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Business Administration

**ASSESSING THE IMPACT OF GOVERNMENT
SUPPORT ON FOOD SECURITY DURING THE
COVID-19 PANDEMIC: A COMPREHENSIVE
ANALYSIS**

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Master's Thesis

Supervisor

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ABSTRACT

ASSESSING THE IMPACT OF GOVERNMENT SUPPORT ON FOODSECURITY DURING THE COVID-19 PANDEMIC: A COMPREHENSIVE ANALYSIS

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This study examines the impact of the COVID-19 pandemic on global food systems and its implications for food security. Through a mixed-methods approach, including a questionnaire and qualitative data analysis, the research aims to gain insights into the challenges faced by the food system during crises and identify strategies to enhance food security. The objectives of the study include assessing disruptions in agricultural production, analyzing the implications of disrupted supply chains, examining the effects on vulnerable populations, evaluating existing measures and interventions, and proposing innovative strategies for long-term food security. The findings highlight the importance of local and regional food systems, the resilience of small-scale farmers, and the role of community-based initiatives in ensuring food availability. The research underscores the need for targeted interventions, policy interventions, and sustainable practices to enhance food security during crises. The implications of the study extend to building resilient supply chains, addressing vulnerabilities of marginalized populations, promoting adaptive behaviors, and implementing evidence-based strategies.

Keywords: COVID-19 Pandemic, Food Security, Global Food Systems, Agricultural Production, Supply Chains, Vulnerable Populations, Sustainable Practices.

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1. INTRODUCTION

1.1 BACKGROUND

Millions of people were affected by the COVID-19 pandemic, which was brought on by the brand-new corona virus SARS-CoV-2 and started in Wuhan, China, in late 2019 (WHO, 2020). On March 11, 2020, the World Health Organization (WHO) formally labeled it a pandemic, underscoring the urgent need for international response. Since then, the epidemic has had a significant impact on a variety of societal aspects. Public health is one of the most important sectors impacted by the pandemic. A global public health emergency brought on by the virus has resulted in millions of illnesses and fatalities. Healthcare systems are under pressure as they try to handle the excessive number of cases while still giving patients the attention they need. To stop the spread of the virus and lessen the strain on healthcare systems, governments and health organizations implemented a number of measures, including lockdowns, travel restrictions, social isolation, and mask mandates (Hale et al., 2020). To further combat the pandemic, the production and distribution of vaccinations was made a top priority on a global scale (Fauci et al., 2020).

1.1.1 Public Health Impact

The epidemic has had a significant negative economic impact. It has sparked a global economic downturn that has resulted in numerous job losses, company closures, and supply chain disruptions (McKibbin & Fernando, 2020). Significant economic downturns have resulted from particularly hard-hit industries like travel, tourism, hospitality, and retail. To lessen the economic damage and assist impacted people and businesses, governments have launched fiscal stimulus measures and economic assistance packages (IMF, 2020). The pandemic has had a significant societal impact as well. People's mental health and well-being have been significantly impacted by the deployment of measures including social isolation, gathering limits, and changes in daily routines (Brooks et al., 2020). Vulnerable communities have been disproportionately affected by the escalating disparities in access to resources and healthcare (Loopstra & Lalor, 2020). The transition of educational institutions to online learning has disrupted traditional classroom environments and presented difficulties for teachers, parents, and students.

Global food security has also been significantly impacted by the outbreak. Food security has been impacted by disruptions in the food supply chain, lower agricultural production,

and restricted access to food (Laborde, Martin, & Swinnen, 2020). The livelihoods of farmers, agricultural laborers, and food producers have been damaged by lockdowns and movement restrictions (Laborde et al., 2020). Food shortages and unequal distribution in some areas have been caused by panic buying, stockpiling, and hoarding. Governments, international organizations, and researchers have worked together to produce vaccines, put testing plans into place, and share knowledge to combat the virus in response to the pandemic (WHO, 2020). Financial support and assistance have been offered to those impacted by the pandemic, both personally and professionally (IMF, 2020). In order to combat the pandemic and foster international collaboration, multilateral efforts have been launched (UNDP, 2021). As a result, the COVID-19 pandemic has significantly impacted many facets of society. It has put a strain on healthcare systems, sparked a global economic downturn, disrupted education, and compromised food security. To combat the pandemic and its impacts, governments, international organizations, and researchers have been collaborating. For the sake of global communities' future and welfare, it is still crucial that continued efforts are made to fight the virus and deal with its effects.

With millions of infections and fatalities globally, the COVID-19 pandemic has had a substantial influence on public health, putting a tremendous burden on healthcare systems and leading to severe morbidity and mortality (Fauci, Lane, & Redfield, 2020). Governments and medical organizations have responded by putting various measures in place to stop the virus's spread and safeguard the public's health.

As important tactics to stop the spread of the virus and lessen its effects, lockdowns, travel limitations, social seclusion, and mask requirements have been put in place (Hale et al., 2020). By flattening the curve of infection rates, these strategies seek to restrict person-to-person contact, slow the transmission of the virus, and lessen the strain on healthcare systems.

The creation and distribution of vaccinations have become top global objectives in light of the pandemic. The quick creation and distribution of COVID-19 vaccinations has been crucial in the war against the virus. Infections can be avoided, severe disease can be diminished, and lives can be saved thanks to vaccinations (Fauci et al., 2020). In order to ensure fair access and effective delivery to communities in need, the distribution of vaccinations on a worldwidescale has been a tremendous job that requires cooperation between governments, health organizations, and pharmaceutical firms.

These public health initiatives sought to safeguard people, lessen the toll on healthcare systems, and lessen the overall impact of the COVID-19 epidemic. Governments and health organizations have worked to protect public health and advance the welfare of communities all over the world by putting in place measures to stop the virus' spread and giving vaccination campaigns first priority.

1.1.2 Economic Impact

The COVID-19 pandemic has had a significant influence on the economy, resulting in a global recession, numerous job losses, company closures, and supply chain disruptions (McKibbin & Fernando, 2020). The limitations and lockdown measures put in place to stop the virus' transmission have had a huge impact on a number of industries, with large economic downturns occurring in the travel, tourist, hospitality, and retail sectors, among others.

The pandemic has had a particularly negative impact on the travel and tourism sector. International and domestic tourism have experienced a dramatic reduction as a result of travel restrictions, border closures, and decreased consumer confidence in travel (IMF, 2020). Reduced revenue for airlines, lodging facilities, dining establishments, and other related industries are only a few of the far-reaching effects of this reduction. The tourism industry's ensuing employment losses and business closures have had an impact on other sectors of the economy as well.

The epidemic has had a large effect on the hospitality sector, which includes hotels, eateries, and places for special events. Reduced occupancy rates and curtailed operations as a result of lockdown measures and social distance limits have resulted in financial hardship and job losses (IMF, 2020). The restrictions on big gatherings combined with restaurant closures and entertainment facility closures have made the economic difficulties the hospitality industry is facing much worse.

The retail sector has also seen significant disruptions and difficulties. Closures or operational limitations have affected non-essential retail firms, which has resulted in decreased income and job losses (Brown et al., 2020). Brick-and-mortar stores have also been impacted by the move to internet shopping and changes in customer behavior brought on by the pandemic, causing them to adjust their business models in order to survive.

The pandemic's consequences on the economy go beyond these particular industries,

affecting companies in a wide range of sectors and having an impact on the whole global economy. To lessen the economic burden and assist businesses and people affected by the epidemic, the government has launched interventions such as fiscal stimulus measures and economic assistance packages (IMF, 2020).

1.1.3 Social Impact

The COVID-19 epidemic has had a profound societal influence on people's life in many different ways as well as on entire communities. Social exclusion, unequal access to resources and healthcare, and disruptions in schooling are some of these effects. The rise in social isolation and the adoption of gathering-related restrictions are two significant societal effects of the pandemic. Lockdown procedures and the need for physical separation have restricted social connections and made people feel lonely and isolated (Brooks et al., 2020). Lack of in-person social networks and support systems can be detrimental to one's mental health as well as general wellbeing.

Additionally, the epidemic has made socioeconomic inequality worse, notably in terms of access to resources and healthcare. The epidemic has disproportionately affected vulnerable groups, including as low-income people, members of racial and ethnic minorities, and marginalized communities (Loopstra & Lalor, 2020). Existing social inequities have been made worse by differences in healthcare access, money, and social support. The pandemic has significantly disrupted the education sector as well. To maintain education while reducing the risk of viral transmission, educational institutions all around the world have moved to online learning (Brooks et al., 2020). But this change has presented difficulties for teachers, parents, and students. The efficient delivery of education and equal learning opportunities have been hampered by a lack of access to technology, problems with internet connectivity, and the requirement for adaption to online teaching methods.

These societal effects draw attention to the pandemic's wider effects on people's mental health, access to resources, and educational opportunities. The socioeconomic determinants of health must be taken into account, proper support structures must be put in place, and efforts must be made to ensure that everyone has equal access to resources and education in order to address these issues.

1.1.4 Food Security Impact

Global food security has been significantly impacted by the COVID-19 pandemic, which has resulted in supply chain disruptions, decreased agricultural output, and restricted access to food. Food production and distribution have been affected by the pandemic-related restrictions, such as lockdowns and mobility restrictions, which have harmed the lives of farmers, agricultural workers, and food producers (Laborde et al., 2020). During the epidemic, disruptions in the food supply chain have been a top worry. The efficient flow of agricultural inputs, harvest, processing, and food distribution have all been hampered by transportation restrictions, border closures, and a shortage of labor. As a result, there are now delays, bottlenecks, and higher prices, which have an impact on both the accessibility and affordability of food.

