CULTURE IN THE FOOD SECURITY LITERATURE OF WEST AFRICA: A CRITICAL REVIEW

By

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A THESIS

Presented to the Department of Global Studies
and the Division of Graduate Studies of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Master of Art

September 2021

THESIS APPROVAL PAGE

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Title: Culture in the Food Security Literature of West Africa: A Critical Review

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Degree awarded September 2021

THESIS ABSTRACT

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Master of Arts

Department of Global Studies

September 2021

Title: Culture in the Food Security Literature of West Africa: A Critical Review

This critical review analyzes the visibility of three aspects of culture in West African food security literature: livelihood and practice, social, and systems of meaning. It presents insights into these cultural applications within localized food studies. This review offers a critical lens into food security engagement that is necessary during a time of heightened food insecurity due to stressors, including political unrest, climate change, and the COVID-19 pandemic. To develop sustainable programming around food security, it is useful to audit previous studies to capture the best methodologies of measurement and localized definitions. Valuable insights from this review include an analysis of examples of engagement with all three aspects of culture, an emphasis on qualitative methodologies that capture personal narratives and perceptions of well-being, the presentation of gaps in the literature, and proposed pathways for future research and practitioners that wish to incorporate cultural studies into their research and programming framework.

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ACKNOWLEDGMENTS

I wish to express my sincere appreciation to my committee chair, Dr. Stephen Wooten, whose passions for food, culture, and West Africa have encouraged my curiosities and research. Dr. Wooten has provided continuous intellectual mentorship throughout this critical review process. His support and influence do not go unnoticed in this finished review. I also want to express my gratitude to my thesis committee members Dr. Lesley Jo Weaver and Dr. Hannah Cutting-Jones. They provided essential expertise and guidance on the construction and process of this critical review. It is inspiring to be supported by a committee full of enthusiasm and interest in food security, culture, and well-being.

I want to thank my graduate school cohort members, Neti Gupta, Lydia Caudill, Matthew Fouts, Ingrid Ambriz-Mata, and Maria Carvalho, for navigating the thesis process with me and allowing me to talk through the changing elements of the research continuously. I also want to express gratitude to the University of Oregon International Studies Faculty and Staff, who provided patience and support during the many uncertainties of the COVID-19 pandemic.

Finally, I want to thank my parents, Debbie and Greg Ziesenhene, who have supported me and loved me throughout my many adventures in life that have brought me to be able to complete this thesis. I want to thank my sister Jenna Ziesenhene and best friend Amber Port, who have provided long hours of editing support. Lastly, I want to thank my Oregon support system, Elliot Van Susteren, and my dog Koumba for taking me away from the computer and allowing me to experience the remarkable wonders of the Oregon Wilderness.

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CHAPTER I

INTRODUCTION

I.I Introduction

Ending hunger is one of the primary components of the Sustainable Development Goals (SDGs) and is the focus of a recent report by the United Nations Food and Agriculture Organization (UN FAO) titled, "The State of Food Security and Nutrition in the World 2021: The World is at a Critical Juncture." This report outlines the current global experiences of hunger and notes that contrary to international efforts, the amount of people who are hungry, face food insecurity, or are malnourished is growing. As of 2020, between "720 and 811 million people" were hungry, and during 2020 the world saw this number grow to the equivalent of the past five years combined (UN FAO, 2021, p.xii). UN FAO (2021) attributes this growing trend in hunger to "conflict, climate variability and extremes, economic slowdowns and downturns," and the COVID-19 pandemic (UN FAO, 2021, p. xii). With the Sustainable Development Goals' 2030 deadline swiftly approaching, practitioners and global leaders are scrambling to pivot their efforts to end global hunger towards more transformative paths that support greater resilience. In this context, scholars have been applying a concentrated and critical lens on the previous efforts and studies around hunger and food security to encourage more inclusive and successful interventions. Inspired by this scholarship, the present study explores how studies focusing on the cultural dimensions of hunger and food security can contribute to more inclusive and successful interventions. Through a regional scope of West Africa, this review will seek out valuable insights regarding the intersection of culture and food security. Information on culture will be derived through the analysis of

three apsects livelihood and practice, social, and systems of meaning. This review will provide support and suggestions to scholars and practitioners interested in leveraging knowledge of the ways food security and culture interact in order to help promote successful and sustainable interventions.

As pointed out by the UN FAO 2021 report above, hunger is a concept that is at the forefront of global development. Hunger is most often aligned with efforts around food security and health. Many development practitioners and globalists try to establish that hunger is a fixed universal concept and experience that can easily be alleviated through increased nutritional intake. As seen in the UN FAO 2021 report, many of the paths toward ending hunger focus on the economic and nutritional indicators and standards that can be universalized. However, as written about by modern scholars like Kristin Philips or foundational anthropologists like Audrey Richards, hunger is not a universal experience. Hunger is dynamic and collides with the cultural and localized well-being of a person or people.

In her book, *An Ethnography of Hunger: Politics, Subsistence and the Unpredictable Grace of the Sun* (2018), Kristin D. Phillips illustrates how subsistence farmers in Tanzania adapt their social and livelihood practices to the constraints and effects of hunger rather than yield to it. Phillips (2018) highlights the general understanding of hunger as "the severe lack of food" (Phillips, 2018, p. x). This general definition allows development practitioners and the media to paint a picture of hungry people as also experiencing a lack of autonomy, sociality, power, and even a life. However, Phillips stresses that hunger is "neither universally manifested nor uniformly experienced" (Phillips, 2018, p. x). This claim is supported by the ethnographic work of

Audrey Richards, a foundational social anthropologist who spent her life understanding the social dynamics of the Bemba people. In her book, *Land, Labour, and Diet, in Northern Rhodesia: An Economic Study of the Bemba Tribe* (1939), Richards discusses the Bemba's unique experience of hunger and reasons for eating. The author notes that "besides their general ideas as to what a meal should consist of, the Bemba have definite views as to the effects of eating and drinking" (Richards, 1939, p. 50). She compares her findings to that of Bronislaw Malinowski, who studied the social and eating habits of the Trobriand Islanders. The examples of the Bemba people and the Trobriand Islanders present different perspectives on their process and reason for eating. Richards (1939) mentions that the Trobriand Islanders consumed food and drink more for pleasure, whereas the Bemba people ate to maintain strength and energy. It is important to note that both the narratives of Malinowski and Richards are rightly critiqued as colonial and racist. However, there are important points made by these two anthropologists regarding the unique experiences around hunger, food security, and nutrition. This uniqueness of hunger can be directly linked to the context of a people and their definitions of well-being which are shaped by their systems of beliefs.

Today, people are often viewed as overcoming hunger when they are food secure. Thus, achieving and maintaining food security is one of the anticipated outcomes of the Sustainable Development Goals. As mentioned in the UN FAO 2021 report, food security is viewed as a state where a person is no longer hungry. Popular understandings of food security correlate with Western economic and nutritional standards that that are not always relevant in a localized context. As food security studies have grown and development practitioners have continued to intervene with food and agriculture practices

in local communities, some scholars have argued that priorities around how food security experiences are measured need to shift to be more inclusive of qualitative data based on personal narratives and cultural beliefs. This position is similar to that of Phillips (2018) and Richards (1939), which stress the uniqueness and context necessary when working with food.

In one study, Han Mohan Mathur (2019) writes extensively on the need to consider culture in development initiatives that can also transcend into academic research. Culture needs to be considered in all interventions and research to ensure positive experiences and outcomes, especially for the local communities. Mathur (2019) notes a growing "lack of receptivity" among local communities who interact with development practitioners because their cultural values and perspectives are not taken into consideration or incorporated into the programing (Mathur, 2019, p.73). Mathur points out that when research and programs do not consider local traditions, habits, tastes, and customs, less success is achieved after implementation. This can most often be seen in interventions around education, gender and food, and agriculture.

In Mathur's discussion around food and agriculture, he presents a vignette around a study on the introduction of a hybrid corn variety in New Mexico, in which scholars found that taste rather than profit proved to be a more "decisive factor" to the successful production of the crop variety (Mathur, 2019,76). This concept of prioritizing unique tradition or taste can be seen in research previously discussed, such as Phillips (2018) and Richards (1939), or in research by prominent scholars Jack Goody and Sidney Mintz. Sidney Mintz is known for comparing cuisine to the culture of food. According to Sidney Mintz (1996), the culture of food encompasses the ingredients, technologies, and systems

of meaning and beliefs around what constitutes a proper meal that is healthy and tastes good. Goody (1982) notes an increase in the shifts around food culture as local communities become more situated into a globalized network. For example, the lasting effects of the Industrial Revolution in West Africa include the shifting of local tastes that now prioritize more processed food like sugar, canned beer, canned fish, and canned tomatoes (Goody 1982). Mathur (2019), Phillips (2018), Mintz (1996), Goody (1982), and Richards (1939) highlight the varying ways in which culture and food intersect and how important of a role tradition plays in the interactions around food and agriculture. These scholars also underline the fragility of local food systems and food practices, and their findings show how easily cultures can shift to a more globalized system. As planned interventions designed to address global poverty and hunger have increased over time in the age of "development," the relationship between the general and the specific nature of food in/security has become more significant – for developers and developees alike.

Because of this fragility, some scholars and practitioners have argued that current research must prioritize local culture, traditions, and beliefs when studying food and agriculture through qualitative-based methodologies. By prioritizing local culture in research, practitioners who utilize the findings to develop interventions comprehensively understand the local cultural contexts around food and are better positioned for successful interventions and outcomes. This critical scholarship has taken shape in the last several decades, with essential contributions based on studies in various global settings. Examples of recent scholarship that applies a critical lens of culture includes Hadley et al. (2019) and Ohna et al. (2012). Hadley et al. (2019) assessed if individuals in Ethiopia and Brazil shared conceptualizations of food values. Their findings indicate that, there is a

shared experience of the conceptualization of food value. Hadley et al. (2019) report that "the meaning of food is as real (and measurable) as the caloric, protein, and micronutrient contents in various foods and dishes" (Hadley et al., 2019, p. 99). These findings support the foundation for this critical review in showcasing that "food has signaling value and that consumption of foods can have private benefits (i.e. meeting macronutrient and micronutrient needs) and public benefits (i.e. signaling the socioeconomic position of individuals)" (Hadley et al., 2019, p. 100). Whereas Ohna et al. (2012) uses diet and cuisine as tools for analyzing cultural categories and systems of meaning within a village in Tanzania. Ohna et al. (2012) claim that the decisions people make around acquiring, preparing, and consuming food are distinctly linked to a "set of social categories that carry meaning and act as signifiers of cultural identities but also of social status and wealth" (Ohna et al., 2012, p.11). These meanings can be translated into the general well-being of a community or individual. Ohna et al. (2012) also make a direct call to action when they state "thus, the dynamic combinations of the cultural and social categories in households' and individuals' decisions on food consumption also provide a—necessary—basis for understanding future outcomes of interventions seeking to improve the nutritional value of local diets" (Ohna et al., 2012, p.11). This call to action will be echoed within this review and justifies the reason behind this critical review.

This growing trend in prioritizing local context in food security studies, presents an opportunity to audit the current status of culture in food security literature, assess the patterns in this literature, and predict paths for future engagement. A comprehensive tool to "take stock" is through a critical review. This critical review will audit the current

position of culture in food security literature in a specific region and how these presentations of culture and food support the comprehensive understanding of the well-being of local people. West Africa is the geographic scope of this review as it tends to be overlooked in modern research. This indicates the possibility of significant gaps within cultural studies and food studies of this region. This review will serve as a unique piece of research that weaves together culture, food security, and well-being. This review will be a transparent resource that future scholars can utilize to support claims around the intersection of food security and culture.

I.II Research Questions

This critical literature review aims to present the state of existing knowledge, in the form of scholarly literature, on the visibility of culture in food security research in West Africa. The primary research questions for this review are: What is the status of the present scholarly literature on food security in West Africa? How is culture presented in food security literature of West Africa? How can these insights into the connect between food and culture be applied to future research and development interventions? Much of the literature on food security asses the concept through its fundamental ideals of nutritional well-being, economic success, and local development. Over the past 50 years, humanistic qualities like culture have not been presented as a significant principle or metric in food security studies. This literature review will serve as an audit of the food security literature of West Africa to understand where culture is discussed and if it is considered, what approach is taken. As will be seen in future sections of this review, engaging with culture can foster a more enhanced understanding of locally relevant

concepts and practices around food and foodways. This understanding can lead to more successful and meaningful interventions.

