


Article

The Effects of the COVID-19 Pandemic on Food Security in Rural and Urban Settlements in Benin: Do Allotment Gardens Soften the Blow?

Mawuna Donald Houessou^{1,2,3,*} , Annemijn Cassee^{1,†} and Ben G. J. S. Sonneveld^{1,4}

¹ Athena Institute, Vrije Universiteit Amsterdam, De Boelelaan 1085, 1081 HV Amsterdam, The Netherlands; annemijncassee@hotmail.nl (A.C.); b.g.j.s.sonneveld@vu.nl (B.G.J.S.S.)

² Laboratoire d'Etude sur la Pauvreté et la Performance de l'Agriculture (LEPPA), Faculty of Agricultural Sciences, University of Abomey-Calavi, Cotonou 03 BP 2819, Benin

³ Centre d'Actions pour l'Environnement et le Développement Durable, Abomey-Calavi BP 660, Benin

⁴ Amsterdam Centre for World Food Studies, De Boelelaan 1085, 1081 HV Amsterdam, The Netherlands

* Correspondence: donaldhouessou@gmail.com or m.d.houessou@vu.nl; Tel.: +229-96091680

† Equal contribution.

Abstract: A Rapid Food Security Appraisal among 240 rural and urban dwellers in southern Benin was conducted, using univariate and bivariate analyses, to evaluate the effects of the imposed COVID-19 'cordon sanitaire' on food consumption patterns. As this is one of the first empirical studies on the COVID-19 food security nexus, we found that the raging pandemic has affected the food security pillars (availability, accessibility, utilization, and stability) in both rural and urban areas, within and outside the cordon sanitaire. The steepest decline was observed among respondents who live inside the cordon sanitaire, where rural producers and urban inhabitants without access to allotment gardens were hit hard. Increased food prices, disruptions in food logistics, and inability to work due to movement restrictions were most frequently indicated as reasons for the decline. Access to allotment gardens effectively supported households in mitigating the effects of the COVID-19 pandemic on the food crisis.

Keywords: SARS-COV2; COVID-19; cordon sanitaire; food diversity; diet patterns; urban agriculture; food supply; food systems; poverty; food policies; economic recovery



Citation: Houessou, M.D.; Cassee, A.; Sonneveld, B.G.J.S. The Effects of the COVID-19 Pandemic on Food Security in Rural and Urban Settlements in Benin: Do Allotment Gardens Soften the Blow? *Sustainability* **2021**, *13*, 7313. <https://doi.org/10.3390/su13137313>

Academic Editors: Adanella Rossi and Giaime Berti

Received: 9 May 2021
Accepted: 18 June 2021
Published: 30 June 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Since 2020, the COVID-19 pandemic has become an unprecedented public health crisis that has triggered radical measures across the world. Indeed, as of 12 March 2021, the COVID-19 dashboard has registered almost 119 million confirmed cases of COVID-19, including 2.6 million deaths according to the WHO [1]. After its appearance in December 2019, the virus rapidly spread throughout the world and became a political priority in all nations, which have implemented historic contingency plans such as lockdowns, border closures, movement restrictions, air and sea travel cancellation, and shutdown of non-essential economic activities. The enforcement of these stringent measures has inevitably disrupted people's way of life, with significant ramifications for food and nutrition security [2].

Food insecurity has been a growing concern during the pandemic, as food availability and accessibility are seriously affected in various ways [3]. First, the availability and accessibility of food have been the most affected during the COVID-19 pandemic due to problems with transportation, distribution, and delivery [4]. Second, the chain of food availability and accessibility has been gravely disrupted, as the planting of crops has been delayed due to late harvesting caused by there being fewer workers [5], while import restrictions have reduced the availability of production inputs (e.g., seeds, fertilizer). Indeed, an impaired functioning of the food supply chains combined with a lack of social safety nets has put populations at a high risk of food insecurity. For instance, the World Food

Programme (WFP) has warned that COVID-19 could make an additional 130 million people food-insecure due to movement restrictions that disrupt the transport and processing of food [6,7]. The African continent, especially in its urban settlements, towns, and cities, is at high risk because most countries are net food importers [8].

In African countries, many cities and municipalities that were under lockdown in response to COVID-19 experienced increasing food insecurity [9]. Needless to say, it has been the urban poor who have suffered the most. Indeed, while food production, distribution, and retailing are generally considered ‘essential services’, many countries have allowed formal retailers, such as supermarkets and their supply chains, to remain operational, while shutting down the informal food sector on which the urban poor depend [10]. Furthermore, urban inhabitants do not have the natural endowments and easy access to areas of food production that rural areas enjoy. In this study, we investigate whether food insecurity is particularly daunting for the urban poor. Concerning gender-related food insecurity, households headed by women with dependent children who have limited access to assets and (well-paid) jobs are among the most vulnerable. There is a need for urgent action to ensure food security for these vulnerable population groups.

In this study, we hypothesize that allotment gardens in urban and peri-urban areas—urban gardens—could provide an excellent safeguard to soften the blow to food security that results from a lockdown. For instance, in their dissertation on the food systems during the COVID-19 pandemic, van der Ploeg [11] described the politico-economic crisis created by the COVID-19 pandemic and demonstrated the indispensable role that food sovereignty, peasant agriculture, territorial markets, and agroecology may play in the recovery of food security. Although their area coverage was broader than urban areas, they raised the importance of local food production for food security, especially for poor people, and the need for a transition towards sustainable food systems. This importance of local production was further conveyed by Ruszczuk, et al. [12], who contextualized the COVID-19 pandemic’s impacts on food security in two small cities in Bangladesh. They found that smaller cities have greater opportunities for practicing urban agriculture and they were, therefore, more able to improve the food security of city dwellers than bigger cities. Furthermore, the role of urban gardens in improving food security under COVID-19 lockdowns in cities in Africa and Asia was highlighted in a recent review that analyzed the contribution that a city region food systems approach makes to regional sustainability and resilience for existing and future shocks [13]; hence, the call to organize and implement urban gardens seems to be justified, but requires empirical evidence to inform and convince decision-makers to intervene.

The Republic of Benin is a case in point. This West African country is currently facing challenges in combating the COVID-19 pandemic. From 16 March 2020 to 12 March 2021, there have been 6501 confirmed cases of COVID-19 in Benin and 81 deaths [1]. The country is facing a considerable burden on the health system, considering the already limited capacity before the pandemic. After the country identified its first case, the government took a series of barrier measures of progressive intensity, one of which was the establishment of a sanitary cordon or ‘cordon sanitaire’ to isolate the high-risk zones from other regions of the country. Specifically, a sanitary cordon is the restriction of movement of people into or out of a defined geographic area, such as a community, region, or country [14]. It is generally created around an area experiencing an epidemic or an outbreak of infectious disease or along a border between nations. Once established, people from the affected urban areas are no longer allowed to leave or enter the cordon; thus, the disease was circumscribed to the sanitary cordon, comprising 15 municipalities. Only the transport and distribution of food products were allowed; however, aspects such as increased transfer costs and difficulties in access to factors of production were experienced by the population, which in turn affected food prices and urban food security. Additionally, the country is heavily dependent on food imports and has a weak economy with limited opportunities for strong social safety measures [15], again exposing the poor urban dwellers to food insecurity. Moreover, price increases and loss of income forced vulnerable groups to abstain

from expensive fresh and healthy foods and succumb to nutrient-poor and calorie-rich foods, with adverse consequences for their health and development [16–18].

The aim of this study is two-fold. First, we analyze the impact of the COVID-19-related lockdown effects on the food security of urban and rural populations. Second, we elucidate the role of allotment gardens on food security in urban areas. In this study, the focus is especially on the urban poor who live in slums or any poor-identified zone in the peri-urban areas. Our approach is as follows. First, we conducted a Rapid Food Security Appraisal (RFSA) among urban and rural inhabitants within and outside a cordon sanitaire and among urban dwellers with and without access to an allotment garden. Participants were asked about their food consumption patterns before and after the implementation of the cordon sanitaire, and to discuss the reasons for food-insecure situations. Furthermore, in a transdisciplinary setting, the research consults experts and stakeholders in food systems and policy to make recommendations to guide the implementation of aid packages and social protection measures.