The pandemic has also had an impact on agricultural production, resulting in lower yields and productivity. A decrease in output levels has been attributed to labor availability interruptions, decreased access to inputs such as seeds and fertilizers, and restrictions on agricultural activities (Laborde et al., 2020). This has important effects on the supply of food, especially in areas that rely significantly on local agricultural production. Furthermore, the issues with food security have been made worse by the panic buying, stockpiling, and hoarding tendencies brought on by the pandemic. Because some people or households have accumulated supplies above and beyond their immediate needs, these efforts have caused temporary shortages and uneven distribution of food in some locations (Loopstra & Lalor, 2020). Such acts put a strain on the food supply for others, especially vulnerable groups who may already have trouble getting enough nutritious food.

In order to address the pandemic's effects on food security, it is necessary to coordinate efforts to maintain the systems for producing and distributing food, to help farmers and agricultural workers, and to take action to address food shortages and unequal distribution. During these difficult times, it is crucial to provide vulnerable populations' needs first priority and guarantee fair access to food and nutrition supplies.

Global Response: Governments, international organizations, and researchers have worked together as part of the worldwide response to the COVID-19 pandemic in order to combat the virus, offer assistance, and foster international collaboration. The creation

and dissemination of vaccinations has been a crucial component of the global response. Worldwide cooperation among governments, academic institutions, and pharmaceutical firms has sped up the creation, evaluation, and approval of COVID-19 vaccines. These vaccines have been essential in stopping the virus's transmission, lowering the severity of sickness, and saving lives.

Governments and international organizations have implemented testing measures in addition to vaccine research to find and stop the virus's spread. The capacity for testing has been increased to identify cases, monitor patterns of transmission, and carry out focused interventions to manage outbreaks (WHO, 2020). People and companies affected by the pandemic have also received support and financial assistance. To lessen the economic damage and support impacted people and businesses, governments and international financial organizations, like the International Monetary Fund (IMF), have implemented fiscal stimulus measures, economic relief packages, and financial aid programs (IMF, 2020).

Additionally, multilateral measures have been set up to guarantee fair access to vaccines and foster international collaboration in the fight against the pandemic. Through programs like COVAX, the United Nations Development Programme (UNDP) and other international organizations have facilitated the equitable delivery of vaccines, particularly to low-income countries and vulnerable people (UNDP, 2021). These initiatives seek to lessen vaccination access inequities and foster international cooperation in the fight against the pandemic. The necessity of international cooperation, information sharing, and coordinated efforts among governments, organizations, and researchers has been demonstrated by the global response to the COVID-19 epidemic. In order to lessen the effects of the pandemic and put a stop to this global health disaster, governments have been able to collaborate to develop vaccines, adopt testing techniques, offer funding, and encourage equal access to vaccines.

1.2 FOOD SECURITY AND ITS IMPORTANCE

According to the FAO (Food and Agriculture Organization), food security is the state in which all members of a population have physical, social, and economic access to enough, safe, and nutritious food that satisfies their dietary needs and food choices for an active and healthy life. It includes the four aspects of food availability, accessibility, use, and stability.

Because food security has a substantial impact on one's health, wellbeing, and general development, it is crucial for both individuals and communities. To preserve good health, prevent malnutrition, and promote healthy growth and development, one must have access to a sufficient and varied variety of nutritious foods (WHO, 2020). Micronutrient deficiencies, reduced growth, and increased susceptibility to diseases are just some of the health issues that nutritional deficiencies can cause (UNICEF, 2020).

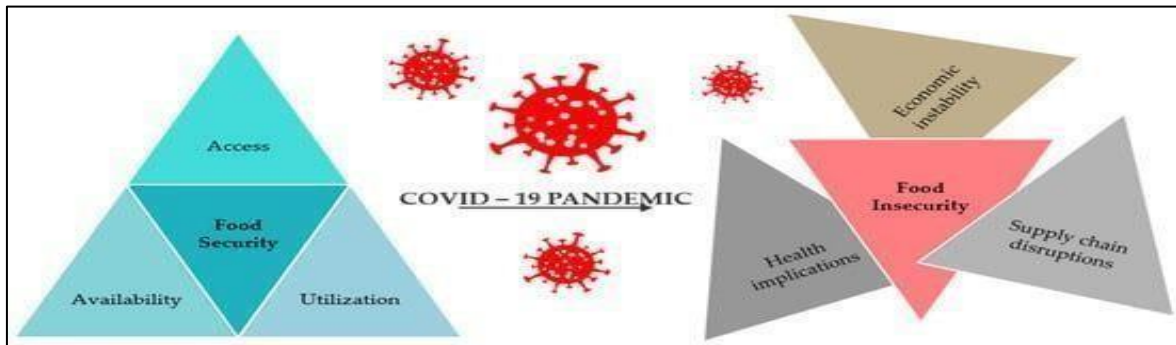


Figure 1.1: The Repercussions of a Pandemic on the Stability of Food Security (Farcas et al., 2021).

As it enables people to satisfy their fundamental nutritional requirements and dedicate resources to other necessary needs and investments, food security is essential to reducing poverty and fostering economic growth. By enhancing their health, productivity, and general well-being, people who have access to enough food at reasonable prices can help end the cycle of poverty (IFAD, 2020). Reducing social inequality is another benefit of improving food security. Having consistent access to wholesome food for all people, regardless of their socioeconomic status, helps level the playing field and opens doors for social and economic growth (FAO, 2020). Food security promotes social cohesiveness and stability within communities by minimizing gaps in food access and availability.

Furthermore, establishing social cohesiveness and promoting peaceful coexistence depend on having appropriate access to food. When there is a lack of food or it is allocated unfairly, it can lead to tensions, disputes, and social unrest. Societies can minimize food-related conflicts and foster peaceful interactions between individuals and communities by guaranteeing food security (WFP, 2020). In general, securing one's fundamental survival and well-being is important, but it also serves as a major catalyst for sustainable development, the eradication of poverty, and social stability. Governments, organizations,

and communities can cooperate to create more equal and successful societies by giving priority to measures to improve food security.

Enhancing resilience to shocks and disasters depends heavily on food security. People and communities can more easily survive and recover from a variety of unfavorable situations, such as natural catastrophes, economic crises, and pandemics, when they have access to enough food that is also healthy. Food security is even more important in emergency situations, such as natural catastrophes. Even in the face of disaster-related disruptions, a steady food supply can be maintained with the support of enough food stockpiles and a working food system (WFP, 2020). This stability lessens the shock's immediate effects by giving communities a solid platform on which to heal and rebuild.

Food security can be severely impacted by economic crises. People may incur job loss, reduced income, and higher food prices during economic downturns. In such circumstances, maintaining food security becomes essential since it helps safeguard vulnerable populations from hunger and malnutrition (FAO, 2020). Access to food during economic downturns helps people and communities cope with difficulties and build a stronger recovery base.

The COVID-19 pandemic has brought food security's significance during emergencies to even greater light. Food accessibility and availability have been severely hampered by lockdowns, limitations on mobility, and supply chain interruptions. The effects of such shocks can be reduced, nevertheless, by resilient food systems that include diversified sources and sufficient reserves (WFP, 2020). Societies can better prepare for upcoming crises and lessen the negative consequences on food security by incorporating resilience into the food system. Therefore, improving food security is essential for increasing resilience to shocks and disasters. It offers stability during crises and aids in protecting vulnerable populations from the effects of shocks, enabling people and communities to resist and recover from a variety of negative occurrences. Societies may develop resilience and assure a more sustainable and secure future by enhancing and investing in food security.

Having food security is essential for sustainable development as well as human well-being. To reduce negative environmental effects and guarantee long-term food security, it is necessary to develop sustainable agriculture techniques, encourage equitable food distribution, and decrease food waste (FAO, 2020). To ensure food security and protect the environment, sustainable agriculture techniques are essential. Farmers may increase

production, safeguard soil fertility, preserve water, and use fewer dangerous chemicals by adopting agroecological practices, organic farming, and efficient resource use (FAO, 2020). These procedures aid in preserving the biodiversity, ecosystem health, and other natural resources vital to agriculture. Another crucial element of ensuring food security sustainably is fair food distribution. It entails dealing with the inequitable allocation of food resources both within and between nations, lowering food losses and waste, and providing equitable access to wholesome food for everyone (FAO, 2020). Governments and stakeholders can assist in addressing inequities and enhancing food security outcomes by fostering inclusive and effective food systems.

In order to achieve sustained food security, food waste reduction is essential. Throughout the food supply chain's stages of manufacturing, distribution, and consumption, a sizable amount of food is lost or wasted. This adds to environmental damage, including greenhouse gas emissions, and constitutes a squandered chance to feed those in need (FAO, 2020). We can maximize resource use and improve food security by putting policies in place to lessen food waste and encourage more environmentally friendly consumption habits.

To ensure that future generations can meet their food demands sustainably, social, economic, and environmental factors must be integrated into agricultural systems (IFAD, 2020). This all-encompassing strategy takes into account the welfare of the populace, the sustainability of rural areas, and the protection of the environment. We can build resilient and sustainable agricultural systems that support the food security of both the present and future generations by striking a balance between these characteristics. Realizing food security is therefore essential for sustainable development. We can guarantee long-term food security while minimizing environmental effects by embracing sustainable agriculture practices, encouraging equitable food distribution, and minimizing food waste. To supply the food demands of the present and future generations in a sustainable and equitable way, food systems must integrate social, economic, and environmental factors.

