continues to affect livelihoods in Kenya. Rapid Response Phone Survey, Rounds 1–5. Retrieved 16/4/2022 from: <https://openknowledge.worldbank.org/bitstream/handle/10986/36650/How-COVID-19-Continues-to-Affect-Livelihoods-in-Kenya-Rapid-Response-Phone-Survey-Rounds-1-to-5.pdf?sequence=1&isAllowed=y>
- World Bank. (2021c). Kenya Economic Update: From Recovery to Better Jobs. December 2021, edition 24. Retrieved 16/4/2022 from: <https://documents1.worldbank.org/curated/en/099910012132120798/pdf/P1749610b2583d010089f90bb1057d49c8c.pdf>



Verena Bitzer PhD, is an interdisciplinary social scientist working on the nexus of international development and transnational governance. She specializes in inclusive global agricultural value chains, which includes research on multi-stakeholder initiatives, sustainability standards, and responsible business conduct. Verena holds research positions at KIT Royal Tropical Institute, Amsterdam, and the Maastricht Sustainability Institute of Maastricht University,

the Netherlands. Prior to this, she has worked at the Graduate School of Business of the University of Cape Town, Wageningen University and Utrecht University, where she also obtained her PhD.



Froukje Kruijssen MSc, is an agricultural development economist working on applied research in agri-food value chains and sustainable development. Her work has a focus on fisheries and aquaculture value chains, but also includes research on other commodities. Her research interests are around social inclusion in value chains, including for smallholders, women, and youth, both for value chain actors, and from a consumer perspective. She is currently a human rights programme manager at the Aquaculture Stewardship Council. At the time of this research she was an advisor and researcher at KIT Royal Tropical Institute in Amsterdam, where she worked on applied research, evaluations and capacity development in the broad areas of inclusive value chains and sustainable economic development. Before joining KIT, she worked at WorldFish and Bioversity International, both international research organizations, and as a private consultant.



Johnny Mugisha PhD, is a Professor of Agricultural Economics in the Department of Agribusiness and Natural Resource Economics, Makerere University. He graduated from Makerere University with BSc. Agriculture and MSc. Agricultural Economics, and Justus Liebig University Giessen in Germany with a PhD. He has been doing applied research in the discipline of socioeconomics at farm, household and market levels including agricultural technology adoption, urban waste utilization,

biogas production and utilization, agricultural resource optimization, value chain studies and impact assessment. He has won and successfully implemented collaborative research and capacity building grants from various donors and development partners. He has over 50 publications in various refereed journals, and has supervised and mentored over 80 graduate students. He is the former Dean of the School of Agricultural Sciences in the College of Agricultural and Environmental Sciences, Makerere University. He is a reviewer for various journal publishers and a member of various academic associations.



Lydia Waswa PhD is a Lecturer in the Department of Human Nutrition, Faculty of Health Sciences, Egerton University, Kenya. She holds a PhD in Home Economics and Nutritional Sciences from Justus Liebig University-Giessen, Germany, an MSc. in Foods, Nutrition and Dietetics and a Bachelor of Education (Home Economics) degrees both from Kenyatta University, Kenya. She has more than 15 years' experience as a lecturer

and researcher and is engaged in teaching and mentoring both undergraduate and postgraduate (PhD and MSc) students in Human Nutrition and related fields. Her research interest focus on linking agriculture and nutrition and nutrition education all aimed at enhancing food and nutrition security, dietary diversity and alleviating all forms of malnutrition and their associated diet-related non-communicable diseases among vulnerable population groups. She is involved in several collaborative research projects in various capacities and has published in peer reviewed scientific journals.



Judith Aliso BSc, is an agricultural extension specialist with over 4 years of experience. She holds a bachelor of Agriculture degree from Gulu University, Uganda, and is currently pursuing a Master of Agribusiness Management, in the Department of Agribusiness and Natural Resource Economics, Makerere University, Uganda. Her current research is situated in the field of applied research, with a focus on nutrient-dense crop production

and implication on household nutrition security.



Betty Nakazzi BSc, holds a bachelor's degree in Agribusiness Management from Makerere University, Uganda, and is currently pursuing a Master of Science in Agriculture and Applied Economics, in the Department of Agribusiness and Natural Resource Economics, Makerere University, Uganda. Her current research is focused on nutrient-dense food and the gender consumption gap among smallholder farmers. She participated in an Exchange program

at the University of Pretoria, South Africa and specialized in Rural Development.