I.III Research Approach and Positionality

This research originated from the conceptual curiosity around the intersection of food practices and cultural aspects during my time as a Peace Corps Volunteer in Guinea. For two years, I lived in a Kissi village, developing relationships that allowed me to begin to understand Kissi culture. I came to understand food as an essential component to maintaining personal, cultural, and community well-being. As a development practitioner living and participating among the community within which I work, I began to question the stability, sustainability, and appropriateness of the interventions encouraged by my organization and others. I found myself asking questions like, how does this align with Kissi food values? How does this alter the prioritized crops of Kissi farming? How can this intervention shift gender or social expectations that weave together the Kissi culture? These are important questions development practitioners and researchers engaged with development agenda items need to be asking themselves in order to construct the most sustainable interventions for all participants.

This review engages with methods inspired by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), to capture the current state of food security literature that comprehensively engages with different aspects of culture. Some of the PRISMA derived processes of this review include the combination and analysis of concepts in order to find the intersection and gaps, the collection of "relevant evidence that fits pre-specified eligibility criteria to answer a specific research question" (Shamsee et al., 2014, p. 3), and the synthesis of results.

The articles that are presented in this critical review will outline best practices around the engagement with culture and food, and showcase evidence that underscores why prioritizing culture is essential in understanding an individual's or community's food security

I.IV Outline of Paper

This critical review is organized into six chapters. Chapter I includes the introduction to the review, an overview of the research questions, an overview of positionality and methods, and this general outline of the paper. This chapter sets the foundation of the review and positions the reader with a broad understanding of the topic.

Chapter II is an extensive background of three key terms: food security, culture, and well-being. For food security, the contextual history of the term is presented. There is also a section on the globally applied measurements of the term. Lastly, here is a section on how current literature suggests that the concept can be expanded beyond its general definition. This final section for food security opens the door for discussion around its intersection with culture and the value of including culture in food security conversations.

The next term, culture, is addressed through two sections. First, there is a general presentation of the concept of culture, which includes the anthropological development of the term. Next, culture is looked at through the lens of development, and the question, "why does it matter," is addressed. Addressing this question is essential, as it highlights the gaps within development and food security literature with which culture should have been engaged. This section justifies why this review was conducted. Lastly, in this chapter, well-being is addressed through a general discussion around the concept while highlighting how different cultures have different understandings of well-being. Well-

being is defined, because food security plays a significant role in the well-being of humans and can have direct links to culture and cultural well-being.

Chapter III is the methods chapter. In this chapter, my positionality is represented along will an alignment of the theoretical framework to current literature that engages with the intersection of food security and culture around the world. This chapter discusses the methodology inspiration and points out important distinctions that make this review unique. Then the literature search and development and application of inclusion and exclusion criteria of this review are presented step by step to provide transparency. It is important to thoroughly explain these methods so that future research can address biases and gaps. Lastly, the results of the literature search are described, which includes how articles were selected to be included or not in the review. Along with these results, the identification of the major themes and the coding conducted to highlight subthemes are presented. After the discussion around the coding processing, there is a breakdown of each theme and the subtheme.

Chapter IV is an extensive breakdown of the subthemes. This chapter presents an analysis of each subtheme, and uses thirty articles identified in the review to showcase exemplary applications of each subtheme as well as lessons learned from weak applications of a subtheme. Some articles are analyzed multiple times via different subthemes. There is also a methods analysis section in this chapter that highlights how food security was measured in the articles. This section highlights the gaps that arise from relying only on quantitative methods and the synergy that mixed methods present in relation to the intersection of food security and culture.

Chapter V and VI are the closing chapters. Chapter V presents a summary of findings which highlight where culture is visible. The limitations of the research are also explained in this chapter. Chapter VI highlights the contributions of this review to food security literature, the path for future research, and the conclusion of the review. Lastly, there is an Appendix that is referenced throughout the review and includes the list of references cited.

CHAPTER II

BACKGROUND

This section will engage with three foundational terms found at the center of this review, food security, culture, and well-being, to allow for a comprehensive and contextual understanding of the framework of this research. These three terms were chosen as the framework concepts for this review through preliminary research. This research indicated that all three terms are important in the maintenance and daily sustainability practices in communities. All three terms are transdisciplinary and highlight social, economic, and communal linkages that allow for a comprehensive understanding of a local context. It is essential that this review includes an extensive description of these terms, including history, current application, and measurements because all three are multilayered, contentious, and viewed as evolving toolkits. This section begins with food security, the foundational concept of this research, then moves to culture, the intersecting concept in which this review seeks to uncover within food security research, and ends with well-being, the product of the intersection of food security and culture.

II.I Food Security

II.I.I What is Food Security

Because of its complex and interlinking layers, food security has faced much contention around its definitions, metrics, and applications. For a basic understanding of food security, one can look to the UNFAO definition, which states, "food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and

healthy life" (World Food Summit, 1996). As of 2006, four general food security parameters have been identified: food availability, food access, utilization, and stability. The UNFAO provides a comprehensives explanation of these parameters in the policy brief "Food Security" (2006):

- Food availability can be understood as "the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports" (World Food Program, 2006, p. 1).
- Food access can be understood as "access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet" (World Food Program, 2006, p. 1).
- Utilization can be understood as the "utilization of food through adequate diet, clean water, sanitation, and health care to reach a state of nutritional well-being where all physiological needs are met" (World Food Program, 2006, p. 1).
- Stability can be understood as "a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g., an economic or climatic crisis) or cyclical events (e.g., seasonal food insecurity)" (World Food Program, 2006, p. 1).

These four parameters often referred to as pillars, are seen as quantitative universal understandings and guidance for food security measurements. Along with the general definition, these four pillars often serve as the blueprint for understanding food security.

II.I.II Conceptual History of Food Security

Global development and modernization became a priority towards the end of World War II. Many countries sought to establish "peace and prosperity" (Margulis, 2012, p. 55) and advance nations through a more collective and secure international community. It is important to note that much of the general background literature on food security points out that the fundamentals of food security, including scientific advancement around nutrition, began even before WWII under the International Institute for Agriculture and the League of Nations (McDonald, 2010; Shaw 2007). In the early 20th century, one of the young development movement's top priorities was eradicating hunger and advancing "nutrition and agricultural science" (Margulis, 2012, p. 55; Shaw, 2007). Margulis (2012) and Shaw (2007) both narrate the development history of food security and begin their discussions in 1945 when the United Nations' Food and Agriculture Organization (UNFAO) was first established. Shaw (2007) notes that the founding conference of the UNFAO was "organized to consider the goal of freedom from want concerning food and agriculture" (FAO, 1943, as cited by Shaw, 2007, p. 3). The original mission of the UNFAO was to redistribute surplus food through internationally coordinated grain production and trade (Margulis, 2012, p. 55). After the first session of the founding UNFAO conference, which was attended by 44 countries, its mission was specified as:

- Elevating nutrition and living standards, especially among those in rural and impoverished regions;
- Expanding and improving global food production and trade;
- General economic growth (Shaw, 2007).

However, hegemonic nations like the United States found the position to advance the UNFAO agenda to fit their needs better, such as "strengthening food supply management within developing countries" (Margulis, 2012, p. 55). This set the position of power dynamics within global development, placing Western standards and goals as the priorities.

Fifteen years later, the world population experienced a drastic increase and a slowing global food supply, which raised Malthusian-based fears of food shortage and looming global famine. This hypothesis of global food shortage was developed in 1798 when economist Thomas Malthus predicted a "catastrophic scenario" of global famine when the human population would surpass food production capacity (Binns & Bateman, 2017; Margulis, 2012). This catastrophic scenario is often referenced as part of the human food nexus. It is the foundation for much of the hunger mitigation strategies and food systems advancements worldwide. Binns and Bateman (2017) point out an alternative perspective to the Malthusian doom developed by Danish economist Ester Boserup in 1965. Boserup theorized a more positive relationship within the human food nexus and "argued that population growth and increasing population density could be essential factors in generating innovation and intensification in traditional food production systems" (Binns & Bateman, 2017, p. 157). However, regarding the relationship between food and human populations, the global community would not sit idly and wait.

To prepare for potential widespread food shortage and famine, the UNFAO developed the World Food Program (WFP), with a food assistance mission. The WFP centralized the "international cooperation on hunger" (Shaw 2007, as cited by Margulis,

2012 p. 55). Following the establishment of WFP, many hegemonic countries like the United States and Canada collaborated on a partnership to "foster food production in developing countries" (Margulis, 2012, p. 55) through the promotion and application of advanced agricultural technologies. Margulis (2012) highlights the Green Revolution as the most prominent program of this collaboration.

As the global community experienced supply and price fluctuations among staple crops like corn and wheat, members of the United Nations met for the 1974 World Food Conference to form strategies that would end hunger and increase nutritional intake (Binns & Bateman, 2017). At this conference, a declaration was drafted that states "every man, woman, and child has the inalienable right to be free from hunger and malnutrition to develop fully and maintain their physical and mental faculties" (UN, 1975 p.2, as cited by McDonald, 2010 p. 18). McDonald (2010) notes that the 1974 World Food Conference was an "important milestone in global recognition of food insecurity as a subject for first-order political concern;" however, it failed in establishing "an agreed-upon global path" (McDonald, 2010 p. 18) to mitigate food insecurity.

Food insecurity was placed at the forefront of global collective development throughout the many UN and international community conferences held at the beginning of the 1990s. Throughout the many conferences held in this decade and the previous, the concept of food security underwent significant shifts in meaning and application. Shaw (2007) notes that in 1983, the FAO expanded the concept by adding a framework around "securing access to available food" to the already existing frameworks of "adequate food production" and "stability of food supplied" (p. 349). The term was one of the central priorities in 1996 at the World Food Summit, which was conducted to advance further the

"realistic approaches to food security" (Shaw, 2007 p.348). At this conference the term was expanded and formally presented as the following:

- Availability of sufficient quantities of food of appropriate quality supplied through domestic production or imports;
- Access by households and individuals to adequate resource to acquire appropriate foods for a nutritious diet; and
- Utilization of food through adequate diet, water, sanitation, and health care (Shaw, 2007 p. 349).

By applying the three dimensions listed above to the general state of global food insecurity, world leaders sought to set targeted goals that would reduce the number of people who fell into the quantitative category of "malnourished." At the 1996 World Food Summit, leaders agreed to half the number of undernourished people by 2015 (McDonald, 2010). This goal was then supported in 2000 when the global Millennium Development Goals (MDGs) were adopted. The first goal of the MDGs had an aim to "eradicate extreme poverty and hunger by 2015" (McDonald, 2010 p.18). This goal set quantitative indicators like the number of "underweight children" and the "proportion of population below minimum level dietary energy consumption" (McDonald, 2010 p.18). As will be underscored later in this paper, these indicators prioritized quantitative "measurable" indicators of hunger and food security, and paved the path for future research and programming to capture the multi-layered approach necessary for understanding food security inadequately.

McDonald (2010) makes an important point when stating that after the MDGs were adopted, the term food security continued to evolve and should be understood as a "progressive goal of ensuring access to food that is adequate, safe, and nutritious" (McDonald, 2010, p. 18). By adding more depth to the term, the public and practitioners of the field realized that "food security is not just to ensure that people are well-fed, but that they have all the requirements to fully flourish as individuals, communities, and societies" (McDonald, 2010, p. 18). This fluidity of the meaning of food security underlines the importance of an increased qualitative and humanistic application of the concept.

After the inception of the MDGs, world leaders have continued to prioritize global collectivism and security, including in the fields of food and agriculture. As this paper is being written, a 2021 Food Systems Summit is planned for September 2021. The purpose of this summit will be to support the Sustainable Development Goals (SDGs), which are the revised MDGs that were initially adopted in 2012 at the Roi +20 Summit. Owen Gaffney notes that the SDGs go beyond ending poverty like their predecessor. Instead, these goals sought and continue to seek "a new world view and provide the beginnings of a plan to end poverty without imposing significant costs on Earth's life-support systems" (Assembly, 2015, p. 23). The United Nations webpage highlights that this upcoming summit will be the premier UN summit focused on food systems, but that "it builds on decades of countries, civil society and UN leadership and critical efforts to ensure food security and nutrition for all" (General FAQs, n.d.). However, throughout the 2021 summit web pages, it is clear that food security is not the center point of the conference but rather a necessity for cultivating multi-stakeholder partnerships within

food systems that support the SDGs. From the earlier discussion of McDonald (2010), it could be argued that this summit's focal point is just part of the many layers to food security.