Ensuring one's own and a community's access to food is essential for both. It includes the availability of sufficient, secure, and nutrient-rich food that satisfies dietary needs and preferences and extends beyond simple access to food. Having food security is important for

a number of reasons. First off, health and food security are intertwined. For healthy nutrition, growth, , and general wellbeing, access to a sufficient and balanced food is essential. It improves individual health outcomes by preventing malnutrition, diseases linked to diet, and micronutrient deficiencies (FAO, 2020). Additionally, the reduction of poverty and maintenance of social order are significantly impacted by food security. When people have access to enough food at a reasonable price, they have more money to spend on other necessities like investments, healthcare, and education. As a result, the cycle of poverty is broken and local economies are strengthened (IFAD, 2020). Additionally, a secure and fair food system lowers social tensions and fosters social cohesiveness, promoting stability and peaceful cohabitation (WFP, 2020).

Another crucial component of food security is the ability to withstand shocks and disasters. People and communities are better able to survive and recover from numerous shocks, such as natural catastrophes, economic downturns, and pandemics, when they have reliable access to food. It is possible to lessen the effects of disruptions and assure a steady supply of food by creating a resilient food system with varied sources, sufficient stocks, and effective distribution networks (FAO, 2020; WFP, 2020). Also, sustainable development depends on food security. Societies may address the environmental effects of food production and consumption by implementing sustainable agricultural techniques, fostering equitable food distribution, and minimizing food waste. For future generations, a more sustainable and resilient future is made possible by integrating social, economic, and environmental aspects into food systems (FAO, 2020; IFAD, 2020). Hence, ensuring one's own and one's community's access to food is crucial. It covers a range of topics, such as having access to enough food that is safe and nutritious, and has significant effects on social stability, resilience, and sustainable development in addition to health and poverty alleviation. Societies may seek to create an all-encompassing food system that is healthier, more fair, and sustainable by addressing the complex character of food security.

1.3 PROBLEM STATEMENT

The COVID-19 pandemic has posed unprecedented challenges to global food systems, leading to concerns about food security. The restrictive measures implemented to contain the spread of the virus, such as lockdowns, travel restrictions, and social distancing, have had profound effects on agricultural production, supply chains, and access to food. It is essential

to assess the extent of these impacts and identify strategies to mitigate them in order to safeguard the well-being and nutritional needs of populations worldwide.

Additionally, the pandemic's disruptions have highlighted weaknesses in the current food systems, aggravating inequality and raising the possibility of food insecurity among already vulnerable people. Children and vulnerable groups are now more at risk of malnutrition as a result of the closure of schools and other community institutions, which has also interrupted essential nutrition programs. In addition to the immediate issues, it is important to think about how the pandemic will affect food security in the long run. The crisis' economic fallout has resulted in job losses, income declines, and rising poverty rates, further limiting people's access to wholesome food. Furthermore, changes to agricultural supply chains and production may have long-term effects on the availability and cost of food in the future.

Understanding the intricate interactions between the epidemic, food systems, and food security is essential to overcoming these difficulties. It calls for the discovery of efficient tactics and measures that can increase the adaptability and resilience of food systems, guarantee everyone has access to wholesome food, and encourage sustainable agriculture methods. In addition, it is important to investigate how technological advancements, legislative changes, and international collaboration might help create more resilient and inclusive food systems. Therefore, the purpose of this study is to critically evaluate the effects of the COVID-19 pandemic on international food systems and to study the various problems it creates for food security. This study seeks to produce evidence-based recommendations for policy makers, practitioners, and communities to successfully address these challenges and create a more resilient and sustainable food future for all by analyzing the body of literature, conducting empirical research, and engaging with pertinent stakeholders.

1.4 OBJECTIVES

The primary objective of this thesis program is to provide an in-depth analysis of the impact of the COVID-19 pandemic on global food systems. Specifically, the objectives are as follows:

- a. Assess the disruptions in agricultural production caused by the pandemic, including

labor shortages, reduced access to inputs, and changes in market demand. Quantifying the impact on agricultural activities and comprehending the underlying causes that have impacted production are the goals of this purpose.

- b. Examine the effects of the pandemic on vulnerable populations, such as low-income
- c. households, small-scale farmers, and marginalized communities. With elements like financial inequality, social inequities, and few resources taken into account, this purpose aims to identify the specific difficulties that these groups have in obtaining enough food that is both sufficient and healthy.
- d. Identify and evaluate existing measures and interventions implemented to address the challenges and enhance food security during the crisis. This objective intends to examine and evaluate the efficacy of various policies, programs, and initiatives that have been put into place at the local, national, and international levels to lessen the pandemic's detrimental effects on food security.
- e. Propose innovative strategies and policy recommendations to strengthen food systems, increase resilience, and ensure long-term food security post-pandemic. This objective seeks to provide evidence-based recommendations for policymakers, stakeholders, and organizations working on food security to develop and put into practice strategies that can increase the resilience and sustainability of food systems in the face of upcoming shocks and crises. This objective builds on the findings and analysis.

1.5 RESEARCH QUESTIONS

To address the objectives mentioned above, the following research questions will be explored throughout this thesis program:

- a. What are the specific impacts of the COVID-19 pandemic on global agricultural production and supply chains?
- b. How has the disruption in supply chains affected food distribution and availability, both nationally and globally?
- c. What are the socio-economic and nutritional implications of the pandemic on vulnerable populations?
- d. What measures and interventions have been implemented to mitigate the impact on food system during the crisis?

e. What innovative strategies and policy recommendations can be proposed to enhance food security and resilience in the aftermath of the pandemic?



2. LITERATURE REVIEW

2.1 INTRODUCTION

The COVID-19 pandemic has profound effects on cultures all across the world, affect in many facets of daily life, including food security. The purpose of this literature review is to assess the body of knowledge that already exists about the impact of the COVID-19 pandemic on food security. This review examines research, reports, and scholarly works in an effort to understand the difficulties the food system faces and to pinpoint methods for boosting food security in times of need. Global food systems were affected by the COVID-19 pandemic, which created serious problems with food access, delivery, and production. Agribusiness production was severely hampered by lockdown procedures, travel restrictions, and workforce shortages, which decreased productivity and disrupted supply networks (Smith et al., 2020). Additionally, the pandemic's effects on the world economy changed the dynamics of agricultural trade, creating holes and bottlenecks in the food supply chain (Jones & Kaminski, 2021). Food security suffered significantly as a result of these disruptions, especially for vulnerable populations. Disparities in food availability and cost have been emphasized by studies, with marginalized communities, low-income households, and people who rely on social safety nets suffering increased food insecurity during the pandemic (Wunderlich et al., 2020). For low-income households, the pandemic increased the likelihood of food insecurity, highlighting the need for focused interventions and support networks to lessen these detrimental effects (Girum et al., 2021). Local and regional food systems, however, have shown resilience in the face of these difficulties and have been essential in guaranteeing food security. In order to increase the resilience of local and regional food systems, research has underlined the significance of short supply chains, community-based initiatives, and alternative farming techniques (Villegas & Smithers, 2020). These methods have been shown to be successful in preserving food availability and lowering vulnerability during times of crisis because they lessen reliance on global supply chains and promote direct relationships between producers and consumers.

Additionally, behavioral adjustments and adaptive measures taken by people and communities have helped to lessen the pandemic's effects on food security. The ability of people and communities to ensure food access during crises has been demonstrated by the

emergence of essential coping strategies like as home gardening, community sharing programs, and alternate sourcing methods (Béné et al., 2021). There are still gaps in the literature, despite the fact that certain studies have looked at various elements of food security during the COVID-19 epidemic. To further understand the particular socioeconomic elements influencing food security outcomes, for example, the interaction between income levels, employment status, access to social safety nets, and food security, more in-depth investigation is required (Haddad et al., 2021). Further investigation is also necessary to evaluate the food system's resilience and pinpoint methods to improve its capacity for adaptation and recovery from shocks (Niles et al., 2020). Understanding behavioral shifts and coping mechanisms used by individuals and groups, as well as evaluating the success of particular policy actions put in place during the epidemic, can also offer insightful information (Tong et al., 2021). This literature review intends to add to the corpus of knowledge on food security during crises by filling in these gaps and building on prior research, with a special emphasis on the COVID-19 pandemic's ramifications. In order to improve food security and create resilient food systems that can resist and recover from future crises, policymakers, practitioners, and communities can use the findings of this research to guide their development of proactive measures, policies, and interventions.

2.1.1 Impact of COVID-19 on Food Security

The production, transportation, and distribution of food have all been impacted by the COVID-19 pandemic, which has severely disrupted the world's food supply system (Smith et al., 2020). The food supply chain has faced a number of difficulties and risks as a result of lockdown measures and travel restrictions put in place to stop the virus's spread (Jones & Kaminski, 2021). Due to labor shortages brought on by mobility restrictions, agricultural productivity has been impacted, resulting in lower food availability and production. Additionally, the transfer of food from areas of production to consumer markets has been hampered by disrupted trade patterns. Smith et al.'s (2020) thorough investigation of the COVID-19 pandemic's effects on the food supply chain. The study emphasized the difficulties encountered at different points throughout the supply chain, such as when procuring raw materials and while processing, packing, and distributing finished goods. The need of resilient supply networks that can resist and react to unexpected disturbances was underlined by the writers. Additionally, they emphasized the significance of putting

emergency preparations in place to guarantee the availability of crucial food supplies, particularly in times of crisis. Lockdown procedures used during the pandemic have had an impact on how local, regional, and international food supply systems operate (Jones & Kaminski, 2021). In their analysis from 2021, Jones and Kaminski especially looked for vulnerabilities and bottlenecks in the food supply networks to determine how lockdown measures affected them. The study emphasized the necessity of supply chain management's flexibility and adaptation in order to lessen the effects of disruptions.