The paper is structured into five sections. Section 2 presents the study areas, the sampling scheme, the survey implementation and the data analysis process. Section 3 presents the sociodemographic and economic information of the respondents, the situation of the lockdown and aid packages, the effects of the COVID-19 pandemic and related measures on food security, the coping strategies adopted by respondents, and the role of allotment gardens in softening the blow to food security, as well as a summary of a policy dialogue that validates and discusses the results. Section 4 discusses the main findings of the research and compares with similar academic literature. Section 5 concludes.

2. Materials and Methods

2.1. Study Areas

The research covered four municipalities of Southern Benin: Allada, Cotonou, Zogbodomey and Dangbo. Allada and Cotonou were the rural and urban areas within the cordon sanitaire while Zogbodomey and Dangbo were the rural and urban areas outside the cordon sanitaire. Figure 1 showed the municipalities surveyed as well as the boundaries of the cordon sanitaire.

2.2. Sampling Scheme

Our sampling of the respondents used a three-pronged approach. First, we stratified along the 15 and 29 municipalities within and outside the cordon sanitaire, and for urban and rural areas. Next, we randomly selected an urban area and a rural area at each site. Second, urban areas were stratified among urban garden participants and non-participants living in slums or peri-urban areas. Third, as we did not have lists of our study populations (urban gardeners, urban non-gardeners, and rural farmers), we chose the spinning bottle-transect technique to select respondents randomly. The technique aimed to make a random selection of respondents while avoiding bias in center-specific influences. The technique also ensured that sample selection was independently and identically distributed.

The technique started by spinning a bottle to randomly choose a line or transect for the survey. The technique was repeated each time to identify the next respondent among potential participants. The approach generated six strata as follows: (i) urban dwellers with access to an urban garden, within the cordon sanitaire; (ii) urban dwellers with access to an urban garden, outside the cordon sanitaire; (iii) urban dwellers without access to an urban garden, within the cordon sanitaire; (iv) urban dwellers without access to an urban garden, outside the cordon sanitaire; (v) rural farmers, within the cordon sanitaire; and (vi) rural farmers, outside the cordon sanitaire. The approach targeted 40 participants for each stratum, hence, there was a sample size of 240 respondents. Furthermore, the approach used a list of four inclusion criteria to select the urban dwellers without access to an urban garden and who lived in poor urban zones. The criteria were that respondents (i) did not have high-paid employment; (ii) had no access to the formal health systems; (iii) had no access to credit; and (iv) had no access to farmland.

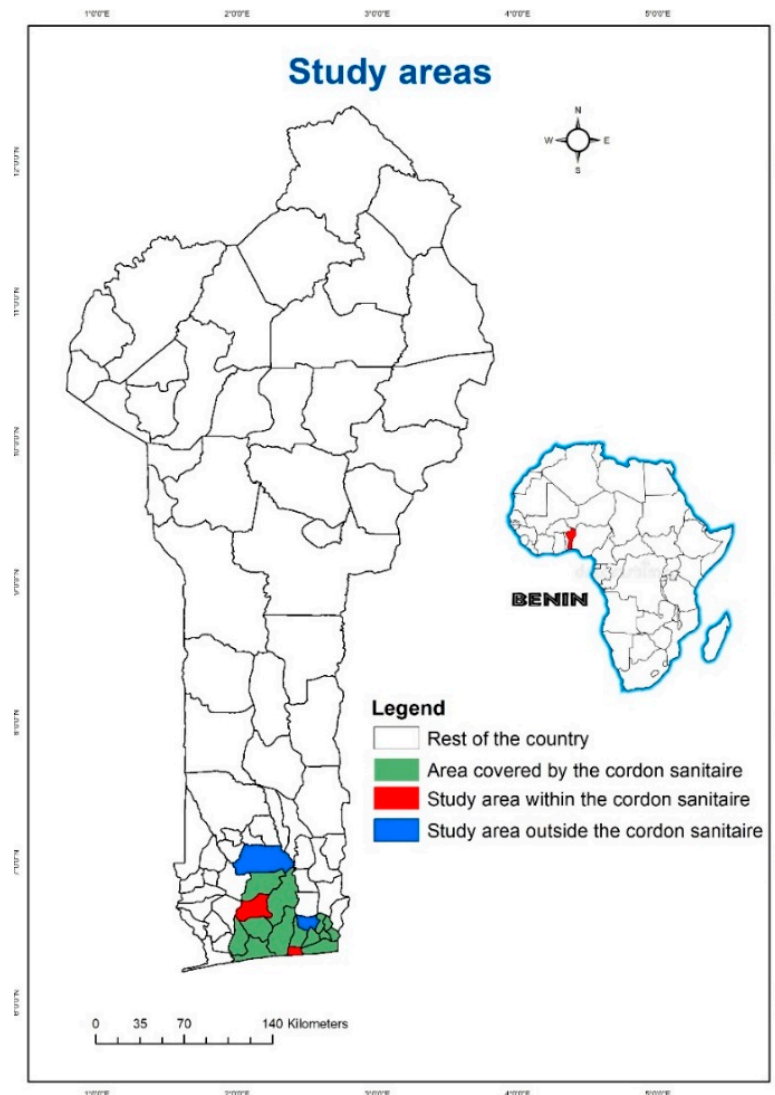


Figure 1. Boundaries of the cordon sanitaire and research area.

2.3. Survey Implementation

A survey was designed and covered five sections: (i) sociodemographic and economic characteristics; (ii) lockdown conditions; (iii) household food security; (iv) coping strategies and solutions; and (v) role of allotment gardens. The survey was accompanied by instructions to introduce the purpose of the survey to enumerators and guide them during field interviews and data entry. Six enumerators specialized in agronomy were recruited and trained on the questionnaire and how to approach and gain confidence of respondents in the field. Each enumerator was assigned a stratum (40 respondents) to ensure they focus on their target groups. The survey was conducted from September to October 2020 in a series of 12 consecutive days. As data were urgently needed for policymaking, the speed of data compilation was important and at the very core of this research. The questionnaire was, therefore, digital, concise, and focused on profiling target groups and exposing underlying mechanisms that affected food security under the COVID-19 crisis, as well as taking stock of solutions that softened the full-blown impact on food security in the short and long term.

2.4. Rapid Food Security Appraisal

Through a Rapid Food Security Appraisal (RFSA), respondents were asked about their food security situation (number of meals per day for the last 30 days) and food diversity patterns (eaten food groups recalled for the last 24 h). Indeed, using a four-week

(30 days) period, we asked three items related to the number of daily eating occasions as follows: (a) number of times any household member did not have a single meal during the day; (b) number of times any household member had only one meal during the day; (c) number of times household members had two or more meals during the day. The responses were dichotomized and respondents who experienced items 'a' and 'b' were assigned '1', else '0'; while the response 'c' was negated and respondents who experienced such item were assigned '0', else '1'. Then, we calculated a sum of the item scores, ranging from zero to three. Respondents who received a score of zero were categorized as food secure while those who received a score of one were categorized as moderately food insecure. Respondents who received a score of two or three were categorized as severely food insecure.

2.5. Data Analysis

Data management and analysis were performed using Excel and StataSE 16. Categorical answers were harmonized in standard formats and presented as frequencies, while numerical answers were processed and presented as mean and quartiles. Chi-square tests were performed to determine some statistically significant differences between frequencies.

The research took a transdisciplinary approach by assuring full involvement of responsible authorities from the ministries of agriculture and environment as well as representatives from local authorities, the private sector, the civil society, and farmers associations. The discussions were made through a policy dialogue that gathered 36 participants and were synthesized in the results section with explicit action points.