In a final attempt to conceptualize food security, it is crucial to engage with a visual presented by Shaw (2007), which depicts "the broad concept of food security and nutrition security" (Shaw, 2007, p. 384). Figure 1 is a replica of the three concentric circles Shaw (2007) uses in Chapter 40, "Redefining the Concept of Food Security." Shaw (2007) highlights the significant events and shifts in global food security. When engaging with figure 1, it is essential to understand that many of the key "concerns" will become fundamental themes found throughout the literature of this meta-analysis and are based upon geographic and spatially specific applications. As narrated from the text, the "innermost circle – the eye of the storm- includes a series of interlocking food and nutrition concerns" (Shaw, 2007, p. 383), which are locally specific and dependent. Then the middle circle encompasses more regional concerns, and the outer circle envelopes general "global concerns" Shaw, 2007, p. 383-4). Shaw (2007) partners this figure with a summary of key developments within the conceptualization of food security, which include the 1974 World Food Conference, Amartya Sen's concept of food entitlement, the world economic recession of the 1980s, and the 1990s' "rediscovery of human development" (Shaw, 2007 p, 383-4).

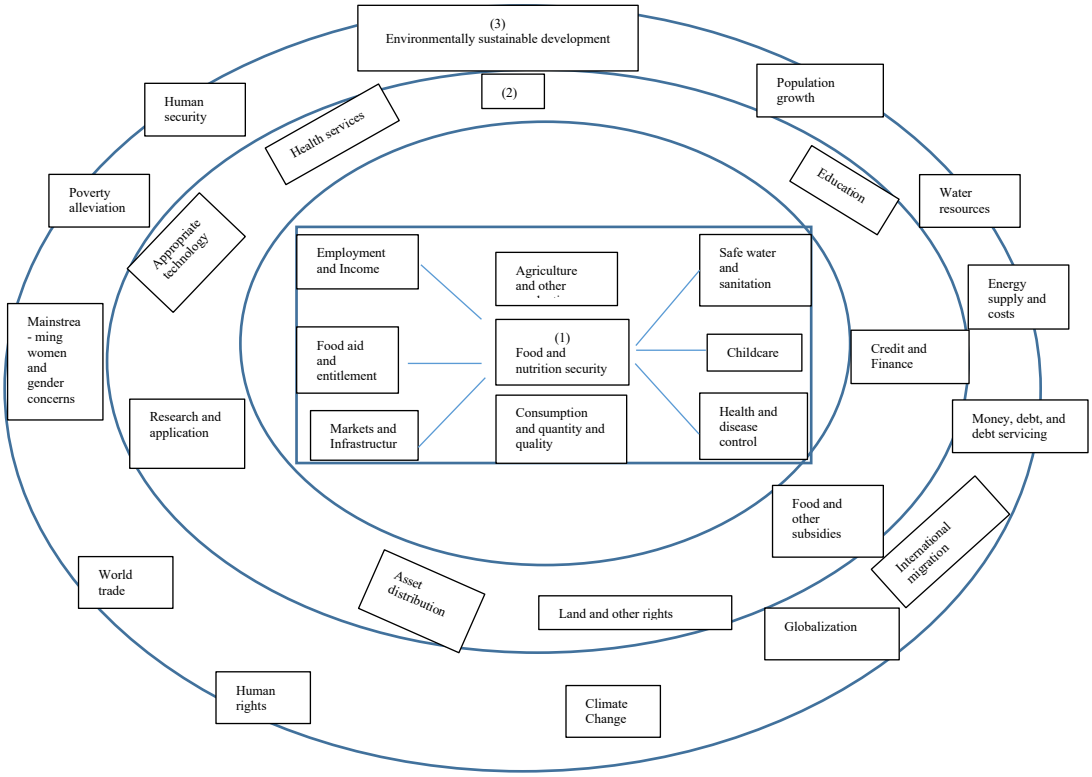

Figure 1
"The Broad Concept of Food and Nutrition Security"
(Shaw, 2007 p. 384)

II.I.III How is Food Security Measured

As its definition, the measurement of food security is an evolving toolkit. As mentioned earlier, the four-primary metrics for food security are food availability, access, utilization, and stability. Jones et al. (2013) conducted a comprehensive review of the standard measurement tools and assessments found in food security literature. Typically, food security measurements are determined through quantitative data around food availability, access, utilization, and the stability of food security (Jones et al., 2013). Jones et al. (2013) note that the source of this data can vary and could be found in

"hypothesized determinants of food security (e.g., the price of commodities) or on data from purported consequences of food security (e.g., child malnutrition)" (Jones et al., 2013, p. 484). In the review, Jones et al. (2013) present an extensive table of standard food security metrics and information on what these metrics narrate and their purpose.

Food security is often measured at the country or national level to illustrate general food availability within the population. Data that supports national level measurements rely on total imports/exports and utilization of foods imported (how much is fed to livestock, etc.) Jones et al. (2013) critique national food security measurements, citing the problems in their abilities to project future food demand (Jones et al., 2013, p. 484). Jones et al. (2013) also suggest that these measurements should be used as "yardsticks for cross-national comparisons and monitoring changes in macro-level trends" (Jones et al., 2013 p. 484). As cited by Jones et al. (2013), standard metrics are used at the national level, including Famine Early Warning System (FEWS NET), Global Food Security Index (GFSI), Household Dietary Diversity Score (HDDS), Food Consumption Score (FCS), Coping Strategies Index (CSI), Household Consumption and Expenditure Survey (HCES), Comprehensive Food Security and Vulnerability Analysis (CFSVAS), Global Hunger Index (GHI), relative dietary supply index, the share of food expenditure by the poor, and prevalence of undernourishment.

On a smaller scale, regional or household measurements are often conducted to collect data on the relationships between and within households and tend to more "accurately capture the 'access' component of food security than measurements that rely on nationally aggregated data" (Jones et al., 2013, p. 490). Jones et al. (2013) note that many of the metrics used at the household level engage with food access on a more in-

depth level, often measuring food acquisition/food consumption. Standard metrics of household-level food security include months of inadequate household provisioning, Household Hunger Scale (HHS), Household Food Insecurity Access Scale (HFIAS), Household Economy Approach (HEA), Coping Strategies Index (CSI), Household Dietary Diversity Score (HDDS), Food Consumption Score (FCS), and Household Consumption and Expenditure Survey (HCES). Most of the literature analyzed for this food security and culture meta-analysis presents data gleaned from household-level metrics. Further discussion will be provided around the use of these metrics and their appropriateness of capturing culturally-related measurements.

Also, in terms of food security measurements, a widely applied metric and the often viewed "gold standard" for measuring food security are anthropometric measurements. Anthropometric measurements include body measurements like height, weight, and recumbent length and seek to provide a narrative around "individual nutritional status" (Jones et al., 2013, p. 488). However, Jones et al. (2013) and Weaver et al. (2014) note that it is crucial to recognize that many of the anthropometric factors used to understand food security often correlate to other socio-economic indicators of well-being, including mental health and sanitation, and can "misrepresent the extent to which inadequate or unequal food distributions are problems" (Jones et al., 2013, p. 499). One way in which researchers seek to minimize the misuse of data is to pair anthropometric measurements with previously listed metrics like HFIAS or FSI.

Lastly, it is important to note that there are alternative measurements and metrics around food security that support the claims of incorporating cultural and qualitative measurements within food security metrics found at the foundation of this review. In fact,

a handful of articles analyzed in this review engage and present ideas of food security measurements that go beyond the metrics previously discussed. For example, in the article "Foraging is Determinant to Improve Smallholders' Food Security in Rural Areas in Mali" by N'Danikou et al. (2017), the idea of applying livelihood assets and elements within a community as measurements of food security are presented. In this application, there are two forms of variables, a response variable and explanatory variables. The response variable is the food security index which can be described as "14 short term, food-based coping strategies" (N'Danikou et al., 2017, p. 4). The explanatory variables are five different forms of capital, natural, financial, human, social, and infrastructure. Though many of these explanatory variables can be found in the traditional forms of food security measurements like household measurements and financial measurements, others like social capital can provide more qualitative explanations.

A second article that presents an alternative measurement of and approach to food security is "Rural Livelihoods and Food Security: Long-term Insights from Sierra Leone's Eastern Province" by Binns & Bateman (2017). This article presents the concept of food sovereignty. Food sovereignty factors in the many foundations of food security, but also seeks to understand control within food and agriculture systems. Food sovereignty:

> puts the question of power and politics at the center of the [food and agriculture] debate ... (emphasizing) that consumers and producers should be in control of the food business, not corporations or unaccountable international institutions of regional or global governance (Young, 2012, p.24, as cited by Binns & Bateman, 2017, p. 158).

It is important to bring up the concept of food sovereignty as it is places the emphasis and power into local hands and acknowledges the cultural value and qualitative factors like local knowledge, beliefs, perspectives, tastes, and preferences. It is important to note that food sovereignty was not part of the conceptual foundation to this review as it would have made the review unmanageable in regards to eligible articles. N'Danikou et al. (2017) and Binns & Bateman, (2017) both provide clear paths for alternative measurements of food security and open up the conversation to how and why food security can be expanded.

II.I.IV How and Why Can Food Security Be Expanded

Many food security practitioners and scholars are advocating to expand the concept of food security beyond the four pillars of availability, access, utilization, and stability; scholars who advocate for cultural inclusion within food security measurements critique the dearth of literature within this framework. In their powerful article, Alonso et al. (2018) argue the need to consider the impact of culture within the four pillars of food security, specifically in regards to the social contexts of culture, which includes gender, family, and decision-making powers. Alonso et al. (2018) claim a "growing recognition" of cultural engagement around food security. However, it remains "on the fringes of discussions on the fight against malnutrition among policy-makers and researchers" (Alonso et al., 2018, p.113). As will be discussed in a future section of this review, there "are many examples of well-intended food security interventions that failed because they did not take cultural settings into account" (Alonso et al., 2018, p.113).

Alonso et al. (2018) present the relevance of culture to the four pillars of food security with an accompanying local application for each pillar. For example, in their

discussion around food access and culture, the authors claim that "food may be physically available, but its intake and the resulting nutrient uptake will depend on a household's and individual's ability to obtain that food. Two major dimensions of access to food are economic access and social access" (Alonso et al., 2018, p. 116). In highlighting the role of social access within one's experiences of food security, the authors cite Arzoaquio et al. (2015). The latter presented social expectations around food and pregnant women in Ghana and the systems of meaning within these food taboos. It is necessary to note that the article cited, "Motivations for Food Prohibitions During Pregnancy and Their Enforcement Mechanisms in a Rural Ghanaian District," engages with the three approaches to culture applied in this review. Yet, the article never mentions food security; thus, it was never part of this review. Even with its lack of formal engagement around the term food security, this article presents ample examples of the intersection of culture and food. It could serve as evidence of the importance of considering culture in food security research and policy. Alonso et al. (2018) present extensive evidence for incorporating culture in food security literature, research, and policy, and these connections and arguments will be further incorporated in the discussion section of this review.

In supportive evidence and research to the article by Alonso et al. (2018), culture is also a crucial framework in the article, "Beyond Food Security: Understanding Access to Cultural Food of Urban Indigenous in Winnipeg as Indigenous Food Sovereignty" (2015), by Cidro et al. In this article, the authors address the insufficient quantity of studies linking food security and culture when they state that as of 2015 "the relationship between culture and food consumption is not well understood in the academic literature"

(Cidro et al., 2015, p. 26). Cidro et al. (2015) make the connections between food, cultural health, and tradition, stating that food ties adults to their "cultural values including keeping people 'in tune' with nature, facilitating sharing, [and is] a way for adults to display responsibility for their children, and to practice spirituality" (Receveur et al., 1998, p. 118, as cited by Cidro et al. 2015, p.27). Other scholarship that has prioritized culture in food security studies includes previous discussed Hadley et al. (2019) and Ohna (2012). In connection to the geographic scope of this article, Naughton et al. (2017), Kiba et al. (2020), and Kuusaana & Eledi (2015) illustrate this applied framework of culture to food security

Those scholars who believe in the importance of cultural value in food security studies have even termed the concept "cultural food security." Through the lens of the Aboriginal People of Canada, Elaine Power conceptualized this term because she finds that, "for many Aboriginal people, country/traditional food retains significant symbolic and spiritual value, and is central to personal identity and the maintenance of culture" (Power, 2008, p. 96). Power (2008) supports the emphasis by Cidro et al. (2015) on maintaining cultural health through food, especially culture food security. The arguments made by Alonso et al. (2018), Cidro et al. (2015), and Power (2008) regarding the relationship between food security and cultural health are a foundation for this critical literature review.