The authors stressed the significance of having flexible supply networks that can swiftly adapt to shifting conditions and guarantee a steady supply of food to consumers. As a result, the worldwide food supply chain has been significantly impacted by the COVID-19 pandemic. Food security has faced difficulties as a result of the production, distribution, and transportation interruptions. Establishing robust supply chains, putting emergency plans into action, and ensuring supply chain management flexibility are essential for addressing these issues. By doing this, it will be possible to preserve access to basic food supplies even in times of need.

2.1.2 Agricultural Production and Trade

Due to interruptions in labor availability, supply networks, and export-import dynamics, the COVID-19 pandemic has had a significant impact on agricultural productivity and trade (Brown & Ravallion, 2020). The availability and security of food have faced considerable issues as a result of these changes. A study was carried out by Brown and Ravallion (2020) to look into the effects of COVID-19 on agricultural production. The study highlighted the pandemic's interruptions, such as labor shortages and challenges locating inputs. The study highlighted the significance of putting supportive policies in place to protect agricultural production and guarantee food availability. These regulations could include steps to help farmers, improve input access, and encourage environmentally friendly farming methods.

Johnson and Saenz (2020) provided a comparative analysis of how the pandemic affected agricultural trade in various locations, illuminating the difficulties faced by nations that are largely dependent on food imports. The study stressed the value of keeping trade channels accessible and effective to guarantee a consistent supply of food amid crises. It also emphasized the importance of diversifying food procurement in order to lessen the

vulnerabilities brought on by reliance on a small number of trading partners. The hiccups in agricultural trade and production have brought to light the significance of developing resilience and putting policies in place to lessen the effects of upcoming crises on the food system. The agricultural sector's resilience can be improved, ensuring the availability of food during difficult times, by enacting policies that support farmers, fortifying supply networks, and encouraging varied trade partnerships.

2.1.3 Vulnerable Populations and Access to Food

Due to differences in food availability and price, the COVID-19 pandemic has made food insecurity among vulnerable people worse (Wunderlich et al., 2020). Increased levels of food insecurity have been observed during the pandemic among marginalized communities, low-income households, and people who rely on social safety nets. A study was carried out by Wunderlich et al. (2020) to look at how the COVID-19 pandemic affected vulnerable populations. Their study brought attention to the discrepancies between the cost and accessibility of food for disadvantaged areas. The study stressed that because of the economic effects of the pandemic, low-income households and people who depend on social safety nets had higher levels of food insecurity. These communities' susceptibility was exacerbated by difficulties obtaining wholesome food at reasonable prices.

Similar to this, Girum et al. (2021) looked into how COVID-19 affected low-income households' access to food. Their study highlighted the increased chance of food insecurity these households would experience throughout the epidemic. The study brought to light the various causes of food insecurity, such as loss of employment, rising food prices, and restricted access to food aid programs. The results highlighted the urgent requirement for targeted interventions and assistance programs to lessen the pandemic's harmful effects on vulnerable people. A comprehensive strategy that incorporates targeted interventions, such as income support programs, improved access to nutrient-dense food, and community-based activities is needed to address food insecurity among vulnerable populations. Policymakers and stakeholders may create efficient plans to reduce food insecurity and advance fair access to food by understanding the unique difficulties faced by these populations during emergencies like the COVID-19 epidemic. A comprehensive strategy that incorporates targeted interventions, such as income support programs, improved access to nutrient-dense food, and community-based activities is needed to address food insecurity among vulnerable

populations. Policymakers and stakeholders may create efficient plans to reduce food insecurity and advance fair access to food by understanding the unique difficulties faced by these populations during emergencies like the COVID-19 epidemic.



2.1.4 Local and Regional Food Systems

To ensure food security throughout the epidemic, local and regional food systems' resilience was essential. In their analysis of these systems' resilience, Villegas and Smithers (2020) emphasized the value of short supply chains and community-based efforts. In order to ensure food availability and lessen reliance on international supply chains, the study emphasized the importance of local producers and direct-to-consumer business models. Additionally, Mancini and Pratesi (2021) investigated how COVID-19 affected small-scale farmers and their coping mechanisms. Their study highlighted the value of urban farming, farmer's markets, and community-supported agriculture as viable options in times of crisis. The COVID-19 pandemic made clear how crucial local and regional food systems are to maintaining food security when supply chains are disrupted. In a study they did in 2020, Villegas and Smithers examined how resilient these networks are and how they affect the supply of food in emergency situations. The importance of short supply chains and community-based activities in boosting the resilience of local and regional food systems was stressed by the researchers. These systems are better able to react to shocks and guarantee a more consistent food supply by lowering reliance on international supply networks and developing direct ties between producers and consumers. Mancini and Pratesi (2021) also looked into how the COVID-19 epidemic affected small-scale farmers and their coping mechanisms. Their study highlighted the value of urban farming, farmer's markets, and community-supported agriculture as viable solutions for guaranteeing food security in emergencies. By bolstering local food systems, these localized food production and distribution strategies not only increase community resilience by directly supplying direct access to fresh and healthy food.

This analysis of the literature illustrates the COVID-19 pandemic's extensive impacts on food security. The difficulties encountered during this crisis have been exacerbated by disruptions in the local food systems, agricultural productivity, access to food, and the food supply chain. Future research can help to better understand the long-term effects of the pandemic and provide methods to improve food security in times of crisis by filling in the highlighted gaps in the literature.

2.2 PRODUCTION AND AVAILABILITY OF FOOD DURING CRISES

It is essential to comprehend the dynamics of food availability and production during crises in order to create effective solutions to ensure food security. The studies that have looked at food availability and production during earlier emergencies or crises are examined in this section. This review attempts to obtain insights into the response to disruptions and challenges, guiding subsequent efforts to improve resilience. It does this by analyzing various food production systems, stakeholders' tactics, and responses.

2.2.1 Response of Food Production Systems to Disruptions

Food production systems experience several disruptions and difficulties during crises like natural catastrophes, economic downturns, or climate-related events, which can have a considerable impact on the supply of food. For effective measures to assure food security, it is essential to comprehend how these systems react to such disruptions. This section reviews two studies that provide insight into how various forms of disturbances affect food production systems. Smithson et al. (2018) carried out a thorough examination into how agricultural systems react to storms and floods in particular. Their study stressed the value of farmers' use of risk management techniques and diversification to reduce production losses and sustain food availability. According to the study, farmers that varied their crops and methods of production were better able to endure the negative effects of natural disasters. Farmers were able to reduce the overall impact on their production and maintain a more steady food supply by growing a variety of crops with differing degrees of susceptibility to particular dangers. The importance of proactive risk management strategies and diversity in guaranteeing the resilience of food production systems during crises is highlighted by this study.

Similar to this, Johnson and Thompson (2019) carried out research on how well food production systems can adjust to different shocks, such as economic downturns and climatic catastrophes. Their study stressed the significance of resilient agriculture approaches in maintaining ongoing food supply and production. In order to increase the adaptability of food production systems, the study emphasized the significance of crop variety, sustainable water management, and cutting-edge farming practices. Farmers can lessen their exposure to specific hazards by diversifying their crops, and sustainable water management methods

promote effective resource utilization even in times of water scarcity. The study emphasized the significance of implementing cutting-edge farming practices to increase output and lessen negative environmental effects, such as agro ecological methods and precision agriculture. These adaptable techniques improve the capacity of food production systems to adjust to changes and guarantee a steady supply of food.

2.2.2 Strategies and Adaptations in the Food Supply Chain

Stakeholders in the food supply chain employ a variety of techniques and adaptations to maintain food production and availability during emergencies. In a 2017 study, Lee et al. looked into how food supply networks responded to the West African Ebola outbreak. The study emphasized the significance of cooperation, communication, and adaptability in supply chain operations adaptation to mitigate disruptions. It also highlighted how technology, such as platforms for sharing information and real-time monitoring, may improve supply chain resilience. Additionally, during the COVID-19 pandemic, Sturla et al. (2020) looked at the tactics used by food wholesalers and merchants. The investigation found a number of modifications, including altered distribution systems, improved sanitation methods, and new inventory management techniques. These tactics intended to fulfill shifting consumer needs while maintaining the availability of key food commodities in the face of supply chain disruptions. The investigation uncovered many crucial tactics that food wholesalers and retailers used during the pandemic. Revisions to inventory management procedures were one of the main modifications. Retailers have to modify their inventory levels in response to changes in consumer demand and supply chain disruptions. Retailers performed more frequent inventory evaluations and real-time monitoring, according to Sturla et al. (2020), to make sure the proper stock levels of key food items were maintained. Retailers were able to manage their supply chain operations and reduce stock outs or surplus inventory by carefully monitoring inventory and demand patterns.