3. Results

3.1. Sociodemographic and Economic Characteristics

Tables 1 and A1, Tables A2–A7 in the Appendix A show an overview of the main sociodemographic and economic characteristics of the respondents who were almost equally distributed by sex. Slightly less than half of the respondents had no formal education, among whom 59% were women. The proportion of illiteracy was the highest among urban non-gardeners, specifically 78% of urban non-gardeners outside the cordon sanitaire and 65% of those inside the cordon. In comparison, urban gardeners within the cordon were the most schooled and only 18% reported that they were non-literate. The average age of the sample was 39 years; the lowest average age was among urban non-gardeners within the cordon (27.85 years), while the highest average age was among the rural producers within the cordon (47.55 years). Accordingly, most urban non-gardeners within the cordon were single and living in small households (four members) as opposed to rural producers within the cordon (with 11 members), while the average household size among all groups was around seven members, and three out of four respondents were married.

Less than half of rural producers and urban gardeners had a second job, while 74% of urban non-gardeners had a job; 8% of urban non-gardeners lost their employment due to lockdown and movement restrictions. Their jobs were mainly as retailers and service providers (e.g., cleaner, carpenter, barber) on which, on average, urban non-gardeners spent six days a week, while rural producers and urban gardeners spent four days. Next, more than half of the respondents indicated that another household member, usually the spouse, contributed to the household expenses, though some lost their financial capacity due to the COVID-19 crisis. Regarding housing, more than half of the respondents lived with friends or families, which was more pronounced (72%) outside the cordon sanitaire. Within the cordon, respondents either rented a house (41%), lived with friends/families (33%), or owned a house (23%).

Table 1. Sociodemographic and economic characteristics.

| Variable | Share (%) | Variable | Share (%) |
|---------------------|-----------|---|-----------|
| Sex | | Marital status | |
| Women | 45.42 | Single | 13.75 |
| Men | 54.58 | Married | 77.50 |
| Education | | Divorced | 2.08 |
| No schooling | 48.75 | Widowed | 6.67 |
| Alphabetized | 4.17 | Another member financially contributing | |
| Vocational training | 2.50 | Yes | 52.50 |
| Primary | 19.58 | No, due to COVID-19 he or she is currently not contributing | 3.33 |
| Secondary | 22.92 | No | 44.17 |
| University | 2.08 | Housing | |
| Age | | Live with friends/family | 52.50 |
| Mean | 38.90 | Own a house | 19.17 |
| Std. dev. | 11.52 | Rent a house | 21.67 |
| Min | 19 | Others (garden, church, heritage) | 6.67 |
| Max | 85 | | |
| Household size | | | |
| Mean | 6.61 | | |
| Std. dev. | 3.79 | | |
| Min | 1 | | |
| Max | 25 | | |

3.2. Lockdown (Cordon Sanitaire) Restrictions and Aid Packages

Tables 2 and A8–A10 present the situation of the lockdown (cordon sanitaire) and the aid packages provided to the respondents. During the movement restrictions, only a few respondents within the cordon sanitaire (3%) were able to go outside the cordon for work or to buy food, while 27% of those outside the cordon could enter, without the authorities' approval. Within the cordon sanitaire concentrated in the most densely urban areas, more than half of respondents were able to move around for activities. In general, the surveillance of the cordon sanitaire was strict to prevent unnecessary and unauthorized movements; most respondents fully complied with the restrictions.

To 'build back better', some aid packages were provided to the population and to agricultural producers by the government and non-state actors (NGOs, technical cooperation) to support their activities and reduce the impact of the COVID-19-related measures. Only 1% and 2% of the respondents—all living within the cordon—benefited from income support from the government and inputs (seeds, fertilizer, water pump) from non-state actors, respectively. The beneficiaries indicated that the aid packages had a moderate or major impact on their livelihoods.

3.3. Effects of the COVID-19 Pandemic on Food Security

Figure 2 depicts the food security situation before and after the COVID-19-related measures and shows that all respondents experienced a decline in their food security. Urban gardeners within the cordon (78%) and urban non-gardeners outside the cordon (62.5%) were most food secure before the pandemic. Interestingly, after the COVID-19-related measures, while urban gardeners within the cordon experienced a slight decline (58%) in their food security, urban non-gardeners outside the cordon experienced a major decline, leaving only 7.5% as food secure. It is of note that food security among urban gardeners outside the cordon sanitaire declined more sharply (32.5% to 5%) compared to urban gardeners within the cordon.

In terms of food insecurity, urban non-gardeners within the cordon were severely food insecure before (62.5%) and after (80%) the COVID-19 crisis. The second most affected group during the COVID-19 pandemic was the rural producers within the cordon sanitaire,

where 40% were severely food insecure, whereas, before COVID-19, 5% were severely food insecure.

Table 2. Cordon sanitaire's restrictions and aid packages.

| Items | Groups within the Cordon | Groups outside the Cordon | <i>p</i> -Value |
|--|--------------------------|---------------------------|-----------------|
| Were you able to enter or move outside the cordon sanitaire for buying food or for work? | | | |
| Yes, with authorities' approval | 0 | 0 | |
| Yes, without authorities' approval | 4 | 32 | |
| No | 116 | 88 | 0.000 |
| How strict was the surveillance of the cordon sanitaire? | | | |
| Not at all | 1 | 1 | |
| Minor | 1 | 6 | |
| Moderate | 40 | 33 | |
| Major | 78 | 80 | 0.234 |
| To what extent did you comply with the cordon sanitaire restrictions? | | | |
| I did not comply | 1 | 5 | |
| I partially complied | 37 | 28 | |
| I fully complied | 82 | 87 | 0.131 |
| Did you benefit from an aid package provided by the government? | | | |
| Yes | 2 | 0 | |
| No | 118 | 120 | 0.156 |
| Which aid package did you receive? (Income support, Debt or contract relief, Seeds, Fertilizer, Credit) | | | |
| Income support | 2 | 0 | 0.156 |
| Did you benefit from any other aid package from NGOs, technical cooperation, individuals, etc.? | | | |
| Yes | 4 | 0 | |
| No | 116 | 120 | 0.044 |
| Which aid package did you benefit from? (Income support, Debt or contract relief, Seeds, Fertilizer, Credit) | | | |
| Seeds | 1 | 0 | |
| Fertilizer | 2 | 0 | |
| Others (gel, mask, water pump, food) | 3 | 0 | |

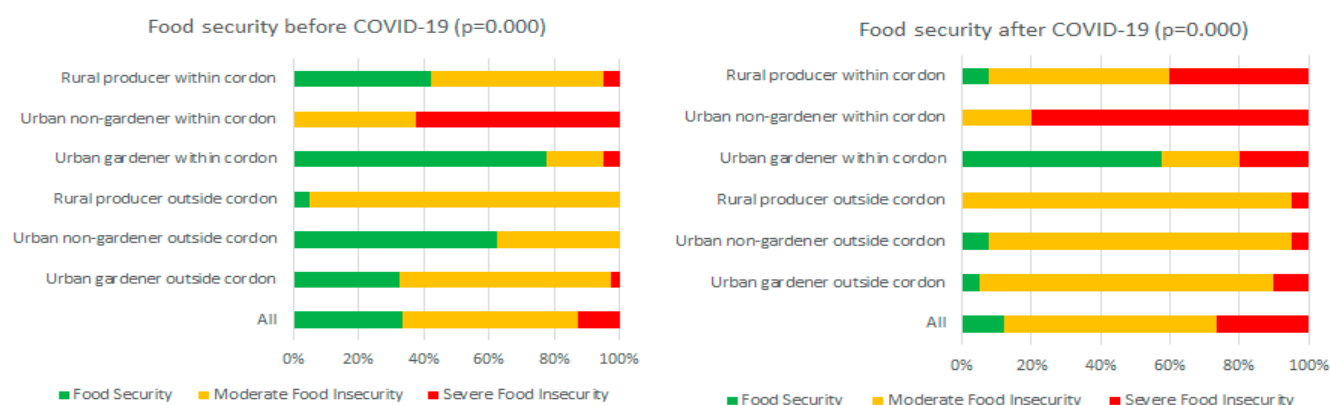


Figure 2. Food security situation of the respondents before and after the COVID-19 crisis.