II.II Culture

II.II.I What is Culture

Similar to the first component of this review, food security, the second component, culture, has a history of a shifting definition and application in the

professional and scholarly fields. Therefore, it is essential to highlight various constructed definitions of culture to grasp the multi-disciplinary concept. Schech & Haggis (2002) describe culture in broad terms as "a network of representations- texts, images, talk, codes of behavior, and the narrative structure organizing these – which shapes every aspect of social life" (Frow and Morris, 1993, p. viii, as cited by Schech & Haggis, 2002, p. xiii). In his text regarding the role of anthropology in development, Mathur (2019) presents an extensive list of prominent anthropologists in academia that have established their own interpretations of culture, including definition by Franz Boas, Claude Levi-Strauss, and Bronislaw Malinowski. The definitions are:

- "Culture embraces all the manifestations of **social behavior** of a community, the **reaction**s of the individual as affected by the **habits** of the group in which the **lives, and the product of human activities** as determined by these traits" (Boas, 1930, p. 37, as cited by Mathur, 2019, p. 149);
- "Culture is neither natural nor artificial. It stems from neither genetics nor rational thought, for it is made up of **rules of conduct**, which were not invented, and whose function is generally not understood by the people who obey them. Some of these rules are residues of traditions acquired in the different types of **social structure** through …each human group has passed. Other rules have been consciously accepted or modified for the sake of specific goals. Yet there is no doubt that between the instincts inherited from our genotype and the rules inspired by the reason, the mass of conscious rules remains more important and more effective because **reason** itself… is a product rather than a cause of cultural evolution" (Levi-Strauss, 1993, p. 41, as cited by Mathur, 2019, p. 150).;

- Culture is the integral whole consisting of implements and consumer goods, of constitutional charters of the various **social groupings of human ideas and crafts, beliefs, and customs.** Whether we consider a very simple or primitive culture or an extremely complex and well developed one, we are confronted by a vast apparatus **partly material, partly human, and partly spiritual,** by which man is able to cope with the concrete, specific problems that face him (Malinowski, 1944, p. 39, as cited by Mathur, 2019, p. 149-150).

Mathur (2019) also presents four factors of socio-culture dynamics to understand the broad concept of culture better. These factors include attitudes and values, tradition and customs, habits and tastes, and lastly, needs (Mathur, 2019). The aspects of these socio-cultural factors within food security and development will be addressed in a later section. Similar elements appear in the definition and application of culture presented by Rao & Walton (2004). Rao & Walton (2004) position culture in relation to development and wellbeing in a way that helps frame this study. They equate culture to "relationality-the relationships among individuals within groups, among groups, and between idea and perspectives" (Rao & Walton, 2004, p. 4). Rao & Walton (2004) continue to connect culture with "identity, aspirations, symbolic exchange, coordination, and structure and practices that serve relational ends" (Rao &Walton, 2004, p. 4). Rao and Walton (2004) set an excellent foundation for this review when they highlight that a focus on culture "confronts the difficult questions of *what* is valued in terms of well-being, *who* does the valuing, and *why* economic and social factors interact with culture to unequally allocate access to a good life" (Rao &Walton, 2004, p. 4). For the purpose of this review, food security serves as the well-being factor for the individual or group. Then referencing the

three explanations of culture presented above and the *what, who, and why* concept, culture can be applied in three categories: 1) Systems of meaning (*what and why*); 2) Social (*who and why)*; 3) Livelihoods and practice (*what, who, and why*).

II.II.II What is Culture in Development and Why Does it Matter

Like food security, culture has become a prominent and contentious component to development studies and practices. Recently, culture has found a more important position in the development nexus with development theorists and economists, like Amartya Sen, who advocates for "paying attention to the influence of culture on development planning and economic matters" (Mathur, 2019, p.1). Sen's theory is used as support by Rao & Walton (2004) when they claim that culture needs to be incorporated in development practice because it can either [reproduce] inequality and discrimination, they [culture] can be exploitative, exclusionary and conflictual" (Rao & Walton, 2004, p. 4). Cultures can also "be harnessed for positive social and economic transformation, through their influence on aspirations, the coordination of collective action, and the ways in which power and agency work within society" (Rao & Walton, 2004, p. 4). However, in the past, culture was often ignored throughout the development process, and the history of culture in development practices has been erratic and shifting.

Schech & Haggis (2002) provide a comprehensive history of culture and the anthropological lens in development practices. Schech & Haggis (2002) beginning the discussion through the "West and the Rest" theory formulated by Stuart Hall (1992). This theory conceptualizes the "power imbalances" often experienced "between the affluent industrialized societies of Western Europe and North America and the developing countries" (Schech & Haggis, 2002, p. xiii). The "West and the Rest" theory encourages

scholars and practitioners to "break the cycle of global inequality" and to challenge the "taken-for-granted meanings embedded in economic, political, and social knowledge about the world" (Schech & Haggis, 2002, p. xiii). Connecting to the standard definition and metrics of food security found earlier in this review, Hall notes that the "West" is often used as the "tool of categorization" and "operates as a standard of comparison; the criterion for evaluating other cultures" (Schech & Haggis, 2002, p. xiv). Placing "the West" on the pedestal of development goals is deeply embedded in colonial rhetoric and knowledge. This review seeks to narrate where academic literature is still following a Western value of food security and where this western standard has been broken, placing value on local culture, knowledge, and experience.

Schech & Haggis (2002) notes that much of Hall's discourse around the "West and the Rest" is derived from a combination of Foucault's power/knowledge nexus and Marxian cultural traditionalists. Foucault argues that culture plays a significant role in development, or colonization, because of this power/knowledge nexus. Schech & Haggis (2002) note Foucault's argument stating "knowledge always expresses a will to power because it represents 'this and not that'" (Ransom, 1997, p. 19, as cited by Schech & Haggis, 2002, p. xiv). This can be illustrated through the dominant narrative, definition, and measurements of food security. Turning to the Marxian cultural traditionalist Gramsci, who introduced the concept of hegemony regarding class power struggles in Italy during the 1930s. Schech & Haggis (2002) draw connections to that discourse of hegemony to the argument "subaltern narratives hidden behind" (Schech & Haggis, 2002, p. xvii) the colonizing productions of knowledge and culture made by Partha Chatterjee. In connection to this review, the conversation around the knowledge/power nexus within

development and its intersection with culture is essential to understand as one begins to engage with the subjects of the articles that will be analyzed, their application of the concept culture, how the knowledge produced from them could be applied, and the power that surrounds this knowledge.

Amartya Sen also explores the power/knowledge discourse discussed above in his chapter, "How Does Culture Matter" found in Rao & Walton (2004). Sen underscores the arguments above when he states there is a concern for the role of culture in development, especially when we live in a world that is "asymmetrically dominated by western preeminence and power" (Rao & Walton, 2004, p. 54). However, in this chapter, Amartya Sen addresses development and culture in a more applied discussion and presents seven categories that illustrate the relationship. They are:

1) "Culture as a constitutive part of development:" Cultural well-being should be a fundamental ingredient and goal for development (Rao & Walton, 2004, p. 39).

2) "Economically remunerative cultural activities and object:" culture and cultural objects can be "directly or indirectly" involved in economic advancements and engagement. It is imperative that monitoring and evaluation are conducted to understand the appropriateness of particular cultural objects involvement in commercial activity (Rao & Walton, 2004, p. 39).

(3) "Cultural factors influence economic behavior:" There is a relationship between culture and economic behaviors including, "work ethics, responsible conduct, spirited motivations, dynamic management, entrepreneurial initiatives, and willingness to take risks" (Rao & Walton, 2004, p. 40).

(4) "Culture and political participation:" Involvement in political discourse and activities can be linked to "cultural conditions" (Rao & Walton, 2004, p.40-41).

(5) "Social solidarity and association:" elevated social capital and mutual support rely on culture (Rao & Walton, 2004, p. 41).

(6) "Cultural sites and recollection of past heritage:" Exploring and embracing cultural history can provide a "broader and clearer understanding of county's or community's past" (Rao & Walton, 2004, p. 41-42).

(7) "Cultural influences on value formation and evolution:" Cultural factors "have a central role even in the formation of values" and should be considered in development to better predict the acceptability of desired outcomes (Rao & Walton, 2004, p. 42-43).

These seven categories can all be found in the *what, who and why* understandings of the concept of culture within this review. However, the most visible of these categories in the cultural analysis of this review are "culture as a constitutive part of development, cultural factors influence economic behavior, social solidarity, and association, and cultural influences on value formation and evolution" (Rao & Walton, 2004, p.39-43).

II.III Well-being

The third and final fundamental term to conceptualize for this review is well-being; as the intersection of food security and culture within development should seek to understand and elevate the well-being of the individual, community, or nation under review. The concept of well-being is recognized to go beyond the physical state of bodily health and incorporate the collective “physical, mental, and social” (Jaron & Galal, 2009, p. 685). The concept of well-being has a rich history dating back to the Ancient Greek

philosophies of Socrates, Plato, and Aristotle, who sought to establish what constitutes a "good life." Thus, forming the foundation of subjective well-being (Haybron, 2008, as cited by Stoll, 2014). Aristotle identified three pillars as markers of a good life or happiness. These pillars are:

> goods of the soul, including the moral and intellectual virtues; goods of the body, such as strength, good health, beauty, and sound senses; and external goods, such as wealth, friends, good birth, good children, good heredity, good reputation, and others (Stoll, 2014, p. 15).

Fast forward to the Enlightenment where well-being takes on the understanding that encompasses an individual's "good experiences rather than as arising from the entire narrative of one's life or a series of a good relationship" (Stoll, 2014, p. 17), and becomes situated as a focal point for scientific research.

Today, well-being plays a crucial role in psychology research and is a budding concept within economics and social sciences. As of the late 20th century, well-being is often associated with the theories of John Locke:

> who proposed that well-being involved satisfying an uneasiness that is natural to men and women; and that there was no single version of how humans could flourish, a template forged in heaven for us to follow: different things made different people happy, and to try to satisfy them using the same means was not possible (Stoll, 2014, p. 21).

This emphasis on a non-universal application of well-being is essential in understanding how different cultures may apply the concept and how development programs and policies need to consider these differences to build sustainable solutions to global issues,

like food security. Stoll (2014) points out that well-being has maintained a minor role in economic research and development. It was not until the 1970's that economic and public policy research saw some growth in the use of subjective well-being as a center point.

As of the beginning of the 21st century, there has been more progress in applying and engaging subjective well-being; however, there is a call for more. The emphasis on the dearth of well-being research within social and economic fields is supported by Uchida et al. (2004), who advocated for advanced empirical studies around the intersection of well-being and socio-cultural factors, and Camfield et al. (2009) who advocate for advanced contribution of well-being studies, especially those of more multidimensional and qualitative approaches. Camfield et al. (2009) also encourage those engaging in participatory research to incorporate people's experiences and perceptions more frequently into the studies. It is argued that measurements of well-being exceed the narratives that can be derived from single dimension measurements like physical health or income (Camfield et al., 2009). Camfield et al. (2009) note a shift in development practices to focus indicators of success away from "survival" and towards a more holistic and comprehensive acknowledgment of "people's resources and agency and pursuit of well-being," which includes "values aspirations, and experiences of happiness or unhappiness" (Camfield et al., 2009, p. 7-8). Diener & Suh (2000) suggest a rise in the multidimensional analysis of well-being among people since 1990 and note that societies with "greater levels of subjective well-being-people in them evaluate their lives in positive terms" (Diener & Suh, 2000, p.3). In respect to this review, it will be essential to approach the multidimensional engagement to development and well-being with the inclusion of food security measurements and the cultural components of these

measurements. As will be discussed further in this review, well-being plays a role in many participatory studies, especially those involved in coping strategies regarding livelihood and survival.