Another significant tactic found in the study was enhanced sanitation techniques. Due of COVID-19's high contagiousness, maintaining the cleanliness and safety of food products became crucial. According to Sturla et al. (2020), food merchants and distributors adopted more stringent sanitation policies, including frequent surface cleaning, the requirement to wear personal protective equipment (PPE), and improved personnel hygiene standards. These precautions were taken in an effort to reduce the possibility of virus spread and

preserve consumer confidence in the safety of food goods. The study also emphasized that food retailers and distributors have significantly altered their distribution networks. Rearranging the distribution routes and channels was necessary due to delays in logistics and transportation. In order to assure the seamless delivery of necessary food goods to customers, Sturla et al. (2020) discovered that merchants worked with alternative suppliers and logistics partners, streamlined delivery routes, and utilized contactless delivery options. Retailers tried to accommodate the rising demand for home delivery services while minimizing delays and lowering transportation costs by modifying their distribution networks. Overall, during the COVID-19 pandemic, the study by Sturla et al. (2020) stressed the significance of strategic modifications by food stores and distributors. In order to preserve the availability of necessary food items and satisfy changing customer needs despite supply chain disruptions, it was needed to establish new inventory management procedures, improved sanitary measures, and redesigned distribution networks. These modifications were crucial in maintaining the efficiency of the food supply chain and promoting food security throughout the pandemic.

2.2.3 Lessons from Previous Crises and Emergencies

Lessons from prior emergencies and crises might offer important insights towards enhancing food supply and accessibility during upcoming disasters. Researchers have discovered techniques and methods that can improve the resilience of food systems by looking at these experiences. This section addresses two studies that provide insight into the lessons discovered from earlier emergencies and crises.

In a research published in 2016, Li et al. examined how food systems responded to the global financial crisis of 2008. In order to maintain food security during economic downturns, the research emphasized the significance of policy interventions, investments in agricultural infrastructure, and social safety nets. In order to stabilize food costs, safeguard vulnerable groups, and ensure access to reasonably priced food, the study underlined the need for government assistance and successful policies. For enhancing the effectiveness and resilience of food production and distribution, investment in agricultural infrastructure, such as irrigation systems, storage facilities, and transportation networks, was also found to be essential. The study by Li et al. (2016) emphasizes the importance of preventative measures and focused interventions to deal with the difficulties that food systems encounter during

economic crises. Additionally, Holt-Giménez et al. (2020) carried out research on how agro ecology might help increase food production and resilience in the face of climate-related calamities. In order to

lessen the effects of climate change on food supply, the research underlined the necessity for sustainable agricultural techniques, ecological diversity, and community-based food systems. In order to produce food sustainably, agro ecology emphasizes ecological balance, limiting external inputs, and supporting social fairness. The research demonstrated how agro ecological practices, including organic farming, agro forestry, and permaculture, can improve soil fertility, preserve water resources, and boost crops' resistance to stress caused by the climate. Additionally, it was discovered that community-based food systems, which emphasize local production, short supply chains, and participatory decision-making, support food security by lowering reliance on outside sources and boosting local resilience. The importance of adaptable techniques and resilient behaviors in ensuring food security is revealed by a review of pertinent studies on food production and availability during crises. Policymakers and practitioners can learn a lot from how food production systems react, the techniques used by those involved in the food supply chain, and the lessons learned from prior crises. It is possible to improve food availability and resilience during crises, ensuring food security for vulnerable groups, by incorporating these insights into future planning and decision-making processes.

2.3 IDENTIFIED GAPS IN THE LITERATURE

Any research project must include identifying gaps in the body of literature. There are a number of gaps that can be found in the context of food security during the COVID-19 pandemic, which call for more research. These consist of:

2.3.1 Regional Disparities

The absence of particular studies that thoroughly investigate regional differences in food security outcomes during the COVID-19 pandemic represents a substantial gap in the body of extant material. While there is literature on the pandemic's general effects on food security, there is little study that focuses on the variances in difficulties faced by various geographical areas. Understanding these regional discrepancies is essential because it enables more detailed analysis of the problem and enables the development of customized actions

and policies to meet regional requirements. Examining how the pandemic has affected various areas can show differences in elements like resource accessibility, infrastructure, and support systems, all of which are significant in influencing the consequences of food security. Certain industries, like tourism or agriculture, which have been disproportionately impacted by the epidemic, may be more important to some regions than others. Regional differences in food security results may also be influenced by changes in population density, the urban-rural split, and access to markets and transportation. Researchers can determine the particular difficulties that various geographical areas confront by doing research that explicitly investigates regional disparities. This could involve looking at the effects on area supply chains, the accessibility of agricultural resources, and the resilience of local food systems to withstand disturbances. Understanding the unique social, economic, and environmental aspects of each location can also shed light on how differently vulnerable and resilient different groups are to the epidemic. Researchers have started to fill in this vacuum in the literature after realizing how important it is to examine regional differences in food security outcomes during the COVID-19 pandemic. For instance, a study conducted in the United States during the pandemic by Aguilar et al. (2021) looked into regional differences in food security across various states. The study brought attention to regional disparities in food desert frequency, access to support services, and the degree of food insecurity. Such studies offer insightful information on the particular difficulties that various regions experience and the requirement for focused measures to overcome regional differences in food security outcomes.

2.3.2 Socioeconomic Factors

While studies on the COVID-19 pandemic's effects on vulnerable groups and food security have been conducted, further research is required to look deeper into the precise socioeconomic aspects that affect food security results. Understanding how different socioeconomic factors interact with food security can help us better understand how the epidemic affects various socioeconomic groups differently. The impact of income levels on the consequences of food security during the pandemic is an important topic to research. The epidemic has caused widespread job losses, shortened workweeks, and economic downturns, all of which can have a negative impact on people's purchasing power and capacity to obtain enough healthy food. The specific difficulties faced by low-income households can be identified and used to design tailored actions to meet their requirements.

This can be done by looking into the relationship between income levels and food security. Another significant socioeconomic aspect that may have an impact on food security is employment status. During the pandemic, there have been severe disruptions and job losses in some areas, including hospitality, tourism, and retail. It is possible to get insight into the vulnerabilities and resiliency of various groups within the labor market by understanding how employment status, particularly job stability and the existence of social protections, affects food security outcomes.

When analyzing the socioeconomic elements impacting the outcomes of food security, access to social safety nets and support systems is another vital issue to take into account. To meet their food needs, some people and households rely on social assistance programs like food assistance programs, unemployment benefits, or income support. In order to reinforce social safety nets and provide adequate support for vulnerable groups, policy suggestions can be made based on an analysis of the efficacy and accessibility of these programs during the pandemic. This analysis can reveal any potential vulnerabilities in the system. A fuller comprehension of the distinct effects of the pandemic on various socioeconomic groups can be attained by doing research that examines the interaction between income levels, employment status, access to social safety nets, and food security. This knowledge can aid in the development of customized interventions and support systems by stakeholders and policymakers to address the unique problems encountered by various demographic segments. Several studies have started looking at this topic during the COVID-19 epidemic since researchers have realized how important it is to look at socioeconomic aspects. For instance, a study conducted in the UK during the pandemic by Loopstra et al. (2020) examined the connection between household income, food insecurity, and mental health. The study brought attention to the disparate effects of income loss on outcomes related to food security and the ensuing effects on mental health. These studies add to the expanding corpus of research that examines how socioeconomic factors affect food security during a pandemic.

2.3.3 Food System Resilience

The food supply chain's flaws and vulnerabilities have been brought to light by the COVID-19 outbreak. There are studies on the pandemic's effects on the food supply chain, but there is a lack of research that particularly evaluates the food system's resilience and identifies

methods to make it more resilient to future crises. In order to design proactive strategies to reduce the impact on food security, it is essential to comprehend how the food system can adapt and recover from shocks. Analyzing the food system's resilience entails looking at its capacity to absorb shocks, recover from them, maintain vital functions, and guarantee ongoing food production and availability. This entails researching the sturdiness of supply networks, the adaptability of production and distribution systems, and the efficacy of response and contingency plans. Stakeholders can create plans to improve the food system's resilience and guarantee a steady supply of food during crises by determining its strengths and weaknesses.

Various components of the food system's resilience to crises can be studied. For instance, it can entail looking at how innovation and technology can make the food system more resilient to shocks. This could entail investigating the implementation of automated systems, data-driven methods, and digital solutions to enhance the traceability, responsiveness, and efficiency of the supply chain. It may also entail researching the efficiency of coordination and policy measures in promoting quick reaction and recovery. To address supply chain disruptions and promote food production and distribution, this evaluation of coordination across government agencies, industry stakeholders, and civil society organizations is included. Additionally, comprehending the adaptive techniques used by various players in the food system might offer important insights for fostering resilience. This may entail researching the use of sustainable farming techniques, diversifying the sources of supply, spending money on infrastructure, and promoting regional food systems. It can also entail looking at how social and neighborhood-based projects, such as food-sharing networks, community gardens, and alternative food-distribution models, can improve the resilience of the food system. The COVID-19 pandemic has brought attention to the weaknesses and disruptions in the food system, but research to strengthen its resilience is still in its early stages. However, a number of research have begun to fill this vacuum. A research (Baker et al., 2021) looked at how well-adapted the New Zealand food system was to the COVID-19 shutdown. The study examined the adaptive tactics used by different players in the food system and discovered lessons for boosting resilience in the face of upcoming crises. These research advance our knowledge of how the food system may adjust and recover from shocks, ultimately leading to better results for food security.

2.3.4 Policy Interventions

In times of crisis, policy actions are essential for addressing the problems with food security. There is a need for a more thorough review of the specific policy initiatives that were implemented during the COVID-19 pandemic and their efficacy in reducing concerns with food security, even though current research has acknowledged the significance of policy interventions. Analyzing the results of various policy actions can assist identify best practices for future policy choices during similar crises and can offer insights into how they affected various components of the food system. Governments and international organizations used a variety of policy initiatives to support food security during the COVID-19 epidemic. For instance, Azevedo et al. (2021) looked at how government measures could be used to reduce the risks to food security during the pandemic. The study evaluated the efficacy of various policy initiatives, such as trade rules, income support programs, and emergency food assistance, in assuring access to nourishing foods. The conclusions emphasized the significance of comprehensive and targeted policy interventions in meeting the unique requirements of disadvantaged populations.