Figure 3 and Tables A11–A14 show the declines in the food availability, accessibility, diversity and safety (proxies of utilization) during the COVID-19-related measures. The decline of all pillars over time illustrated the food instability. Respondents also indicated the reasons for the observed decline. A moderate to major decline in food availability and diversity was observed for all respondents, with higher declines for those within the cordon sanitaire (rural producers, urban gardeners); most urban non-gardeners within the cordon experienced no or a minor decline, which could be explained by the already low prevailing food availability in that group (Figure 4). The main reasons that justified the decline in food availability and diversity were the increase in food prices, the difficulties for food coming from outside the region to enter, and the inability to work. Of particular

note is that crop failure due to drought or flood was indicated only by urban gardeners outside the cordon as a reason for the decline in food availability and diversity.

A similar trend was found for the declining food accessibility and food safety, for slightly different reasons. For food accessibility, the main reason was the increase in food prices, and, to a lesser extent, the inability to work. For food safety and quality, three main reasons were: the increase in food prices, the difficulty of bringing in food from outside the region, and the long storage of food. The difficulty in bringing in food from outside the region increased the food prices and made the poor dwellers look for low quality perishable and foods that are prone to perish.

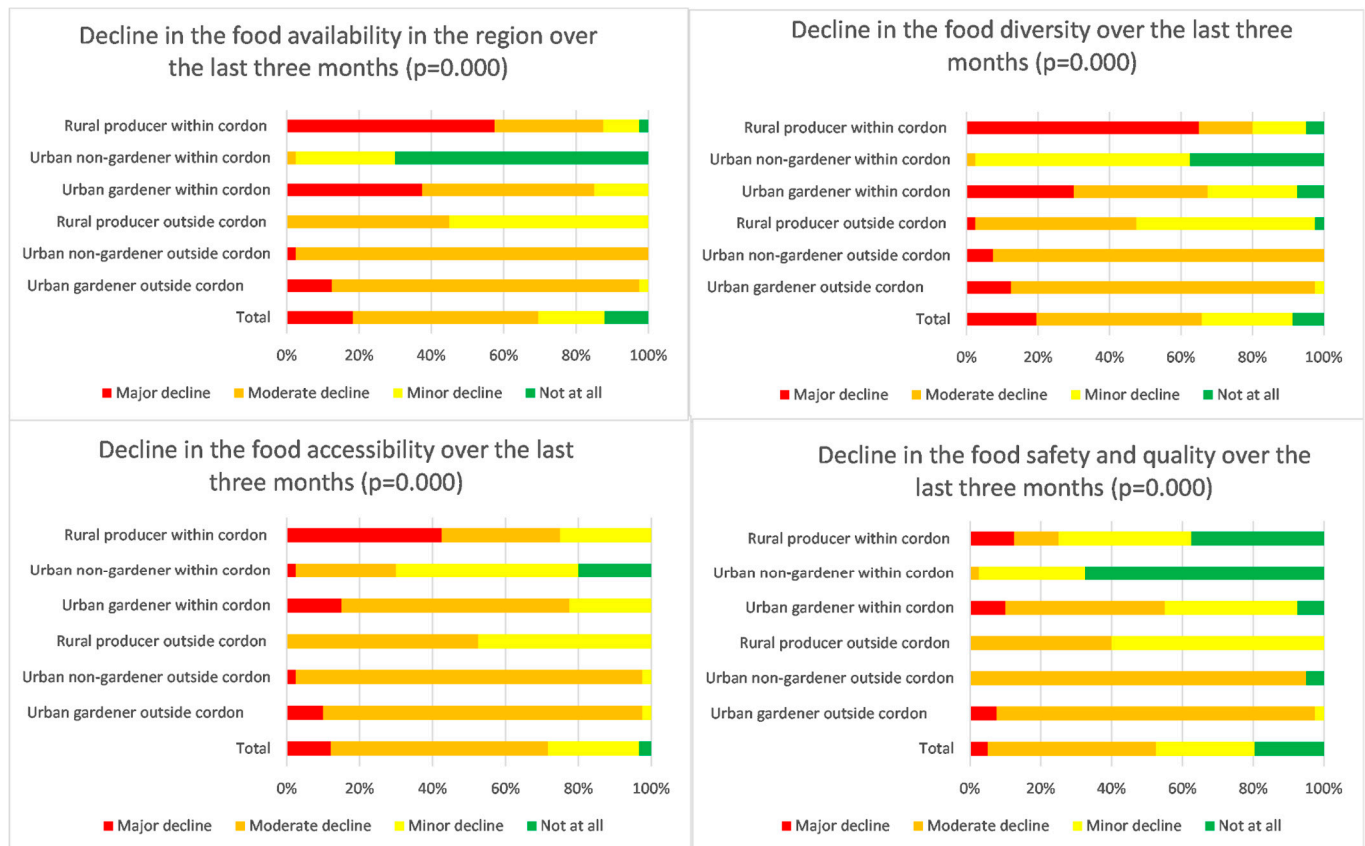


Figure 3. Decline in the food availability, diversity, accessibility, and safety during the COVID-19-related measures.

3.4. Coping Strategies to Mitigate the Effects of COVID-19 Pandemic on Food Security

Figure 4 and Tables A15 and A16 presented the impact of the COVID-19 crisis on the ability to work and to obtain food, the existence of food stocks during the cordon sanitaire, and the coping strategies to mitigate the effects of the COVID-19 crisis, respectively. The coping strategies covered skipping meals, limiting portion sizes, eating less preferred foods, borrowing food or money to buy food, obtaining help from networks, practicing additional jobs, and violating movement restrictions. In general, the respondents indicated that the COVID-19 crisis had a moderate to major impact on their ability to work and to obtain food for their household. The respondents within the cordon sanitaire were more affected than those outside, with rural producers within the cordon being the most affected group. Regarding the existence of food stocks, the respondents within the cordon sanitaire had more during the restrictions than those outside. The food stocks lasted for less than a month or one to two months.

In addition to the above-mentioned coping strategies, respondents used other means to mitigate negative effects of COVID-19-related restrictions. Skipping meals and limiting portion sizes were used most. Eating less preferred food, borrowing food or money to buy food, and obtaining help from social networks were practiced to a lesser extent. Whatever strategy was selected, the respondents indicated that they had a moderate to major impact on their means to protect their households.