It is essential to acknowledge that the multidimensional approach to well-being does not fully encapsulate the "interpersonal and recursive aspects of well-being" (Camfield et al., 2009, p. 8), and understandings of well-being, as mentioned earlier, are not universal and should include the "locally defined necessities or what a person needs to participate and aspire" (Gundeman, 2004, p.9, as cited by Camfield et al., 2009, p. 8). Uchida et al. (2004) engage deeply with the concept of non-universal and localized understandings and applications of well-being in their article "Cultural Construction of Happiness: Theory and Empirical Evidence." In this article, the authors stress that while the general concept of happiness or well-being is universal; culture plays a prominent role in translating the idea. Culture, or "ways of life," in this article includes "public meaning (folk theories and commonsense), and practices (daily routines and scripts)" (Benson, 2000; Bruner, 1990, 1996; Kitayama, 2002; Markus and Kitayama, 1991a; Shweder and Sullivan, 1993; as cited by Uchida et al., 2004, p. 224). To understand how culture and well-being intersect, it is essential to look at the book *Pursuits of Happiness: Well-being in Anthropological Perspective (2009).*

In *Pursuits of Happiness: Well-being in Anthropological Perspective (2009).* Benjamin Nick Colby addresses the relation between culture and well-being when narrating the history of cultural well-being and cultural pathology. Colby (2009) begins by introducing the concept of "cultural synergy." Cultural synergy, which Ruth Benedict introduced, "emphasized cooperative and socially facilitative behavior" (Colby, 2009, p.

52). However, this concept was critiqued for lacking a “full ethnographic treatment” (Colby, 2009, p. 52). Colby then describes the work of Raoul Naroll, who aimed to connect cultural well-being through a “theoretical program” (Kuhn,1970; Lakatos. 1970, as cited by Colby, 2009, p. 5). This theoretical program uses “core values” and social indicators as tools for understanding cultural well-being and pathology. One of the primary components of the cultural well-being theory of Naroll is the proposal that members of a community or family will seek actions in order to cope with challenges that cause strain on “well-being.”

The idea of coping to sustain well-being can be illustrated in the subtheme analysis section of this review found in Chapter V. Many of the subthemes of culture this review addresses are seen as mechanisms to cope with stressors around food security and cultural well-being. To reiterate, this review explores the visibility of culture within the food security literature of West Africa. Through this lens, this review advocates for the incorporation of culture through the what, who and why understandings, to ensure individual and community well-being.

CHAPTER III

METHODS

III.I Positionality

The conception of this review was derived by my personal experiences living as a development practitioner in West Africa. Throughout my many observations and conversations around food and culture, it became evident that culture mattered. In direct connection to the theoretical framework presented by Kristin D. Phillips (2018) around how hunger is "neither universally manifested nor uniformly experienced" (Phillips, 2018, p. x), I was often told that I did not eat unless there was rice in my meal. This local and cultural value of rice highlights the essential role the grain plays in the well-being of a person. This sparked research curiosity around the role of culture in food security development, thus leading to the creation of this critical review.

Through preliminary research, it was clear that food security and culture were empirically inter twined around the world. Weaver, Meek, & Hadley (2014) note that food it not only a biological foundation for humans, but also a social foundation, and that humans "have elaborate cultural systems that define how food should be obtained, when it should be consumed, what types of food should be consumed at each meal, who should present the meals, how the food should be put into the mouth, the posture and stance of consumers while eating, the order in which items should be consumed, how important the foods are that others are eating, and what items should be consumed together" (Farb and Armelagos, 1980, as cited by Weaver, Meek, & Hadley, 2014, p. 251-252). Through this lens of food as a social and cultural value, Weaver, Meek, & Hadley (2014) present several connections to food insecurity and decreased physical and mental well-being in

Brazil. In a similar article, scholars in South Africa connect elements of culture, including social dynamics, gender, and power structures, to food production (Trefry, Parkins, & Cundill, 2014). In their article, Trefry, Parkins, & Cundill (2014) note that "food becomes a lens through which we may explore the stratified realities of a society, its ideas about worth, and about class, sex/gender, race, religion, and even nationality and humanity" (Bonnekessen, 2010, p. 280, as cited by Trefry, Parkins, & Cundill, 2014, p.556). The results of this underscores the role of culture in food security practices and the implications of a changing culture on local food security. Weaver, Meek, & Hadley (2014), Trefry, Parkins, & Cundill (2014) as well as previously mentioned articles, Cidro et al. (2015), and Power (2008) support the theoretical framework linking culture, food security, and well-being and present the path toward applying this framework in West Africa.

III.II Methodology

This critical review is inspired by the guidelines and processes of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). However, this review does not follow the PRISMA structure for a review in full. PRISMA outlines protocols and frameworks researchers must follow in order to produce comprehensive and exhaustive results. Examples of articles with a food security framework that followed or were inspired by PRISMA include Manley et al. (2013) and Lawlis et al. (2018). Both articles utilize PRISMA criteria for the search and selection of relevant articles and report their findings accordingly. Lawlis et al. (2018) present their search and selection process through a flowchart that is replicated and tailored within this review. It is essential to note that this review is a critical review and not a synthetic or systematic review like Manley

et al. (2013) and Lawlis et al. (2018). Due to research limitations, this review was unable to carry out the full PRISMA guidelines.

III.III Literature Search

The literature search began with an identification of commonly associated words within the food security, culture, and well-being framework (Table 1), in order to ensure extensive and diverse search results. These words were then separated into two categories, "Keyword 1" and "Keyword 2." The "Keyword 1" group is made up of words directly associated with food security and even included the concept of food security. The "Keyword 2" group is made up of words related to culture and social engagement. These two groups were paired together in search rounds in three scholarly databases, GEOBase, AfricaBib, and Social Science Premium Collection (Table 2) which were identified through research technical assistance. The identified geographic outline and designated time frame were also included in the search criteria.

The geographic scope of this review is the region of West Africa. This review follows the United Nations designated countries of West Africa which includes: Benin, Burkina Faso, Cabo Verde, Chad, Côte d'Ivoire, the Gambia, Ghana, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo (UNOWA, n.d). West Africa was selected as the geographic focus, due to the general dearth of literature found in preliminary research connected to this region, especially written in English. It is generally seen that Southern and Eastern Africa maintain the focal point of academic literature as well as NGO and International engagement around food security.

There was also a set 15-year time period limit set for this review to maintain a manageable timeline. Thus, only articles from 2005-2020 were searched. In searches that

required a month and data in the time frame component, the date was set as the following, January 1, 2005-December 31, 2020. If databases were searched before December 31, 2020, then the data collection date was set as the latest date. This timeline intersects prominent global events within food security, including the world food crisis of 2007-2008, the global financial crisis of 2008-2009 (FAO, IFAD, UNICEF, WFP and WHO, 2019), and the development of the Sustainable Development Goals (Assembly, 2015). The keywords and geographic scope were searched in relation to all aspects of the article to make the search as inclusive as possible. Below is an example of a search that was conducted in the database.

GEOBASE:

((((("Food Security" AND communit*) WN ALL) AND (("West Africa" OR Benin OR Burkina Faso OR "Cape Verde" OR Gambia OR Ghana OR Guinea OR Guinea-Bissau OR "Ivory Coast" OR "cote d'ivoire" OR Liberia OR Mali OR Mauritania OR Niger OR Nigeria OR Senegal OR "Sierra Leone" OR Togo) WN ALL))) AND ((2020 OR 2019 OR 2018 OR 2017 OR 2016 OR 2015 OR 2014 OR 2013 OR 2012 OR 2011 OR 2010 OR 2009 OR 2007 OR 2006 OR 2005) WN YR)

Keyword 1	Keyword 2
Food Security	Development
Food Insecurity	Well-being
Food Availability	Culture
Food Shortage	Happiness
Hunger	Community
Foodways	Tradition

Table 1: Identified Key Terms for Literature Search

Database Name	Number of Articles Identified for this Search
GeoBase	218
AfricaBib	1
Social Science Premium Collection	95

Table 2: Scholar Databases and Number of Final Articles Pulled from Each Database

III.IV Inclusion/Exclusion Criteria

Articles were searched based on the keywords in table 1, geographic scope, and time frame. Searches were also selected to only yield peer-reviewed materials and materials produced in English. In searches that yielded more than 1000 articles, only the first 150 were analyzed further. Once a search was conducted, the keywords were

searched for in each article's title, abstract, or keywords section. If either of the searched keywords were not identified, it was not selected for further analysis. In the given search example above, 154 articles were found, but only 19 were chosen for additional review.

Once an initial search was completed and 304 articles were selected for further review, the second round of exclusion/inclusion analysis was conducted. In this second round, articles were screened to ensure duplicates were removed, leaving 201 articles. These 201 articles led to further analysis and screening. Each article was reread and coded. First articles were read to ensure they fell into a bracket of a food security framework. Articles needed to have a clear framework of and analysis around the concept of food security. This could mean an extensive background discussion on the term and history in the geographic region or an application of research findings and themes around the framework. Many articles contained food security in the title or abstract, yet upon a more comprehensive review, failed to engage with the concept thoroughly. For example, in the abstract of the article by Arku (2013), "Local Creativity for Adapting to Climate Change Among Rural Farmers in the Semi-Arid Region of Ghana," narrates that climate change is a primary theme within the food security discourse. Yet, food security is mentioned less than five times within the substance of the article. Thus, this article did not continue for further thematic analysis. On the contrary, the article by Yiridoe & Anchirinah (2005), "Garden Production Systems and Food Security in Ghana: Characteristics of Traditional Knowledge and Management Systems," did continue for further thematic analysis because it was found to engage deeply with the food security framework through a subsection called, c*ontributions of garden production to household food security,* located in the results and discussion section.

Along with an extensive inclusion of the food security framework, articles were also analyzed in regards to geographic scope, engagement with the cultural framework, community development focus over a policy or blatant health focus, and overall clarity of methods and results. As previously mentioned, the geographic scope of this review is West Africa, which encompasses the following 16 countries, Benin, Burkina Faso, Cabo Verde, Chad, Côte d'Ivoire, the Gambia, Ghana, Guinea- Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, and Togo (UNOWA, n.d). This is a review of West Africa literature. Thus, only West African countries could be included in each article. Many articles were situated within multiple countries including, "Connecting Women, Connecting Men: How Communities and Organizations Interact to Strengthen Adaptive Capacity and Food Security in the Face of Climate Change" by Cramer et al. (2016) and "Patterns and Determinants of Household Income Diversification in Rural Senegal and Kenya" by Alobo & Bignebat (2017). It is possible that these articles had an extensive presentation of food security and the aspects of culture; however, due to their geographic scope, they were excluded from further analysis.

It was also essential for articles to have some form of engagement with one or more of the three aspects of culture: 1) Systems of meaning (*what and why*); 2) Social (*who and why)*; 3) Livelihoods and practice (*what, who, and why*). If an article did engage with food security, was situated in the correct geographic region, but did not engage with one or more of the three aspects of culture, it was excluded from further analysis. This was often seen in an article that emphasized a country as a whole rather than a localized ethnographic study. "Limits to Green Revolution in Rice in Africa: The Case of Ghana" by Ragasa & Chapoto (2017) and "Impact of an Agricultural Value

Chain Project on Smallholder Farmers, Households, and Children in Liberia" by Rutherford et al. (2016) are both examples of articles that lacked substantive cultural analysis.

Lastly, it was essential that articles had a transparent presentation, methods (including primary research data collection), and results and did not emphasize health and policy. This was to ensure food security and culture were the intersecting frameworks at play for each article and that the research did not rely too heavily on secondary research gathering. Examples of articles excluded due to a vague methods section or with heavy use of secondary research include "The Office du Niger: an Agropole project for food security in Mali" by Brondeau (2018) and "The Effects of Training, Innovation and New Technology on African Smallholder Farmers' Economic Outcomes and Food Security: A Systematic Review" by Stewart et al. (2015). Examples of articles that were too focused on national and global policy or health care include "Antinutrient Content, Vitamin Constituents and Antioxidant Properties in Some Value-Added Nigerian Traditional Snacks" by Aletor et al. (2013) and "How to Diagnose Institutional Conditions Conducive to Inter-Sectoral Food Security Policies? The Example of Burkina Faso" by Alpha & Fouilleux (2018). For a complete list of articles excluded from further thematic analysis and the reason for exclusion, please see Appendix A.

III.V Selected Articles

As previously outlined, the eligibility of an article chosen for thematic analysis depended on the following variables. Was the article produced within the years of 2005-2020? Is the research for the article only based in the geographic focus region of West Africa? Is this article produced in English? Is this a peer-reviewed article? Are the

methodologies of this article based on primary source methodologies? Articles were allowed to be supported by secondary source data, but secondary sources could not serve as the sole or foundational data source. Does this article provide a robust conceptual presentation of food security or thematic application around food security? Is there a level of analysis around at least one of the three aspects of culture? Lastly, it was essential that the article did not rely too heavily on policy foundations or health and nutrition foundations. It is also important to note that some of the identified articles were not available for complete access, thus they were not eligible for further steps.