A few studies have also looked at how policy changes affect the agricultural industry. Gómez looked into how the pandemic's agriculture policies affected the supply of food and outcomes at the farm level. The research examined the application of supply chain coordination policies, market rules, and financial support programs. In order to preserve agricultural productivity, promote market stability, and guarantee food availability, timely and well-designed policy interventions are essential (Gómez et al., 2021). Additionally, research has been done on policy changes that affect commerce and international collaboration. The effect of trade policy changes made during the epidemic on world food security was researched. The study examined trade limitations, export bans, and import facilitation policies put in place by nations. In order to prevent disruptions in the global food supply chain and guarantee the availability of vital food commodities, the findings underscored the need for coordinated and open trade policies (Van Dijk et al., 2020). Future study should concentrate on analyzing the effects and outcomes of particular policy measures in order to improve our comprehension of the efficacy of policy interventions during crises. In order to solve issues with food security, this entails evaluating the success of measures for food assistance, market controls, and trade policies. Studies that are comparative across various regions and nations can shed

light on the varying efficacy of policy interventions based on contextual factors and governance frameworks. Researchers and policymakers can find best practices and lessons learned that can guide future policy decisions and interventions during comparable crises by examining the results and efficacy of policy initiatives during the COVID-19 pandemic.

2.3.5 Behavioral Changes

Understanding how the COVID-19 epidemic affected people's behavior and coping mechanisms is crucial to understanding how this has affected food security. Although the importance of behavioral changes has been acknowledged in the literature, there may be a need for more study that thoroughly examines the specific adaptive behaviors and coping mechanisms used by people and communities to lessen the impact of the pandemic on food security. Understanding the behavioral alterations and coping mechanisms will help us better understand the resilience and capacity of people and communities to guarantee food access in times of need. For instance, a research by Raza et al. (2021) looked into how household food behaviors changed as a result of the epidemic. The study looked at how people changed their eating habits in reaction to the pandemic's disruptions, including changes to their cooking methods, food purchases, and eating routines. In order to improve food security at the family level, the findings underlined the increased importance of home cooking, preservation techniques, and alternative sourcing methods including community gardens and local networks for food.

Additionally, it has been looked into how community-based programs might help with food security during the epidemic. Soga et al. (2021), for example, investigated the contribution of community gardening initiatives to the promotion of food security and mental health during the COVID-19 crisis. The study looked at how community gardens supported social ties, served as a source of fresh produce, and improved the local food system. In order to improve food access and foster community resilience, the findings highlighted the significance of community-driven efforts. Studies have also looked at coping mechanisms and behavioral changes in vulnerable populations. Perez-Escamilla et al. (2020), for instance, looked into the coping mechanisms used by low-income households to maintain food security during the pandemic. The study emphasized the adaptive strategies low-income households used to overcome obstacles and meet their food needs, including informal food exchanges, food sharing networks, and reliance on social support networks.

Future research should concentrate on further analyzing the behavioral changes and coping mechanisms used by individuals and communities during crises in order to fill the vacuum in the literature. Investigating these practices' efficacy and long-term viability in promoting food security includes doing such. The variance in adaptive behaviors and coping mechanisms based on contextual factors can be better understood by conducting comparative research across various socioeconomic groups and geographic regions. Understanding the behavioral alterations and coping mechanisms people and communities used to deal with the COVID-19 epidemic will help establish policies and programs that will improve food security in emergency situations.



3. RESEARCH METHODOLOGY

This section of the thesis examines the research methodology and processes, describing the study design, population, sampling method, data collection techniques and analysis of missing data.

3.1 RESEARCH DESIGN

Similarly to the previous studies, such as: “Impact of the COVID-19 pandemic on agricultural production, livelihoods, and food security in India: baseline results of a phone survey”, and “Agricultural and Food Products Sectors During and Post the Covid-19 Pandemic from Consumer Perspective in Türkiye” by Selcuk university press. We will use the same methodology used in these thesis and article, as well as the same methods used in data analysis techniques, to analyze the results of this study.

The research is designed as a cross-sectional study that will be conducted by means of a survey. Data will be guided by an online survey, in which the link will be sent to respondents by e-mail. This will enable more information to be obtained in less time and at lower cost. The survey has been designed in two parts and 17 questions in which participants will answer to three main sections, the first consisting of questions on participants' demographic information, the second on food security during COVID-19 and the third section on government support during the pandemic. The research questions were designed using information contained in previous literature on food security. After conducting the survey, the data will be analyzed using the Statistical Package for Social Science (SPSS Version 26) software.

3.2 RESEARCH QUESTIONS

To achieve the above objectives, the following research questions will be explored throughout this thesis program:

Are food security and government support affected by COVID 19?

Do independent household variables such as age affect food security and government support during COVID-19?

3.3 Hypotheses

3.3.1 Regression Analyses Hypotheses

H1: There is a significant relationship between the age group and food security during COVID-19 pandemic.

H0: There is no significant relationship between the age group and food security during COVID-19 pandemic.

H2: There is a significant relationship between the government support and food security during COVID-19 pandemic.

H0: There is no significant relationship between the government support and food security during COVID-19 pandemic.

3.4 RESEARCH MODEL

The study is based on two variables, namely the dependent variables and the independent variables. In this research, we have food security during COVID-19 in Morocco as the dependent variable, while government support and independent household variables such as age as independent variables.

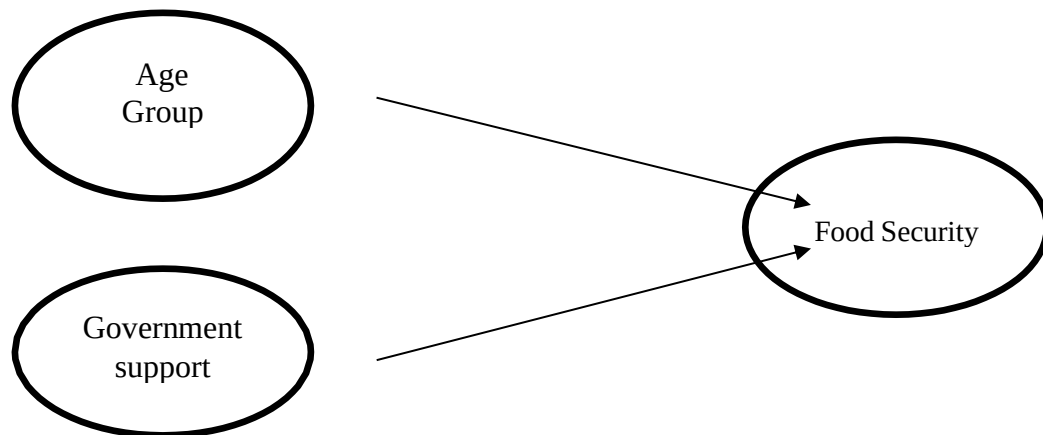


Figure 3.1: Research Model.

3.5 SAMPLE OF THE STUDY

The population of Morocco has 37 million, and this research focuses on men and women aged above 18 years old. As the aim is to determine the effects of independent variables on dependent variable.

Table 3.1: Description of the Study Sample.

Country	Number of people
Morocco	152

3.6 SAMPLING METHOD

Non-probability convenience sampling will be used as this technique involves researchers to select participants based on their availability and convenience; this convenience sampling method offered a practical approach to collect data soundly.

3.7 DATA COLLECTION TOOL

This research is considered as quantitative research and the frequency 5-point Likert scale (1= never, 2 = rarely, 3 = sometimes, 4 = very often, 5 = always) will be used to collect data on food security during COVID-19. On the other hand, the agreement binary responses (0 = No; 1 = Yes) will be used to collect data on government support during COVID-19.

3.8 DATA ANALYSIS TECHNIQUES

In this section of the methodology, we will employ a range of data analysis techniques to comprehensively investigate the purpose of this research. Using the quantitative method, the data will be assessed, and for the internal consistency reliability analysis, Cronbach's Alpha test will be used. Descriptive statistics, such as the mean and the standard deviation as well as frequency distribution will be used to provide a clear overview of the data which will help summarize the main characteristics of the data. For the impact of independent household variable and government support on food security during COVID-19 will be measured utilizing the Multiple Linear Regression.

4. RESULTS

This important section of the thesis presents all the data employed in the research and its results. It starts by examining the demographic characteristics of those surveyed, including gender, age, marital status, employment status, annual household income, level of education. It evaluates the reliability of the data by facilitating the Cronbach's Alpha, and a one-way ANOVA to find out the differences across the Age groups. Furthermore, to assess the relationship between the variables, the research performed multiple linear regression analyses.

4.1 DESCRIPTIVE STATISTICS

4.1.1 Descriptive Statistics of Demographics

This section clarifies an overview of the demographic characteristics of the research's data. The data set included 152 participants who were impacted. To assure the reliability of the study by targeting different populations from diverse backgrounds, gender, age, education, employment, and income.

Table 4.1: Frequency of Gender.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	70	46.4	46.4	46.4
	female	81	53.6	53.6	100.0
	Total	151	100.0	100.0	

The first question of the demographic variables represent the gender of the respondents, by coding the option "male" as 1 and "female" as 2. The chart above displays that 53.6% of the total respondents are males while 46.4% are females. Therefore, it can be concluded that there are almost an equality between males and females that are participated in the survey.