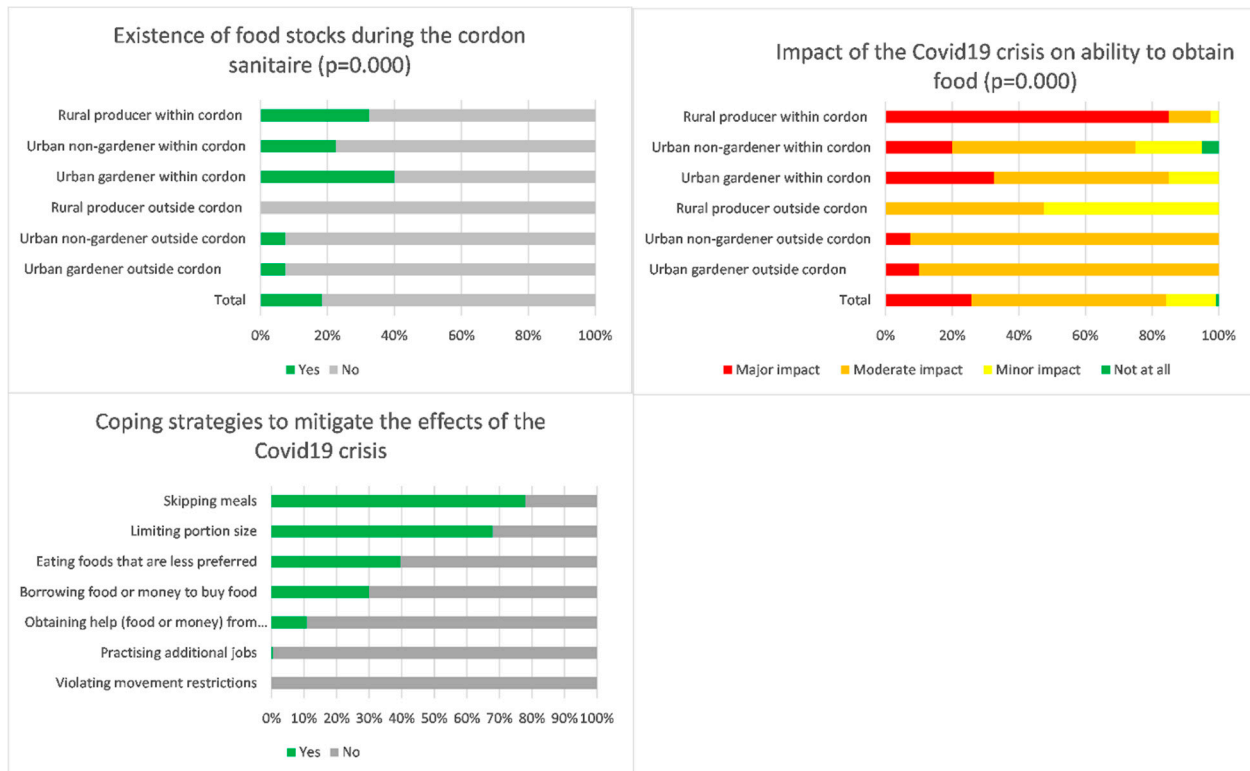


Figure 4. Ability to work, food stocks, and coping strategies during the COVID-19 crisis.

3.5. Role of Allotment Gardens on Softening the Blow to Food Security

Figure 5 and Tables A17 and A18 present the access of rural producers and urban gardeners to their farms during the movement restrictions and the contribution to their food security. In general, the respondents regularly or occasionally had access to their farms during the cordon sanitaire period. Except for rural producers outside the cordon who visited their farms on average three days a week, the other groups had five or six days of visits a week. Indeed, rural producers outside the cordon most likely divided their time between job and farm, while those inside the cordon most likely replaced job loss and the inaccessibility of alternative employment with an increased frequency of visits to the farm. Although they were difficult to follow, the respondents were generally able to maintain the social distancing rules during their farm visits. On the question regarding assessing the importance of the allotment gardens or farms to their food security, most urban gardeners within and outside the cordon sanitaire found the gardens' contribution important or very important. Rural producers were divergent: those within the cordon found the farms' contribution very important or important, while most of those outside the cordon attributed no or moderate importance to their farms.

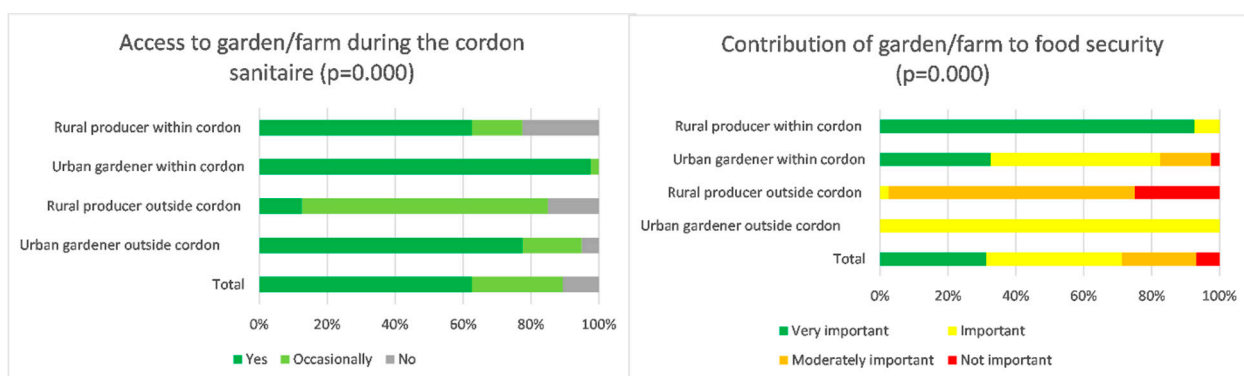


Figure 5. Access to garden/farm during the cordon sanitaire and contribution to food security.

3.6. Policy Dialogue with Stakeholders

The policy dialogue discussed the impact of the COVID-19 pandemic on food systems in general and vegetable production in particular, the consequences on food prices and local consumption, the mitigation measures taken by the government and civil society, and the resilience measures to be sustained by stakeholders.

Widespread hike in food prices. Despite the goodwill of local and national authorities, movement restrictions during the cordon sanitaire did not facilitate a consistent supply of agricultural products. This created distortions in the food supply chain, particularly for inputs (seeds, fertilizers, phytosanitary products) and agricultural products, which exerted a demand pressure on food, resulting in a general increase in the price of agricultural inputs and food.

A renewed interest in local inputs supply. The supply of imported inputs on the market was limited despite the efforts of producer organizations. This situation was even more pronounced in areas outside the cordon sanitaire, since the cordon was concentrated on the major urban centers and thus included most suppliers of inputs, seeds, and phytosanitary products. As a result, producers turned to local seed supply, which was poorly regulated; few seed producers had certified their seeds.

An improved agricultural productivity. With a limited supply of inputs, producers reduced the area planted. This enabled them to take better care and control their production compared to the past when they planted large areas but could not maintain them well. As a result, yields were improved, with subsequent increases in profits.

Difficult food distribution. Food distribution experienced difficulties due to the cordon sanitaire, which limited the transport of products. As a result, many supply contracts for producers were terminated. As with inputs, producers outside the cordon also had more difficulties in transporting their products into the areas bound by the cordon sanitaire. In addition, transport difficulties affected the marketing of some vegetables that expire quickly, such as tomatoes and eggplants (aubergines). Movement restrictions had a positive effect on collective buying and selling, as it was difficult for individual farmers to source inputs and sell outside the cordon sanitaire.

Some economic recovery measures taken by the government. To meet the challenges posed by the COVID-19 crisis, the stakeholders took various measures to strengthen the food systems. At the government level, important economic recovery measures were taken and financed, such as the establishment of guarantee funds through banks and decentralized financial structures to fund agricultural initiatives, and the provision of inputs (seeds, fertilizers, equipment) to producers' organizations to boost agricultural production. These measures brought relief to the beneficiary producers, even if efforts to reach remote, poor, and hidden producers are still needed.

An increase in market share for local products. The COVID-19 crisis demonstrated the importance of building resilient local food systems. Indeed, the implementation of the cordon sanitaire and movement restrictions led to 'panic buying', focused on local

products. Coupled with the closure of land and air borders, the decline in food imports created a renewed interest among local consumers in local products. This increased the market share of local products and rewarded the efforts of producers.

Actions are still needed to improve the resilience of food systems. Discussions showed that the COVID-19 crisis weakened the already vulnerable food systems. While recovery measures were taken to strengthen these, the stakeholders indicated that more efforts were needed to reach remote and poor producers, who were not quickly detected by support mechanisms from state institutions and civil society. For example, although guarantee funds were placed in financial institutions, producers still struggled to organize themselves to develop reliable, viable, and financeable applications. The stakeholders recommended various actions to strengthen local production and the resilience of food systems as follows:

- Strengthen the technical and organizational capacities of producers to improve their resilience to external shocks and facilitate their access to business opportunities;
- Encourage the grouping of food system stakeholders for greater visibility, consultation, and synergy;
- Facilitate, regulate, and strengthen the local production of local and improved seeds and fertilizers to address shortages created by external shocks;
- Raise consumer awareness of local products by organizing fairs, exhibitions, and open days.

4. Discussion

The research offered some important insights into the impact of the lockdown on food security in urban and rural areas that were located within and outside the cordon sanitaire. The study also tested the hypothesis that urban gardeners were better off in COVID-19-imposed lockdown periods than urban citizens without a garden.

We found that rural producers, urban gardeners, and urban non-gardeners, both within and outside the cordon sanitaire, experienced a decline in their food security. This result confirms that the COVID-19 pandemic has left no one untouched during the implementation of contingency measures to control its spread across the population. For example, Erinle, et al. [19], in their work on the impacts of COVID-19 on agriculture and food security, showed how COVID-19 exacerbated food insecurity in low- and middle-income countries. They showed that the movement restrictions destabilized food supply chains (low production, high demand, high food prices), which affected the availability and accessibility of food and led to a food crisis for many individuals and households.