Figure 2 provides a flow chart that follows PRISMA guidelines on synthetic reviews and is inspired by a similar flow chart found in Lawlis et al. (2018). In understanding the flow chart, it is crucial to work from the top down. First, 304 articles were identified in the original searches through the three databases, GeoBase, AfricaBib, and Social Science Premium Collection. Then articles were screened to eliminate duplicate articles, leaving 191 articles. Each of the 191 articles were then thoroughly read, and information was extracted and organized accordingly. This information included the following: 1) Article citation, 2) Methods, 3) Study design, 4) Sample size, 5) Rural or urban, 6) Ethnographic or policy analysis, 7) Location of study, 8) Main results, 9) Key analysis with culture, 10) Meaningful quotes, 11) Gaps and general notes, 12) Number of times cited on Google Scholar.

The next step of the selection process was to decipher which articles were eligible for thematic coding and which were not. If an article did not engage with primary data methods, provide a rich framing around food security, maintain a focused geographic scope of West Africa, provide some level of cultural analysis, and did not have outlying

and disqualifying characteristics like policy-focused or inaccessibility, then the article could continue to the next step. 120 articles were excluded from continuing in the eligibility step, and seventy-one were identified to proceed for thematic coding. Appendix A provides a table of articles excluded from thematic coding and the reason for the article's exclusion. Appendix 3 provides a table of the articles included in thematic coding and their general rating. Thirty articles were coded regarding the identified themes that will be discussed in the following section. From those seventy-one articles, thirty were selected for formal analysis and presentation in this review's discussion section.

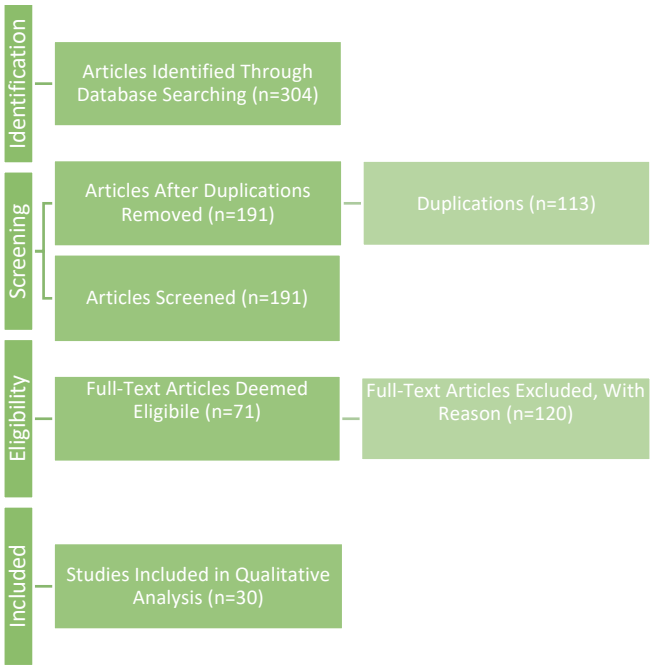

Figure 2: PRISMA Inspired Selection Process

III.VI Identification and Organization of Themes and Eligible Article Coding

In the final step of the eligibility and selection process, the 71 eligible articles were reread, coded, and analyzed for qualitative engagement around the three aspects of

culture. Within the three approaches to culture, the articles were rated from 1 to 5 based on their level of analysis and application of the themes and subthemes within each category. It is important to note that the coding system applied in this review is unique and was developed for this specific review. However, it was inspired by similar reviews mentioned previously. Reference Appendix C for a table of eligible articles by main theme, thematic rating, and subtheme identification. Subthemes will be identified in the following section.

A rating of 1 designates minimal engagement around the primary theme(s), and that significant gaps exist in the analysis and discussion. For example, the article "Understanding the Link Between Households' Poverty and Food Security in South Nigeria," by Omotayo et al. (2018), presents a framework and findings that would fall under both the livelihood and practice theme and the social theme. However, in the authors' attempt to correlate poverty and food insecurity, the authors lack appropriate discussion around subthemes within livelihood and practices that would have allowed for a more dynamic presentation. Regarding the social theme, minor mentions of empirical findings around household size and education are presented in relation to poverty and food security. Thus, this article was coded as "1" for both approaches to culture.

A rating of "2" was assigned to articles that included a minor step-up of engagement in regards to the major theme(s). For example, the article "Food Insecurity Status of the Working Poor Households in South West Nigeria," by Adesoye & Adepoju (2020), provides evidence that examines the factors influencing the status of food insecurity among households in Nigeria. There is a section in the paper's discussion around the profile of working poor and non-poor households in South West Nigeria.

Social subthemes like household dynamic and education are illustrated. However, there lacks a deep analysis of the role of these social themes in regards to food insecurity. Thus, this article is coded as a "2" in regards to the social theme.

A rating of "3" designates moderate engagement with the major theme(s). For example, the article "Characteristics and Strategies Favouring Sustained Food Access During Guinea's Food-Price Crisis," by Peeters & Maxwell (2011), was coded as a "3." This article has a foundational presentation around the major theme, systems of meaning. The subtheme of local perceptions can be found interwoven throughout the article. Yet, there is not a strong enough engagement with the subtheme of systems of meaning for the article to serve as an outstanding example, and it presents gaps that deserve further analysis.

The rating of "4" and "5" were assigned to outstanding articles within each theme. Articles like "Famines are a Thing of the Past: Food Security Trends in Northern Burkina Faso" by West, Somé & Nebié (2014) were assigned "4" because they present deep empirical and qualitative engagement around the theme. For this specific article, personal beliefs and perspective were used as evidence to support the claim that famines are a concept of the past. However, there do seem to be missing pieces of engagement within systems of meaning. If incorporated in the discussion, these missing pieces would have allowed for a clearer understanding of why, culturally in this study, famines are considered a concept of the past. In a step above, articles like Cultivated, Caught, and Collected: Defining Culturally Appropriate Foods in Tallé, Niger, by Towns, Potter & Idrissa (2013), present a robust theoretical framework that values cultural knowledge and localized understanding of food security, and thus was rated as "5.

Chapter IV

Insights to Culture: Thematic Analysis

IV.I Breakdown of Themes

Of the 71 articles, 58 of them engaged with the livelihood and practice theme. 37 of the articles engaged with the theme of social practices. 17 of the articles engaged with the theme systems of meaning. Of the 71 articles, only four articles engaged with all three main themes of culture. From this breakdown, it is clear that livelihood and practice was the most prominent cultural approach. Systems of meaning was the cultural approach with the least number of articles engaging with it. This illustration lays out the very gap this critical review seeks to underline, and the discussion around this gap will be presented in the section, *Summary of Findings,* found in Chapter V.

Throughout the review and coding process, a handful of related subthemes were identified within each main theme, providing essential context to each approach. Within the social approach to culture, the following subthemes were identified and found to be most common: household dynamic, gender, education, social networks, and institutional engagement. Within the livelihood and practice approach to culture, the following subthemes were identified and found to be most common: an urban/rural nexus, economic capabilities, general coping mechanism, participation around agriculture methods, access to resources, and lastly, a general application of a livelihood and vulnerability framework. For the third approach to culture, systems of meaning, the following subthemes were identified and found to be most common: the value of local knowledge and local perceptions. There are only two identified subthemes for the systems of meaning theme due to the opaque qualities of the concept and the dearth of

articles that fell under this cultural category.

IV.II Subtheme Analysis

IV.II.I Culture as Social Practices

The first cultural approach is the analysis of the social approach. As detailed in the *What is Culture* section of this review, the social approach seeks to understand the who and why aspects of culture. The social approach to culture is the day-to-day interactions and group dynamics that shape the lifeways of people found within the same cultural group. Perceptions and understandings of the norms of one's culture are transmitted through social engagements (Alonso et al., 2018). Depending on the partnerships within the engagements, these practices may be considered informal or formal interactions (Yami et al., 2009). The social practices followed by a group of people are developed and maintained through rich histories and traditions and should be taken into extreme consideration when implementing development interventions. Social approaches to culture significantly impact the day-to-day engagements around farming, cooking, and food allocation (Alonso et al., 2018). The major subthemes found within the articles that engaged with this approach are household dynamic, gender, education, social networks, and institutional engagement.

Household Dynamic

Household dynamics was found to be a reoccurring subtheme within the social approach to culture. Household dynamics can highlight family structures, the different roles and responsibilities among the members, and power dynamics. Alonso et al. (2018) note that "at the individual and household level, gender, family, and decision-making power are key cross-cutting determinants that interact with most, if not all, channels

through which culture affects food security" (Alonso et al., 2018, p.118). It is essential to note that in almost every article with a subtheme of household dynamic, gender was also present. However, gender was the most populous subtheme in the social application and will have its own analysis section. The following three articles provide either exemplary engagement with the concept of household dynamics or mediocre engagement.

For this subtheme, the articles to highlight include Poole et al. (216) and Rivers et al. (2018), which provide exemplary insight into the role of household dynamics within the food security framework, and Adesoye & Adepoju (2020), which lacks significant insight to this subtheme. Poole et al. (216) and Rivers et al. (2018) share connections between the analysis of intra-household roles and responsibilities, an emphasis on gender, and the application of qualitative-based methods. In comparison, Adesoye & Adepoju (2020) rely on quantitative methods that limit the results section to a profile breakdown of households instead of a deep narration of the individual food security experiences within the home found in the other two articles.

Both Poole et al. (216) and Rivers et al. (2018) provide deep engagement around the intra-household dynamics in the home. This dynamic is necessary to understand food security interventions because food production, acquisition, and preparation are intensely cultural. Poole et al. (2016) note that understanding household context, composition, and decision making is critical for policies to enhance food security" (Poole et al. 2013, as cited by Poole et al., 2016, p. 5). In connection to intrahousehold dynamics and how specific roles and responsibilities impact the overall well-being of the home, Rivers et al. (2018) note that "collective task and decisions made by one individual has significant ramifications for other households' members" (Rivers et al., 2018, p. 49). If an

intervention shifts the roles of one person in the home, it is essential to consider what effects it might have on the entire household. In connection to this engagement around roles and responsibilities within the home, Poole et al. (216) and Rivers et al. (2018) also take a gender lens to their research. This elevates the social approach to their research and allows readers to better understand the gendered interactions within the home around food. Future scholars and practitioners can look to these articles to incorporate household dynamic and gender into their work.

In contrast to Poole et al. (216) and Rivers et al. (2018), Adesoye & Adepoju (2020) provide surface analysis on the general profile of rural households in Nigeria in connection to factors influencing food security. Though it is crucial to understand a household's profile with which researchers engage, it is vital to take a mixed-methods approach to showcase more layers to the food security narrative. Poole et al. (2016) do this through a mixed-methods approach that utilized a questionnaire, focus groups, and key informant discussions, data around household assets and access resources, utilization of products under consideration, practices around harvesting, processing, consumption, and access, and inter and intra households' roles and responsibilities. Rivers et al. (2018) prioritizes more qualitative methods through the use of semi-structured interviews. Rivers et al. (2018). justify this method when they state, "it is suggested in the literature that this style of interviews, [qualitative based interviews], reveals more about the major beliefs, values and perceptions concerning an issue in a given population" (Morgan et al., 2002, as cited by Rivers et al., 2018, p. 37). The lessons learned from these three articles concerning household dynamics are that data is lost when a qualitative focus is not

applied. There is value in illustrating the cultural connections found within intra-household dynamics around food.

Gender

The next and most noted social subtheme is gender. Alonso et al. (2018) provide a comprehensive description of cultural gender models and why they are important to consider in food security engagement. Alonso et al. (2018) describe cultural gender models as a "set of guidelines, both implicit and explicit, that are acquired from infancy onwards, and tell the individual how to perceive, think, feel and act as either a male or female member of that society" (Helman, 2007, p. 158, as cited by Alonso et al., 2018, p.119). Alonso et al. (2018) note that gender plays a significant role in "determining directly what preferences, beliefs, norms, and practices one is expected to display or observe" (Alonso et al., 2018, p. 119). Food taboos or agriculture practices can illustrate this. These authors also note that "gender roles within the household, notably the division of household labor, are particularly important in the context of culture and food security as they interact with many channels of impact such as dietary practices and intra-household food distribution" (Moss, 2002, Piperata, 2008, as cited by Alonso et al., 2018, p. 119) The following articles support these claims by Alonso et al. (2018) and provide thorough engagement around the role of gender in regards to food security within West Africa.