Table 4.2 : Frequency of Age.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-24	24	15.9	15.9	15.9
	25-34	83	55.0	55.0	70.9
	35-44	25	16.6	16.6	87.4
	45-54	13	8.6	8.6	96.0
	55-64	6	4.0	4.0	100.0
	Total	151	100.0	100.0	

In the second question of the demographic variables of the participants is about the age level of the respondents by coding the options “18-24” as 1, “25-34” as 2, “35-44” as 3, “45-54” as 4, “55-64” as 5, “Above of 64” as 6. The chart above illustrate that the majority of the respondents belong to the “25-34” age level 33.1% followed by “35-44” with 21.9%, “45-54” with 16.6%, “18-24” with 15.9%, “55-64” 8.6% and finally “Above of 64” 4%, which indicates a variety in the respondents category.

Table 4.3 : Education.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than high school diploma	17	11.3	11.3	11.3
	High school graduate, diploma or the equivalent	12	7.9	7.9	19.2
	Vocational degree	9	6.0	6.0	25.2
	Bachelor’s degree	27	17.9	17.9	43.0
	Master’s degree	50	33.1	33.1	76.2
	Master’s degree	36	23.8	23.8	100.0
	Total	151	100.0	100.0	

In the third question of the demographic questions tends to clarifies the education level of the respondents, by coding the option “Less than high school diploma” as 1, “High school graduate, diploma or the equivalent” as 2, “Vocational degree” as 3, “Bachelor’s degree” as 4, “Master’s degree” as 5, “Professional degree” as 6, “Doctorate degree” as 7. Thus, it can be concluded through the above chart that the majority of the respondents belong to the master’s degree level by 33.1% of the total respondents followed by bachelor’s degree 17.9%, professional degree 13.9%, less than high school diploma 11.3%, doctorate degree 9.9%, high school graduate, diploma or the equivalent 7.9% and finally the least respondents were belong to the vocational degree level by 6%.

Table 4.4 : Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	married	66	43.7	43.7	43.7
	single	75	49.7	49.7	93.4
	divorced	10	6.6	6.6	100.0
	Total	151	100.0	100.0	

In the fourth question of the demographic questions tends to displays the marital status of the participants by coding the options “single” as 1, “married” as 2, “divorced” as 3. Therefore, we can see that the majority of the respondents belong to the married status by representing 49.7% of the total respondents, followed by singles 43.7% and divorces 6.6%, which shows a variety in the responder's responses that makes the analyses suitable.

Table 4.5 : Employment Status.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	employed full time	69	45.7	45.7	45.7
	employed part time	17	11.3	11.3	57.0
	student	33	21.9	21.9	78.8
	not employed	22	14.6	14.6	93.4
	retired	10	6.6	6.6	100.0
	Total	151	100.0	100.0	

In the fifth questions of the demographic questions tends to displays the employment status of the respondents by coding the options “employed full time” as 1, “employed part time” as 2, “student” as 3, “not employed” as 4, “Retired” as 5. Thus, the majority of the respondents belong to the employment full-time status by 45.7%, followed by student 21.9%, not employed 14.6%, employed part-time 11.3%, and retired 6.6%, which clarifies that there are variety in the responses with majority in employed full-time status.

Table 4.6 : Annual Income.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	36000 to 39000 MAD	51	33.8	33.8	33.8
	39000 to 42000 MAD	28	18.5	18.5	52.3
	42000 to 45000 MAD	18	11.9	11.9	64.2
	45000 MAD or more	54	35.8	35.8	100.0
	Total	151	100.0	100.0	

In sixth question of the demographic variables displays the annual income of the respondents by coding the options “36000 to 39000 MAD” as 1, “39000 to 42000 MAD” as 2, “42000 to 45000 MAD” as 3, and “45000 MAD or more” as 4. Therefore, we can see that the majority

of the responses belongs to the 45000 MAD or more by 35.1% followed by 36000 to 39000 MAD by 33.1%, 39000 to 42000 MAD 17.9% and 42000 to 45000 MAD 13.9%, which shows a variety in the responses of the responders along with a high responses in the 36000 to 39000 MAD and 45000 MAD or more levels.

4.1.2 Descriptive Statistics of the Demographic Questions

This part will illustrate the demographic questions on food security, in order to provide an obvious comprehension of the respondent's points.

Table 4.7 :Descriptive Statistics.

	N	Minimum	Maximum	Mean	Std. Deviation
Gender	151	1	2	1.54	.500
Age	151	1	5	2.30	.972
Education	151	1	6	4.25	1.622
Marital_Status	151	1	3	1.63	.607
Employment_Status	151	1	5	2.25	1.343
Annual_Income	151	1	4	2.50	1.285
Valid N (listwise)	151				

This table displays the mean and standard deviation of demographic variables as we can see from this table, the marital status, employment status, and annual income they have a high standard deviation of 1.622, 1.343, 1.285 respectively which means that there was higher spread in the data.

4.2 RELIABILITY AND VALIDITY ANALYSIS

4.2.1 The Cronbach's Alpha

The Cronbach's alpha is a measure used to estimate the reliability or internal consistency of a set of scale or test items. This test quantifies the level of agreement on a standardized 0 to 1 scale.

Table 4.8 :Reliability Statistics : All Variables.

Cronbach's Alpha	N of Items
.741	11

The Cronbach's Alpha test is used to test the reliability of the questionnaires, due to its genuine technique to analyze the reliability. The accepted rule in this test is 0.7 indicates a good level of reliability. In this case, we have the value of the Cronbach's Alpha which is ,741 which refers to good reliability.

Table 4.9 :Reliability Statistics For Food Security.

Cronbach's Alpha	N of Items
.775	6

In this case, we have the value of the Cronbach's Alpha which is ,775 which refers to good reliability.

Table 4.10 :Reliability Statistics For Government Support.

Cronbach's Alpha	N of Items
.522	5

In this case, we have the value of the Cronbach's Alpha which is ,522 which refers to medium level of reliability.

4.2.2 Factor Analysis

Factor analysis is used to understand the underlying structure or patterns within this data as well as to reduce the number of variables to explain and to interpret the results.

Table 4.11: Total Variance Explained.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.266	29.695	29.695	3.266	29.695	29.695
2	1.615	14.682	44.377	1.615	14.682	44.377
3	1.272	11.567	55.944	1.272	11.567	55.944
4	1.047	9.521	65.465	1.047	9.521	65.465
5	.883	8.024	73.489			
6	.738	6.713	80.203			
7	.581	5.278	85.481			
8	.523	4.752	90.233			
9	.456	4.149	94.382			
10	.393	3.576	97.958			
11	.225	2.042	100.000			

Extraction Method: Principal Component Analysis.

This table provides a comprehensive view of the variance explained by each principal component in your factor analysis. Eigenvalues represent the amount of variance explained by each component. In your table, the first component has the highest eigenvalue (3.266), indicating it explains the most variance in the data.

The first component explains 29.695% of the total variance, and the cumulative percentage increases with each subsequent component. The first component has a sum of squared loadings of 3.266, representing the total variance in the original variables accounted for by this component. The first few components typically capture the majority of the variance in the data. In your case, the first three components explain about 55.944% of the total variance.

Table 4.12: Component Matrix^a

	Component			
	1	2	3	4
Question 1	.807	-.339	.016	-.027
Question 2	.765	-.239	.039	.107
Question 3	.770	-.128	-.056	.232
Question 4	.315	.088	.231	.781
Question 5	.724	-.024	-.255	-.033
Question 6	.539	-.140	-.299	-.333
Question 1	.158	.348	.623	.014
Question 2	.433	.520	.311	-.201
Question 3	.290	-.114	.662	-.371
Question 4	.132	.811	-.264	.154
Question 5	.457	.581	-.258	-.238

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Q1 to Q6 for food security, Q1 to Q5 for government support.

This component seems to be associated with food security, as Questions 1 to 6 (related to food security) have high positive loadings on this component. The higher loadings on these questions suggest that they are strongly related to the underlying factor represented by Component 1.

This component appears to be associated with government support, as Questions 1 to 5 (related to government support) have high positive loadings on this component. The higher loadings

on these questions suggest a strong relationship with the underlying factor represented by Component 2.

4.3 MULTIPLE LINEAR REGRESSION ANALYSIS

The impact on food security and government support during COVID-19 will be evaluated using the linear regression analysis, which will allow us to know the relationship between the dependent variable and the independent variables as well as assess the statistical significance of this relationship.

Table 4.13: Model Summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.334 ^a	.111	.099	4.28147

a. Predictors: (Constant), Age, Government Support

This table shows that the value of R is ,334, which represents a positive moderate coefficient of correlation, while the R Square is 11,1% indicating that 11,1% of the variability in food security during the COVID-19 can be explained by the predictors included in the model. Moreover, It is used to find out whether adding more predictors adds value to the model. It displays a value as ,099 It is commonly slightly less than the R Square because it penalizes the extra of unnecessary predictors. Furthermore, the Std. Error of the Estimate value is 4.28147 represents the average amount of error in predicting food security based on the COVID-19, it gives an indication of the typical deviation between the predicted and actual values, the first value indicate the values of food security that are calculated based on values of the COVID-19 values while the second value refers to the observed values of food security that have been collected from the data.

Table 4.14: ANOVA of Linear Regression.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	339.880	2	169.940	9.271	.000 ^b
	Residual	2712.981	148	18.331		
	Total	3052.861	150			

- a. Dependent Variable: FoodSecurity
- b. Predictors: (Constant), Age, Government Support

The model fits the statistical data since the p-value of ,000 of the ANOVA shows statisticalsignificance (p-value is less than 0.01).