However, the effects of the COVID-19 crisis on the food security of the sampled population groups were heterogeneous. Indeed, all respondents within the cordon sanitaire were more affected than those outside, probably because of the strict surveillance of the cordon sanitaire that restricted labor mobility and food delivery. The respondents generally indicated the following three main reasons for the decline in food availability, accessibility, diversity, and safety: the increase in food prices, the difficulties for food from outside the region to enter, and the inability to work. Thus, food coming from outside the cordon could scarcely enter, and vice versa. These disruptions were more severe within the cordon where densely populated urban centers are highly dependent on food from outside the cordon. The previous explanation was corroborated by the policy dialogue that indicated that the distortions in the food supply chains exerted a demand pressure on food, resulting in a general increase in agricultural and food prices.

Next, urban gardeners were better off during the cordon sanitaire compared to urban non-gardeners and rural producers, probably for two reasons. The first is that urban gardening is a profitable business that improves the living conditions of those maintaining the gardens. In a forthcoming publication, Houessou, et al. [20] report on a randomized controlled trial (RCT) conducted over two years, which found that treatment participants not only significantly improved their food consumption patterns but also increased their income, compared to the control participants. Second, despite the careful selection of similar

groups, we found that urban gardeners were slightly more educated, and that their spouse more often contributed financially to the household compared to urban non-gardeners. Our conclusion regarding the more resilient situation of the urban gardeners during the lockdown is also corroborated by the following finding: before the COVID-19 pandemic, urban gardeners within the cordon (78%) and urban non-gardeners outside the cordon (62.5%) were most food secure, whereas, after the COVID-19 situation, urban gardeners within the cordon experienced a slight decline (58% food secure) in their food security and urban non-gardeners outside the cordon experienced a major decline (7.5% food secure), probably because they lost their jobs due to COVID-19. Furthermore, the conclusion is supported by Blay-Palmer, Santini, Halliday, Malec, Carey, Keller, Ni, Taguchi and van Veenhuizen [13] who recently found, in their review that analyzed the contribution that a city region food systems approach makes to regional sustainability and resilience for existing and future shocks, that urban gardens played a major role in improving the food security under COVID-19 lockdowns in cities in Africa and Asia.

Furthermore, the research shows that during crises, the ability of vulnerable groups to work and obtain food is reduced and triggers the use of various strategies to cope with the challenges to their food security. Skipping meals and limiting food portions may be considered as coping mechanisms for the short term but are not sustainable strategies to address food shortages in the long term. Relying on social networks may be added as a sustainable measure adopted to soften the blow. In their study on the implications of COVID-19 on household incomes and food security in Kenya and Uganda, Kansime, Tambo, Mugambi, Bundi, Kara and Owuor [2] also found that farmers mainly changed their diet involuntarily, relied on savings, and received help from relatives/friends to cope with problems with food security. Moreover, having access to their farms—rural and urban—may be crucial in helping them reduce their food insecurity. Indeed, among rural producers and urban gardeners, both within and outside the cordon, only rural producers outside the cordon visited their farms less and were found to attribute no or moderate importance to their farms. The policy dialogue further explained that the limited inputs supply reduced the area planted by producers—urban and rural—but enabled them to take better and regular care of their production. As a result, the yields were improved with subsequent increases in the producers' profits; the farms' contribution to food security also justified a renewed interest in local produce. Indeed, the policy dialogue indicated that as food imports were disrupted, there was a renewed consumer interest in local produce, which increased the market share of local products.

Moreover, the government and civil society actors took some measures to support the rural and urban producers to build back better. The economic recovery measures taken by the government, and corroborated by the policy dialogue, included, among others, the provision of inputs (seeds, fertilizers, equipment) to producers' organizations and the establishment of guarantee funds through financial institutions to significantly finance and boost the agricultural sector. However, only 2%—all within the cordon sanitaire—of our respondents benefited from the aid packages and indicated a moderate to major impact on their livelihoods. Such a result shows that remote, hidden, and poor producers are not easily detected by support mechanisms. Hence, policy interventions need to better locate the vulnerable groups, especially when there is field evidence that such interventions can improve their living conditions. For instance, Egger, et al. [21], in their working paper on Africa's lockdown dilemma, found that social protection measures and welfare policies may not only support the livelihoods of the poorest populations, but can also reduce the risks of conflicts. Kansime, Tambo, Mugambi, Bundi, Kara and Owuor [2] also found in Kenya and Uganda that implementing structural changes in social security schemes that consider packages—such as borrowing capacity—that are responsive to members' needs during crises such as the COVID-19 pandemic would give citizens opportunities to restore their livelihoods.

This research has a flaw: the survey targeted a small sample size within each stratum. Ideally, a sampling frame was necessary to compute the sample size but, in its absence,

the research tried to reach an acceptable size for statistical comparisons. Therefore, the findings cannot be generalized to the whole populations of the research strata. However, the research provides some rapid and interesting insights that may trigger bigger studies on the nexus COVID-19-related food security recovery measures and inform future policy interventions in the post-COVID-19 future.

5. Conclusions

Although a growing body of literature has predicted a global decline in food security due to spikes in food prices and disruptive food chains, this study is among the first that provides empirical evidence on the effects of the COVID-19-related policy measures on the food security of vulnerable populations. Overall, there was a global decline in the food consumption levels of urban gardeners, urban non-gardeners, and rural producers. However, we found evidence that urban gardeners are better off in lockdown periods compared to poor urban citizens without a garden, thus confirming our hypothesis and suggesting the development of allotment gardens as an effective social safety net against food security challenges brought about by the COVID-19 crisis. Such a conclusion opens up avenues for operating a transition to sustainable food systems that promote local food supply chains and provide urban dwellers with fresh and healthy food in cities. Furthermore, we recommend that government and non-government aid measures, now and in the future, improve the allocation to the poor whose already dire situation is seriously affected by the COVID-19 pandemic and who will benefit most from direct assistance.

Author Contributions: Conceptualization, M.D.H. and B.G.J.S.S.; methodology, M.D.H., A.C. and B.G.J.S.S.; software, M.D.H. and A.C.; validation, M.D.H. and B.G.J.S.S.; formal analysis, M.D.H. and A.C.; investigation, M.D.H.; data curation, M.D.H. and A.C.; writing—original draft preparation, M.D.H. and A.C.; writing—review and editing, B.G.J.S.S.; supervision, M.D.H. and B.G.J.S.S.; project administration, M.D.H. and B.G.J.S.S.; funding acquisition, B.G.J.S.S. and M.D.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Amsterdam Centre for World Food Studies and Nuffic: R/003248.01.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Marital status among all respondents.

| Groups | Single | Married | Widowed | Divorced |
|---|--------|---------|---------|----------|
| Rural producer within cordon sanitaire | 1 | 32 | 6 | 1 |
| Urban non-gardener within cordon sanitaire | 26 | 13 | 1 | 0 |
| Urban gardener within cordon sanitaire | 5 | 28 | 3 | 4 |
| Rural producer outside cordon sanitaire | 0 | 40 | 0 | 0 |
| Urban non-gardener outside cordon sanitaire | 0 | 38 | 2 | 0 |
| Urban gardener outside cordon sanitaire | 1 | 35 | 4 | 0 |

Table A2. Average household size.

| Groups | Mean | Median |
|---|-------|--------|
| Rural producer within cordon sanitaire | 10.95 | 9 |
| Urban non-gardener within cordon sanitaire | 3.8 | 3 |
| Urban gardener within cordon sanitaire | 4.75 | 5 |
| Rural producer outside cordon sanitaire | 7.7 | 7 |
| Urban non-gardener outside cordon sanitaire | 6.1 | 6 |
| Urban gardener outside cordon sanitaire | 6.3 | 6.5 |

Table A3. Existence of financial contributor per group and second (side) job.