Almost all of the articles within this review provided a gendered lens, showcasing links between the various subthemes and cultural approaches. Three exemplary articles that showcased the gender subtheme are Asitik & Abu (2020), Ahn et al. (2020), and Naughton et al. (2017). All three of these articles encourage the empowerment of women

to shift the overall well-being of a community. Both Asitik & Abu (2020) and Ahn et al. (2020) approach their research with the intent to provide policy and programming suggestions. Naughton et al. (2017) take a more illustrative and personal approach that could be applied to policy and programs. Naughton et al. (2017) utilize the most qualitative methods, whereas Ahn et al. (2020) apply mixed-methods and Asitik and Abu (2020) rely on qualitative methods. It is essential to look at each of these articles and their unique approaches to engaging with gender and food security.

The emphasis on women's empowerment is at the center of all three of these articles. Both Asitik & Abu (2020) and Ahn et al. (2020) underscore the vital role women play in the agriculture sectors of the local economies. It is essential to point out that women make up "47 percent of the agricultural labour force" (FAO, 2022, as cited by Asitik & Abu, 2020, p. 253). Asitik & Abu (2020) mention that women face a disproportionate amount of challenges, including access to land and markets. Thus, if policymakers and development practitioners seek to transform agriculture economies, women's empowerment must be incorporated. Ahn et al. (2020) underscore this claim when they write how women also face challenges around access to resources like credit and land that exacerbate their struggles and their ability to maintain food security in their homes. Ahn et al. (2020) provide a few practical applications, including the expansion of "gender-inclusive" and "gender-sensitive" programming in regards to agriculture extension agents of the area. Alongside this argument for women's empowerment, Naughton et al. (2017) note that their research found that local participation with shea butter production allows women to ensure their family's well-being, especially during times of stress. A grandmother that was part of the qualitative interview process of this

research informed researchers that "she used shea butter profits to purchase millet to make porridge for her grandson's lunch to take to middle school about seven kilometers away because otherwise, he would go hungry" (Naughton et al., 2017, p.775). Thus, all three are in unison with the notion that women face exceptional challenges regarding resource access, that women play an essential role in the world's food systems, and that when women are empowered, their network's well-being is prioritized.

The differences between these three articles lie in the methods utilized to collect data. Asitik & Abu (2020) reported results based on quantitative data collected through an empowerment questionnaire and HHS questionnaire developed by USAID. Though this article was based on quantitative data, it does provide a compelling presentation of data. Along with a robust background section and literature review, the article connects the empowerment of women and food security in a manner that is easily understood and highlights the role of cultural gender models in achieving a food secure household. This is an exemplary example of how quantitative data can yield results and be paired with a narrative that illustrates the many layers of individual and community food security. Ahn et al. (2020) utilized an explanatory sequential method, starting with a quantitative survey followed by more qualitative methods, including group discussions. This mixed-methods approach allowed for the researchers to include supportive narratives around more strict quantitative data. Naughton et al. (20117) also employed a mixed-methods approach. However, unlike Ahn et al. (2020), they utilized a variety of qualitative methods, including participant observation, structured and semi-structured interviews, and focus groups. Naughton et al. (2017) also provide insight into local systems of meaning when they include proverbs and personal narratives from interviews. Naughton et al. (2017)

showcase the most extensive analysis and illustration of food security experiences with a gendered lens of the three articles.

Education

The next subtheme, education, serves as minor support to the social approach to culture, as it did not serve as a foundation to any of the 71 articles analyzed for this review. Education was often seen as a descriptive profile regarding why certain choices were made around coping strategies and agriculture practices. Alonso et al. (2018) list education as a factor in the disappearance of traditional values, beliefs, and customs and that education can lead to the uptake of more "modernized practices." (Alonso et al., 2018). These shifts from traditional beliefs and practices to a more Westernized approach to livelihoods, specifically regarding agriculture, can alter the experience of food security in local areas, which is why education is a valued lens to engage.

Obayelu & Onasanya (2016), Kuwornu et al. (2018), Etongo et al. (2018) are three articles from this review that utilized education as an explanatory variable in livelihood decisions made on and off of the farm. Obayelu & Onasanya (2016) presented a weak connection between education and food security. In the presentation of the quantitative data, Obayelu & Onasanya (2016) briefly mention how social factors like education help to understand the relationship between food security and maize biodiversity. Obayelu & Onasanya draw their connections when they state, "farmers with formal education had the highest proportional abundance of maize cultivars, and the majority of food security respondents cultivated highly diverse varieties of maize" (Obayelu & Onasanya, 2016, p.248). This research left many questions around the

descriptive *why* unanswered, which, if answered, could allow readers and practitioners to better understand the role of education in food security.

The second article by Kuwornu et al. (2018) presents a more in-depth analysis than the previous article. Kuwornu et al. (2018) directly address the value of analyzing education in food security research when they mention "education enhances one's skills and ability to participate in off-farm work and contributes positively to promoting off-farm activity" (Barrett, Reardon, and Webb, 2001; Babatunde, Omotesho, and Sholotan, 2007; Babatunde et al., 2010; Rahman 2013, as cited by Kuwornu et al., 2018, p. 729), and that "education has a positive effect on total and off-farm income" (Jolliffe, 1998;l Mccarthy 2009, as cited by Kuwornu et al., 2018, p. 729). While similar to the previous article, this article did not have the same gaps around the descriptive *why*, since it emphasized understanding education, which can guide future scholars and practitioners interested in its connections to food security.

Etongo et al. (2018) also utilize education as a defining element to understanding why practices or approaches are adopted or not in connection to food security. This article links food security to sustainable land management practices, specifically "local knowledge-based innovations" (Etongo et al., 2018, p.202). Entongo et al. (2018) strengthen their link of education to food when they note that their findings are supported by a previous study by Sidibé (2005), which found that "education influences the adoption of planting" (Etongo et al., 2018, p.210) practices. In their discussion section, Etongo et al. (2018) stress that a head of household's education level was a social factor with influences on the "adoption of [sustainable land management] practices" and that those "who are educated have the capability to seek information and get necessary

support from the government and NGOs" (Etongo et al., 2018, p. 209-210). Of the three articles discussed in this subtheme, this particular article provides the most substance around education and food security and should influence others who seek to engage with this explanatory variable.

Social Networks

The fourth subtheme of the social application of culture is the participation within and influence of community social networks on food security. There are many ethnographic examples highlighting the role that social kinship plays in regard to food and agriculture in village-based lifestyles. In the extensive yet dated publication Land, Labour and Diet in Northern Rhodesia: An Economic Study of the Bemba Tribe, Audrey Richards (1939) thoroughly illustrates the Bemba lifeways. When speaking about local kinship and social groups, Richards (1939) stresses the role of group engagement and the support present to individuals within these groups during times of disaster or scarcity. Though this study focuses on a single ethnic group, these systems of support can be seen in various other studies. Michael Jackson (1989) also presents qualitative data around social networks and the support derived from them in his publication Paths Toward a Clearing: Radical Empiricism and Ethnographic Inquiry. Jackson (1989) states that community or social networks involve "pulling well together" (Jackson, 1989, p. 146-147). The Kuranko people are the focus of this narration, and the research exemplifies how community structures are deeply connected to agriculture and food within village life. Lastly, in a more modern engagement around social networks and food, Mertens et al. (2015) provide a visual of the role of social networks in mediating food security in the Tapajós River region of Brazil. In their article, Mertens et al. (2015) provide substantial

evidence around the strong ties among social networks, including friendships, occupational, and kinship [networks] (Mertens et al., 2015, p.7) with food. The following three articles provide supportive evidence of the vital role social networks play in concerns to foodways and food security. It is important to note that every article that presented a subtheme of social networks received a rating of either "4" or "5." Thus, showing a strong correlation between food and social networks and the need to engage with social networks in food studies.

Tougiani et al. (2009), Ayerakwa (2018), and Olawuyi (2019) were three articles in this review that applied a social network lens to their engagement around individual and community food security. Tougiani et al. (2009) and Olawuyi (2019) presented social networks as a vital resource, and factor development practitioners should consider and incorporate into their intervention programs. Ayerakwa (2018) engaged with remittances and this economic resource's role in maintaining relationships and food security. All three articles provide ample support around the role of relationships in developing and maintaining food security.

Through a specific case study, Tougiani et al. (2009) highlight the benefits of community-based land management and advocate for the inclusion of social networks and community in interventions, especially regarding resource management and food security, and capacity building of community groups. Their results show that those who participated in the community-based management group shifted their perspective around environmental stewardship and uptake in the economic and social benefits within the region. One significant finding is that the community group "has increased social capital and equity" (Tougiani et al., 2009, p. 385). Many marginalized voices, like women and

sedentary Fulani herders, are now being heard and playing a more prominent role in "village dialogue" around major decisions (Tougiani et al., 2009, p. 385). This case study highlights that capacity building in a community can elevate autonomy and the voices of many social groups. In connection to the findings by Tougiani et al. (2009), Olawuyi (2019) highlights the advantages of supporting community groups and found that participation in social networks "have a significant effect on farming household's food security" (Olawuyi, 2019, p.883). Like Tougiani et al. (2009), Olawuyi (2019) advocates for the inclusion of social networks and their roles in communities in developing food security and nutritional policy and programming.

Ayerakwa (2018) also highlights the importance of cultivating and maintaining social groups, but through remittances rather than community groups. Ayerakwa (2018) claims that food remittances are a social linkage to kinship in rural and urban spaces, and those who have access to social networks in different regions "stand the chance of improving their food security situation" (Ayerakwa, 2018, p.425). The social support systems available to family and community members living away from home are essential in maintaining food security and general well-being. The findings by Ayerakwa (2018) connect this subtheme to the many subthemes of the livelihood and practice approach to culture.

Institutional Engagement

The final subtheme for analysis within the social approach to culture is intuitional engagement. Institutional engagements are the relationships between local communities and private and public third parties. These relationships reach beyond the social networks discussed in the previous section and are often experienced as the interactions between

local communities and development organizations, research institutions, or government entities. This engagement can also be experienced through the "structures, mechanisms and processes as well as rules and norms that govern human behavior and social order" (Yami et al., 2009, p. 154). These institutions are often referred to as "formal" institutions," whereas the previous section on social networks could have been considered "informal institutions" (Yami et al., 2009). Formal institutions are often critiqued for not adapting their strategies to the local experiences. Islam & Nursey-Bray (2017) argue that for formal institutions to successfully play a "crucial role" in sustainable agriculture and food security programming, they must "incorporate cultural mechanisms and build partnerships with more community based informal institutions" (Islam & Nursey-Bray, 2017, p. 347). Thus, analyzing culture through these interactions and partnerships can provide qualitative conclusions on best practices. The following articles offer context into these interactions through a food security lens.

Yekinni (2010), Maconachie (2008), and Kuusaana & Eledi (2015) all provide insight into local communities navigating institutional networks to sustain a livelihood. Yekinni (2010) analyzed the relationships between local communities and development programs. In comparison, Maconachie (2008) and Kuusaana & Eledi (2015) present the challenges individuals face when navigating national, local, and traditional law and regulations regarding land management and farming. All three articles employ qualitative based research methods that allow for personal narratives and experiences to be highlighted.

Through a gendered lens, Yekinni (2010) presents research findings around participation with development programs and these programs' effects on food security

status. Yekinni (2010) found that a woman's involvement in development programs "has a positive impact on the food security status" (Yekinni, 2010, p. 34) of the woman's household. Yekinni (2010) advocates for the efficient and appropriate implementation of development programs, especially those with a gendered focus. These findings support previous claims that partnerships between communities and third-party organizations, which focus on women's empowerment, are effective "in the constraints that women face in accessing credit and land and in participating in decision making at the local level" (Yekinni, 2010, p. 30). Yekinni (2010) can serve as a beneficial study for development practitioners considering including women empowerment in their program structure.