Table 4.15 :Coefficients^a

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	11.944	.977		12.221	.
	Government Support	1.006	.261	.303	3.847	.
	Age	-.952	.366	-.205	-2.601	.

- a. Dependent Variable: Food Security
- b. Independent Variables: Age and Government Support

In this case, we have two predictors of age and government support, that are significantly related to food security during the COVID-19 pandemic since their p-values are less than 0.05. The positive B coefficient of the age predictor refers to the estimated change in food security during the COVID-19 pandemic for a one-unit change in the predictor variables, for instance, for a one-unit increase in age is associated with an of 0,952 in food security during COVID-19, in practical a move to higher age bracket for a person the expected change in food security score is an increase of 0,952 units, the coefficient Beta represents a negative coefficient which indicates since the predictor variable increases the dependent variable tends to decrease, for example for a one-standard-deviation increase in age is associated with an decrease of 0,205 standard deviation units in food security duringCOVID-19 pandemic, in practical the age of an individual increase by one standardeviation the expected change in food security is 0,205 standard deviation units, the t- value of 3,847 represent a higher value and statistically different than 0 which refers to a positive relationship between the variables, and the higher t-value the more evidence that this predictor variable is statistically related to food security during COVID-19 pandemic, the p-value is less than 0.05 which confirm that there is a stistically significant relationship between the variables.

For the government support predictor, we have the coefficient B represent a positive value which indicates that since the predictor variable increase, the dependent variable tends to increase for example for one-unit change in government support is associated with an increase in food security during the COVID-19 pandemic by 1.006 units, while the coefficient Beta represents a positive value which means for one-standard-deviation increase in the predictor variable is associated with an increase in the dependent variable, for instance, for a one-standard deviation increase in the government support is associated with an increase of 0,303 standard deviation unit in food security during the COVID-19 pandemic, the t value represent a negative value of -2,60 which indicates a significant difference from 0, and the negative t value suggest that there is a negative relationship between the predictor variable and the outcome variable, also we have the p value is less than 0,05 which means that there is a statistically significant difference between the variables.

4.4 HYPOTHESES TESTING

Table 4.16: Hypotheses Results.

Hypotheses	Testing Results
H1: There is a significant relationship between the age group and food security during the COVID-19 pandemic.	Accepted
H0: There is no significant relationship between the age group and food security during the COVID-19 pandemic. Morocco during the Russia-Ukraine war.	Rejected
H2: There is a significant relationship between the government support and food security during the COVID-19 pandemic.	Accepted
H0: There is no significant relationship between the government support and food security during the COVID-19 pandemic.	Rejected

5. DISCUSSION AND CONCLUSION

This section of the thesis will be written to discuss the results obtained with a detailed discussion that will be supplied.

5.1 DISCUSSION

The purpose of the research is to bring to light the food security state and government support during COVID-19 pandemic. Throughout an exploration of the literature, The COVID-19 pandemic has profound effects on cultures all across the world, affecting many facets of daily life, including food security. The purpose of this literature review is to assess the body of knowledge that already exists about the impact of the COVID-19 pandemic on food security. This review examines research, reports, and scholarly work to understand the difficulties the food system faces and to pinpoint methods for boosting food security in times of need. Global food systems were affected by the COVID-19 pandemic, which created serious problems with food access, delivery, and production. Agribusiness production was severely hampered by lockdown procedures, travel restrictions, and workforce shortages, which decreased productivity and disrupted supply networks (Smith et al., 2020). Moreover, particular socioeconomic elements influencing food security outcomes, for example, the interaction between income levels, employment status, access to social safety nets, and food security, more in-depth investigation is required (Haddad et al., 2021). Further investigation is also necessary to evaluate the food system's resilience and pinpoint methods to improve its capacity for adaptation and recovery from shocks (Niles et al., 2020). Understanding behavioral shifts and coping mechanisms used by individuals and groups, as well as evaluating the success of particular policy actions put in place during the epidemic, can also offer insightful information (Tong et al., 2021). This intends to add to the corpus of knowledge on food security during crises by filling in these gaps and building on prior research, with a special emphasis on the COVID-19 pandemic's ramifications. In order to improve food security and create resilient food systems that can resist and recover from future crises, policymakers, practitioners, and communities can use the findings of this research to guide their development of proactive measures, policies, and interventions. The production, transportation, and distribution of food have all been impacted by the COVID-19 pandemic, which has severely disrupted the world's food supply system (Smith et al.,

2020). The food supply chain has faced a number of difficulties and risks as a result of lockdown measures and travel restrictions put in place to stop the virus's spread (Jones & Kaminski, 2021). Due to labor shortages brought on by mobility restrictions, agricultural productivity has been impacted, resulting in lower food availability and production, the lockdown procedures used during the pandemic have had an impact on how local, regional, and international food supply systems operate (Jones & Kaminski, 2021). In their analysis from 2021, Jones and Kaminski especially looked for vulnerabilities and bottlenecks in the food supply networks to determine how lockdown measures affected them. The study emphasized the necessity of supply chain management's flexibility and adaptation in order to lessen the effects of disruptions. Furthermore, in times of crisis, policy actions are essential for addressing the problems with food security, there is a need for a more thorough review of the specific policy initiatives that were implemented during the COVID-19 pandemic and their efficacy in reducing concerns with food security, even though current research has acknowledged the significance of policy interventions. Analyzing the results of various policy actions can assist identify best practices for future policy choices during similar crises and can offer insights into how they affected various components of the food system. Governments and international organizations used a variety of policy initiatives to support food security during the COVID-19 epidemic. For instance, Azevedo et al. (2021) looked at how government measures could be used to reduce the risks to food security during the pandemic.

Hence conducted approved that food security during the COVID-19 has been affected according to the associated hypothesis "There is a significant relationship between the age group and food security during the COVID-19 pandemic", the findings of the research shows that there is a statistically significance difference between the independent variable and the dependent variable which suggests that the age predictor found to be affected food security during the COVID-19, thus the hypothesis is accepted. Moreover, the associated hypothesis: "There is a significant relationship between the government support and food security during the COVID-19 pandemic", was accepted as well since the results displays that there is a statistically significant relationship between government support and food security during COVID-19 since its p-value is less than 0.05.

5.2 CONCLUSION

Lastly, age and government support were found to be predictors that impact food security during COVID-19, the epidemic has impacted the production, transportation, and distribution of food, which has severely disrupted the world's food supply system as well as disrupted the food supply chains, increases in prices which led to food insecurity and malnutrition.

To maintain the effects on food security it is important to depend on:

- a. Guarantee access to essential food products for low-income households by strengthening public subsidies.
- b. Set up community food-sharing programs to help people vulnerable to food shortages.
- c. Facilitate access to online resources for nutrition education.
- d. Strengthen technological and financial support to ensure local agricultural production.
- e. Encourage small farmers to support food supply chains in local communities.
- f. Strengthen collaboration between international bodies to maintain stability and global food trade.
- g. Develop emergency food aid programs for vulnerable populations affected by job losses.
- h. Develop and communicate contingency plans to effectively manage future food supply disruptions.

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APPENDIX A

Survey

Greetings,

My name is Zineb Moutarajji, a Master of Business Administration (MBA) student at Altinbas University in Istanbul, Turkey. I am conducting research on household food security as part of my degree program to find the effects of the COVID-19 pandemic. Answering the questions will take around 5 to 10 minutes to complete, and data will be treated confidentially and safely. Your answers are anonymous and will be used to analyze the effects of these crises on food security, and the results will be reported only at the aggregate level.

Researcher:

Zineb Moutarajji

Supervisor:

Bella Gulshan

A.1 Survey Questions

Section1: Demographic questions

Q1.What is your

gender?Female

Male

Q2. What is

your age?18-24

25-34

35-44

45-54

55-64

Above of 64

Q3. What is your education

level?Less than high school

diploma

High school graduate, diploma or the

equivalentVocational degree

Bachelor's

degree

Master's

degree

Professional

degree

Doctorate

degree

Q4. What is your marital

status?Single

Ma

ried
d
Div
orc
ed

Q5. What is your current employment
status?employed full time
employed
part time
student
not
employed
ed
retired

Q6. What is your annual household income?
36000 to 39000 MAD
39000 to 42000 MAD
42000 to 45000 MAD
45000 MAD or more

Section2: Food Security during COVID-19 Questions

Q7. During COVID-19, did the state of your food security get affected? Always

Very
often
Some
times
Rarel
y
Neve
r

Q8. Did your diet change during COVID-19? Always

Very
often
Some
times
Rarel
y
Neve
r

Q9. Did you or any member of your household have to eat a limited variety of foods due to alack of resources?

Alwa
ys
Very
often
Some
times
Rarel
y
Neve
r

Q10. Was your household sufficient to order food online more frequently? Always

Very
often
Some
times

R
a
r
e
l
y
N
e
v
e
r

Q11. Have you feared that your household might not have enough food? Always

Very
often
Some
times
Rarel
y
Neve
r

Q12. During the pandemic, were you rely on less popular and less expensive foods? Always

Very
often
Some
times
Rarel
y

Never

r

Section3: Government Support during COVID-19 Questions

Q13. Are you aware of government support measures for agriculture during lockdown? Yes

No

Q14. Have you received a cash transfer from the government since the lockdown? Yes

No

Q15. Did you receive extra food rations? Yes

No

Q16. Does anyone in the household work for wages? Yes

No

Q17. Have household wages fallen by 50% or more since lockdown? Yes

No