| Groups | No | Yes | Due to COVID-19, Not Anymore |
|---|----|-----|------------------------------|
| Financial contributor | | | |
| Rural producer within cordon sanitaire | 20 | 20 | 0 |
| Urban non-gardener within cordon sanitaire | 18 | 15 | 7 |
| Urban gardener within cordon sanitaire | 11 | 28 | 1 |
| Rural producer outside cordon sanitaire | 36 | 4 | 0 |
| Urban non-gardener outside cordon sanitaire | 6 | 34 | 0 |
| Urban gardener outside cordon sanitaire | 15 | 25 | 0 |
| Second (side) job | | | |
| Rural producer within cordon sanitaire | 27 | 13 | 0 |
| Urban non-gardener within cordon sanitaire | 10 | 25 | 5 |
| Urban gardener within cordon sanitaire | 17 | 23 | 0 |
| Rural producer outside cordon sanitaire | 21 | 19 | 0 |
| Urban non-gardener outside cordon sanitaire | 5 | 34 | 1 |
| Urban gardener outside cordon sanitaire | 21 | 19 | 0 |

Table A4. Relationship with household member that is financially contributing to your household.

| Relationship | Frequency | Percent |
|-------------------------|-----------|---------|
| Spouse | 110 | 83% |
| Brother/sister | 13 | 9.7% |
| Children | 5 | 3.7% |
| Parents (mother, uncle) | 4 | 3.0% |
| Friend | 2 | 1.5% |
| Total | 134 | 100% |

Table A5. Types of second (side) job.

| Type of Jobs | Frequency | Percent |
|--|-----------|---------|
| Service provider (cleaning, carpenter, barber) | 47 | 34% |
| Retailer | 65 | 47% |
| Driver (bike, car) | 13 | 9% |
| Animal breeder | 11 | 8% |
| Teacher | 3 | 2% |
| Total | 139 | 100% |

Table A6. Weekly time distribution for second (side) job.

| Variable | Obs. | Mean | Std. Dev. | Min. | Max. |
|---|------|----------|-----------|------|------|
| Time allocation for rural producer and urban gardener | 74 | 3.662162 | 1.624108 | 1 | 7 |
| Time allocation for urban non-gardener | 65 | 5.907692 | 1.271356 | 0 | 7 |

Table A7. Housing among groups.

| Groups | Rent a House | Own a House | House of Friends/Family | Others |
|---|--------------|-------------|-------------------------|--------|
| Rural producer within cordon sanitaire | 0 | 18 | 22 | 0 |
| Urban non-gardener within cordon sanitaire | 30 | 1 | 9 | 0 |
| Urban gardener within cordon sanitaire | 19 | 8 | 8 | 5 |
| Rural producer outside cordon sanitaire | 1 | 9 | 30 | 0 |
| Urban non-gardener outside cordon sanitaire | 2 | 5 | 28 | 5 |
| Urban gardener outside cordon sanitaire | 0 | 5 | 28 | 7 |

Table A8. Movement within the cordon sanitaire.

| Were You Able to Travel within the Cordon or Move Around for Buying Food or Work | | |
|--|-----|--------|
| Yes | 63 | 52.50 |
| No | 57 | 47.50 |
| Total | 120 | 100.00 |

Table A9. Government aid packages: impact of income support.

| To Which Extent Did the Income Support Help? | | |
|--|---|------|
| Not at all | 0 | 0% |
| Minor impact | 0 | 0% |
| Moderate impact | 1 | 50% |
| Major impact | 1 | 50% |
| Total | 2 | 100% |

Table A10. NGO's aid packages: impact of seeds, fertilizer, and others.

| To What Extent Did the Seeds' Support Help? | | |
|---|---|------|
| Not at all | 0 | 0% |
| Minor impact | 0 | 0% |
| Moderate impact | 1 | 100% |
| Major impact | 0 | 0% |
| Total | 1 | 100% |
| To what extent did the fertilizers' support help? | | |
| Not at all | 0 | 0% |
| Minor impact | 0 | 0% |
| Moderate impact | 2 | 100% |
| Major impact | 0 | 0% |
| Total | 2 | 100% |
| To what extent did other packages' support help? | | |
| Not at all | 0 | 0% |
| Minor impact | 0 | 0% |
| Moderate impact | 2 | 67% |
| Major impact | 1 | 33% |
| Total | 3 | 100% |

Table A11. Reasons for the decline in the food availability in the region over the last three months.

| Reasons | Yes | | No | |
|---|-----------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| Due to the government restrictions, people were/are unable to work on land or in shops and stalls | 114 | 54.03 | 97 | 45.97 |
| Too many persons were/are affected with COVID-19 and therefore unable to produce | 1 | 0.47 | 210 | 99.53 |
| Members of the household were/are unwell and therefore in self-quarantine | 0 | 0.00 | 211 | 100.00 |
| Members of our household were concerned about leaving the house due to the pandemic | 17 | 8.06 | 194 | 91.94 |
| Due to the cordon sanitaire in our area, food outside our region could not or cannot enter | 134 | 63.51 | 77 | 36.49 |
| Increase in food prices | 190 | 90.05 | 21 | 9.95 |
| Crop failure due to drought or flood | 37 | 17.54 | 174 | 82.46 |
| I do not know | 0 | 0.00 | 211 | 100.00 |
| Other (rural exodus, lack of money, decline in production) | 7 | 3.32 | 204 | 96.68 |

Table A12. Reasons for the decline in the food diversity over the last three months.

| Reasons | Yes | | No | |
|---|-----------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| Due to the government restrictions, people were/are unable to work on land or in shops and stalls | 105 | 47.95 | 114 | 52.05 |
| Too many persons were/are affected with COVID-19 and therefore unable to produce | 1 | 0.46 | 218 | 99.54 |
| Members of the household were/are unwell and therefore in self-quarantine | 2 | 0.91 | 217 | 99.09 |
| Members of our household were concerned about leaving the house due to the pandemic | 14 | 6.39 | 205 | 93.61 |
| Due to the cordon sanitaire in our area, food outside our region could not or cannot enter | 122 | 55.71 | 97 | 44.29 |
| Increase in food prices | 194 | 88.58 | 25 | 11.42 |
| Crop failure due to drought or flood | 38 | 17.35 | 181 | 82.65 |
| I do not know | 0 | 0.00 | 219 | 100.00 |
| Other (lack of clients) | 1 | 0.46 | 218 | 99.54 |

Table A13. Reasons for the decline in the food accessibility over the last three months.

| Reasons | Yes | | No | |
|---|-----------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| Due to restrictions I am or was not allowed to work | 89 | 38.03 | 145 | 61.97 |
| Due to restrictions I am, or I was not allowed to buy food | 18 | 7.69 | 216 | 92.31 |
| Food prices have increased to an extent that I can buy less food | 218 | 93.16 | 16 | 6.84 |
| I have been (or someone else in my household has been) affected by COVID-19 and therefore unable to leave the house | 2 | 0.85 | 232 | 99.15 |
| Other (lack of clients to sell products) | 2 | 0.85 | 232 | 99.15 |

Table A14. Reasons for the decline in the food safety and quality over the last three months.

| Reasons for the Decline in the Availability of Food in the Region over the Last Three Months | Yes | | No | |
|--|-----------|---------|-----------|---------|
| | Frequency | Percent | Frequency | Percent |
| Due to the COVID-19 crisis, food is stored longer in shops and stalls and therefore more food is expired | 105 | 53.03 | 93 | 46.97 |
| Due to movement restrictions, I have to buy food that can be stored over a longer period and therefore, I do not buy fresh food as much. | 14 | 7.07 | 184 | 92.93 |
| Due to increased food prices, I have to buy food of less quality. | 140 | 70.71 | 58 | 29.29 |
| Due to the lockdown, food outside our region could not enter. | 121 | 61.11 | 77 | 38.89 |
| I have less money to spend | 47 | 23.74 | 151 | 76.26 |

Table A15. How did your food stocks last?

| How Did Your Food Stocks Last? | Less Than a Month | One or Two Months | More Than Two Months |
|-----------------------------------|-------------------|-------------------|----------------------|
| Rural producer within cordon | 6 | 5 | 2 |
| Urban non-gardener within cordon | 9 | 0 | 0 |
| Urban gardener within cordon | 2 | 12 | 2 |
| Rural producer outside cordon | 0 | 0 | 0 |
| Urban non-gardener outside cordon | 3 | 0 | 0 |
| Urban gardener outside cordon | 2 | 1 | 0 |
| Total (Pr = 0.004) | 22 | 18 | 4 |

Table A16. Impact of coping strategies on food security.

| Impact | Major | | Moderate | | Minor | | Not at all | | Total |
|--------------------------------------|-------|---------|----------|---------|-------|---------|------------|---------|-------|
| | Freq. | Percent | Freq. | Percent | Freq. | Percent | Freq. | Percent | |
| Skipping meals | 44 | 23.53 | 116 | 62.03 | 25 | 13.37 | 2 | 1.07 | 187 |
| Limiting portion size | 38 | 23.31 | 96 | 58.90 | 27 | 16.56 | 2 | 1.23 | 163 |
| Eating foods that are less preferred | 25 | 26.32 | 49 | 51.58 | 18 | 18.95 | 3 | 3.16 | 95 |
| Borrowing food or money to buy food | 26 | 36.11 | 30 | 41.67 | 14 | 19.44 | 2 | 2.78 | 72 |
| Obtaining help from social networks | 9 | 34.62 | 11 | 42.31 | 6 | 23.08 | 0 | 0.00 | 26 |
| Practicing additional jobs | 1 | 100.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 |
| Violating movement restrictions | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 |

Table A17. Weekly visit to garden/farm during the cordon sanitaire.

| Week Distribution | Mean | SE (Mean) | Sd | Min | P25 | P50 | P75 | Max |
|-------------------------------|-------|-----------|------|-----|-----|-----|------|-----|
| Rural producer within cordon | 5.323 | 0.29 | 1.62 | 1 | 5 | 6 | 6 | 7 |
| Urban gardener within cordon | 6.5 | 0.16 | 1.04 | 3 | 5 | 7 | 7 | 7 |
| Rural producer outside cordon | 2.529 | 0.21 | 1.21 | 1 | 2 | 2 | 3 | 6 |
| Urban gardener outside cordon | 5.184 | 0.23 | 1.39 | 3 | 4 | 5 | 6.75 | 7 |

Table A18. Ability to maintain the social distancing rule when you visited the garden/farm.

| | Yes | | Not Always | | No | | NA | | Total | |
|-------------------------------|-------|---------|------------|---------|-------|---------|-------|---------|-------|---------|
| | Freq. | Percent | Freq. | Percent | Freq. | Percent | Freq. | Percent | Freq. | Percent |
| Rural producer within cordon | 31 | 78% | 0 | 0% | 0 | 0% | 9 | 22% | 40 | 100% |
| Urban gardener within cordon | 31 | 78% | 9 | 22% | 0 | 0% | 0 | 0% | 40 | 100% |
| Rural producer outside cordon | 1 | 3% | 30 | 75% | 3 | 8% | 6 | 15% | 40 | 100% |
| Urban gardener outside cordon | 38 | 95% | 0 | 0% | 0 | 0% | 2 | 5% | 40 | 100% |

References

1. WHO. WHO Coronavirus Disease (COVID-19) Dashboard. Available online: <https://covid19.who.int/> (accessed on 4 May 2021).
2. Kansiiime, M.K.; Tambo, J.A.; Mugambi, I.; Bundi, M.; Kara, A.; Owuor, C. COVID-19 implications on household income and food security in Kenya and Uganda: Findings from a rapid assessment. *World Dev.* **2020**, *137*, 105199. [CrossRef] [PubMed]

3. Almohamad, M.; Mofleh, D.; Sharma, S. The impact of the COVID-19 pandemic on food insecurity. *J. Agric. Food Syst. Community Dev.* **2020**, *10*, 1–4. [[CrossRef](#)]
4. Galanakis, C.M. The food systems in the era of the coronavirus (COVID-19) pandemic crisis. *Foods* **2020**, *9*, 523. [[CrossRef](#)] [[PubMed](#)]
5. Zurayk, R. Pandemic and food security. *J. Agric. Food Syst. Community Dev.* **2020**, *9*, 1–5. [[CrossRef](#)]
6. Crises, G.N.A.F. Food Security Information Network. In *Global Report on Food Crises: Joint Analysis for Better Decisions*; International Food Policy Research Institute: Washington DC, USA, 2020.
7. World Food Program. COVID-19 Will Double Number of People Facing Food Crises Unless Swift Action Is Taken. Available online: <https://www.wfp.org/news/covid-19-will-double-number-people-facing-food-crises-unless-swift-action-taken> (accessed on 12 November 2020).
8. Moseley, W.G.; Battersby, J. The Vulnerability and Resilience of African Food Systems, Food Security, and Nutrition in the Context of the COVID-19 Pandemic. *Afr. Stud. Rev.* **2020**, *63*, 449–461. [[CrossRef](#)]
9. Clapp, J. Spoiled milk, rotten vegetables and a very broken food system. *The New York Times*, 8 May 2020.
10. Crush, J.; Si, Z. COVID-19 containment and food security in the Global South. *J. Agric. Food Syst. Community Dev.* **2020**, *9*, 1–3. [[CrossRef](#)]
11. Van der Ploeg, J.D. From biomedical to politico-economic crisis: The food system in times of Covid-19. *J. Peasant Stud.* **2020**, *47*, 944–972. [[CrossRef](#)]
12. Ruszczak, H.A.; RaHMan, M.F.; Bracken, L.J.; Sudha, S. Contextualizing the COVID-19 pandemic’s impact on food security in two small cities in Bangladesh. *Environ. Urban.* **2020**. [[CrossRef](#)]
13. Blay-Palmer, A.; Santini, G.; Halliday, J.; Malec, R.; Carey, J.; Keller, L.; Ni, J.; Taguchi, M.; van Veenhuizen, R. City Region Food Systems: Building Resilience to COVID-19 and Other Shocks. *Sustainability* **2021**, *13*, 1325. [[CrossRef](#)]
14. Rothstein, M.A. From SARS to Ebola: Legal and ethical considerations for modern quarantine. *Ind. Health L. Rev.* **2015**, *12*, 227. [[CrossRef](#)]
15. Moussa, A. Does agricultural sector contribute to the economic growth in case of republic of Benin. *J. Soc. Econ. Res.* **2018**, *5*, 85–93. [[CrossRef](#)]
16. FAO. Regional Roundups | Food Price Monitoring and Analysis (FPMA) | Food and Agriculture Organization of the United Nations. Available online: <http://www.fao.org/giews/food-prices/regional-roundups/en/> (accessed on 24 November 2020).
17. INSAE. Indice Harmonisé des Prix à la Consommation National: Octobre 2020. L’Institut National de la Statistique et de l’Analyse Economique. Available online: <https://insae.bj/statistiques/indicateurs-recents> (accessed on 24 November 2020).
18. WFP. Market Monitor July 2020. Available online: https://dataviz.vam.wfp.org/global-coverage-market-monitor-48-jul-2020?_ga=2.88693657.343934339.1603706721-2120039931.1597829656 (accessed on 26 October 2020).
19. Erinle, K.O.; Ogwu, M.C.; Eviwie, S.E.; Zaheer, M.S.; Ogunyemi, S.O.; Adeniran, S.O. Impacts of COVID-19 on agriculture and food security in developing countries: Potential mitigation strategies. *South Asia* **2021**, *30*, 13.
20. Houessou, M.D.; Sonneveld, B.G.J.S.; Aoudji, A.K.N.; Thoto, S.F.; Snelder, D.J.R.M.; Adegbedi, A.A.; De Cock Buning, T.J. Can allotment gardens improve food and nutrition security of poor dwellers in urban Africa? under review.
21. Egger, E.-M.; Jones, S.; Justino, P.; Manhique, I.; Santos, R. *Africa’s Lockdown Dilemma: High Poverty and Low Trust*; World Institute for Development Economic Research (UNU-WIDER): Helsinki, Finland, 2020.