Through a different institutional lens, Maconachie (2008) and Kuusaana & Eledi (2015) showcase findings around the challenges local people face in navigating national, local, and traditional government structures in obtaining land and developing a farming livelihood. Maconachie (2008) engages with both the government of Sierra Leone and the customary laws. Maconachie (2008) found that there are micro-politics embedded in traditional history. However, this scenario presents barriers to families displaced by conflict and who have now returned to their ancestral village. Maconachie (2008) notes that these rich traditions around land ownership also "obstruct the access of local councils or other investors to productive land, especially land that is rich in natural resources" (Jackson, 2007, as cited by Maconachie, 2008, p.246). Similar to Maconachie's (2008) findings, Kuusaana & Eledi (2015) found that in Ghana, the current system of customary land ownership makes land access extremely difficult, especially to urban migrants. Kuusaana & Eledi (2015) stress that the state and local governments must expand efforts to increase accessible land to cultivate urban agriculture, build food security, and ensure

sustainable livelihoods. Both articles discuss the challenges of navigating conflicting government systems and the stressors local communities experience in an increasingly globalized world.

All three articles applied a qualitative-based research method, which allowed for a more comprehensive illustration to be painted. Yekinni (2010) utilized a detailed questionnaire and the Household Food Insecurity Access Scale. However, compared to the other two articles lacked significant personal details. Maconachie (2008) and Kuusaana & Eledi (2015) utilized qualitative methods, including participant observation, interviews, and focus groups.

IV.II.II Culture as Material- Livelihood and Practice

The second major approach to culture is culture as material, through the lens of livelihoods and livelihood practices. This approach correlates directly with the *what, who, and why* questions within cultural studies. Within development studies, specifically those in connection with agriculture and food security, livelihoods are often viewed through the lens of sustainability. A sustainable livelihood can be described as one that "can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base" (Hussein & Nelson, 1999, p. 3). In the development and practice of sustainable livelihoods, individuals and communities are often faced with difficult choices around livelihood diversification to mitigate risk and stress. Hussein & Nelson (1999) note that diversification can come in the form of "on- and off-farm activities which are undertaken to generate income additional to that from the main household agricultural activities" (Carter 1997, Stark and Levhari, 1982, as cited in Hussein & Nelson, 1999, p. 3). The

major subthemes found within the articles that engaged with this approach support this claim by Hussein & Nelson (1999) as are an urban/rural nexus, economic capabilities, general coping mechanism, participation around agriculture methods, access to resources, and general application of a livelihood and vulnerability framework. It is important to note that the largest number of articles engaged with this approach to culture, while frequently intersecting with the social approach, especially the gender subtheme.

An Urban/Rural Nexus

The first subtheme for analysis for the livelihood and practice approach to culture is the urban/rural nexus. The urban/rural nexus can be described as the movement of people from rural areas to urban areas to elevate livelihood opportunities and food security. Hussein & Nelson (1999) claim that migration from rural areas to urban centers is often directly linked to other livelihood strategies and practices, including increasing economic capabilities and seeking access to resources like credit. Understanding how the urban/rural nexus affects the experiences of food security is essential. It can provide insight into how sustainable livelihoods are practiced and perceived and the lasting outcomes migration or non-migration has on periphery populations, including the rural areas in which a person left.

The urban/rural nexus subtheme is essential to engage with because it links to the many other subthemes within this review. Atuoye et al. (2017), Ikudayisi et al. (2019), and Kuusaana & Eledi (2015) are three articles that all engaged with this nexus to a degree in their discussions around food security and well-being. These three articles each take a unique perspective within the urban/rural nexus. Yet, they all claim the importance of understanding this nexus in food security studies because urban food insecurity is

growing as more people leave rural communities for urban spaces. In regards to methods, Atuoye et al. (2017) and Ikudayisi et al. (2019) apply a quantitative methods approach, and Kuusaana & Eledi (2015) use a mixed-methods approach.

Through a quantitative lens, Atuoye et al. (2017) assess the connections between remittances and household food security" "among urban and rural households" (Atuoye et al., 2017, p.18). Similar to findings by Ayerakwa (2018) in the subtheme, social networks, Atuoye et al. (2017) found that remittances create many positive effects on the communities that send them and receive them, including maintaining ties to home or rural spaces and the role of remittances as a buffer that allows rural areas to make up from their loss of labour when individuals migrate (Atuoye et al., 2017). However, the findings of this article do signal the need for further review to understand if remittances help develop a sustainable livelihood. This provided a path for future research to further engage with this aspect of the urban/rural nexus.

Ikudayisi et al. (2019) engage with the urban/rural nexus through the idea that the different levels of urbanization experience food security differently. Ikudayisi et al. (2019) open their article debunking the concept that food insecurity is primarily a rural population experience. Instead, they claim that there is an increase in the experiences of food insecurity in urban areas and that stressors around malnutrition are on the rise (Seidenbusch et al., 2018, as cited by Ikudayisi et al., 2019). This rise of food insecurity in urban spaces is directly linked to the migrations of people from rural spaces to urban spaces. Ikudayisi et al. (2019) advocate for future research and development policy and programming to consider this link to food security and prioritize it when engaging with urban food security. Like Atuoye et al. (2017), this research was based on quantitative

methods and lacked a deeper understanding of individual experiences in these city spaces.

Lastly, it is important to reengage Kuusaana & Eledi (2015), an article discussed in previous subthemes, because of the many layers it touches. This article presents the effects of urbanization on the region's farmers' access to necessary quality or preferred spaces for crop production. In the beginning of the article, Kuusaana & Eledi (2015) note the critical role of urban agriculture for those living in urban spaces, especially the urban poor (Kuusaana & Eledi, 2015, p. 443). Kuusaana & Eledi (2015) cite Thornton et al. (2012) when they say that "urban and peri-urban agriculture" is the lifeline of subsistence for urban dwellers (Thornton et al., 2012, as cited by Kuusaana & Eledi, 2015, p. 444). Similar to the previous articles of this subtheme, this article notes that many urban migrants face challenges to adopting a sustainable livelihood that ensures the community's overall well-being. One key difference of this article to Atuoye et al. (2017) and Ikudayisi et al. (2019) is the application of mixed-methods in the data collection. Through mixed-methods, Kuusaana & Eledi (2015) serve as an exemplary example of engagement with the urban/rural nexus. It effectively underscores the constraints around sustainable urban livelihoods concerning access to suitable farming land and well-being.

Economic Capabilities

The next subtheme within the livelihoods and practice application of culture is economic capabilities. Economic capabilities are the shifts within livelihood practices to increase income within a household. Hussein & Nelson (1999) note that diversifying income-generating activities is a foundation to the sustainable livelihood approach many development practitioners and governments follow and is often categorized as either on-

or off-farm practices. These activities include the "production of other agricultural and non-agricultural goods and services, the sale of waged labour, or self-employment in small firms, and other strategies undertaken to spread risk" (Hussein & Nelson, 1999, p.3). It is essential to note that all of the subthemes within this approach to culture are interconnected and almost directly connected to this subtheme, economic capabilities.

People move to urban spaces from rural spaces often to seek out income-generating activities. Hussein & Nelson (1999) note that "migration forms a central component of livelihood diversification" and that studies from "Ethiopia, Bangladesh and Mali" show that "migration is widespread and in all three cases it is linked to income generation strategies" (McDowell and de Haan, 1997, as cited by Hussein & Nelson, 1999, p.5). Other forms of income-generating diversification include integrating traditional and western agriculture practices and the development of rural micro-enterprises. These income diversification activities allow for "cash income" to be integrated into the household economy and for cash funds to be available to be used to increase foodstuff purchases. Thus, playing a role in the food security experience (Hussein & Nelson, 1999). The following articles present studies around income-generating activities and their role in the food security experience of the study's population.

Within this subtheme, Naughton et al. (2017) present an exemplary example of engagement, Atuoye et al. (2017) offers a mediocre presentation, and Omotayo et al. (2018) present a weak engagement. It is essential to look at all three examples because economic capabilities are at the center of one's ability to increase food security. All three articles take a different approach to engage with economic capabilities, and only

Naughton et al. (2017) presents findings derived from qualitative-based methods. Both Atuoye et al. (2017) and Omotayo et al. (2018) utilize quantitative methods. However, Atuoye et al. (2017) and Omotayo et al. (2018) differ in their level of discussion and presentation.

Naughton et al. (2017), which was discussed in previous subthemes, looks at income-generating activities as a form of gender empowerment, household well-being, and food security development. In this study, shea butter production serves as a valuable tool in promoting women's equality, cultivating social networks, and generating income through the lens of livelihood practices. Naughton et al. (2017) claim that the profits from these sales are often the "only sources of income available to women and families" (Naughton et al., 2017, p.775) and that these profits are used to supplement "gaps" in resources experienced during the hunger season. However, they do stress that shea butter production should be seen as a "mechanism for household income diversification and food security" and not an entire "solution to poverty" (Naughton, 2016, Pouliot, 2012, as cited by Naughton et al., 2017, p.776). This research is an extensive study of the social and livelihood consequences of shea butter production and provides a thorough qualitative lens into this practice, and should serve as a resource to scholars and practitioners interested in increasing women's economic capabilities. It is important to note that this is the only article that presents a gender lens of the three articles in this subtheme.

Atuoye et al. (2017), which like Naughton et al. (2017), has also been previously discussed in other subthemes, looks at migration as an income-generating factor individuals use to increase well-being. In association with the discussion around the

migration of rural individuals to urban space, this migration is often connected with seeking out means of "diversifying household income sources" (Atuoye et al., 2017, p. 20). Migrants to urban spaces hope to increase income-generating activities and send the profits to family members in rural areas to support household needs, like foodstuffs. Similar to Naughton et al. (2017), Atuoye et al. (2017) advocate for the advancement of local economies outside of farming practices to increase the economic capabilities of the local populations.

Lastly, Omotayo et al. (2018) seek to assess the relationship between farming-based households in Nigeria and their experiences with food security. Through results derived from quantitative methods, Omotayo et al. (2018) suggest that investments in social capital innovations should be prioritized to reduce poverty and experiences around food insecurity. The claims made, though advocating for the importance of income-generating activities, are underdeveloped and leave significant gaps in the overall presentation

General Coping Mechanism

General coping mechanisms is the next common subtheme within the livelihoods and practice approach to culture. From the literature, coping mechanisms are most associated with stressors and shifts in livelihood due to climate change. However, they can also be implemented to "ensure survival of the household in times of [other forms of] stress" or as "adaptive strategies" at specific periods of time in a year (Hussein & Nelson, 1999, p. 9). Common coping mechanisms include subthemes that have been previously discussed, like migration from rural to urban spaces and shifts in income-generating activities. Other coping mechanisms that were not previously discussed include adopting

mechanized farming techniques, like water harvesting or other irrigation practices (Molnar, 2010), or shifts in household food access dynamics. Hussein & Nelson (1999) also note a gendered difference in coping strategies, connecting the previous discussion in the social approach to culture section. Hussein and Nelson (1999) warn that some coping mechanisms or adaptive strategies do not always lead to positive lasting consequences like elevated food security. They suggest that "off-agricultural employment arises from the survival strategies of rural households unable to obtain employment or self-employment in agriculture. It is a last resort rather than an attractive alternative livelihood" (Bernstein et al., 1992, p. 153-154 as cited by Hussein & Nelson, 1999, p. 16). It is crucial to understand how coping mechanisms are discussed in the literature and how they can be adequately engaged with, as these livelihood decisions provide a valuable lens into a local area's cultural values and lifeways. The following articles offer exemplary cases of livelihood engagement and an example of minimal attention with significant gaps.

Many of the previously discussed subthemes are interconnected to the subtheme, coping mechanisms, and the three articles presented for this subtheme illuminate these connections. Rademacher-Schulz et al. (2014), N'Danikou et al. (2017), and Maconachie (2018) each provide outstanding insight into the practice of different coping mechanisms for individuals and communities to maintain a livelihood and well-being. It is important to note that each article highlights different strategies for coping with challenges presented by various stressors. Yet, they articulate their results in a highly personal and qualitative way, which allows readers and scholars to better understand why certain livelihood practices are applied.

Rademacher-Schulz et al. (2014) takes one of the most traditional frameworks around coping strategies and livelihood and analyzes the connection between uncertainties around weather patterns, coping mechanisms practices, and their effects on food security in the study region. Rademacher-Schulz et al. (2014) present a fascinating argument that scholars and practitioners should place close attention. This argument is the difference between coping and adaptation. Coping can be considered more aggressive or fast-paced choices that are made to survive. For example, selling assets to buy food for a short period of time (Cannon and Müller-Mahn, 2010, as cited by Rademacher-Schulz et al., 2014) is considered coping. Adaptation, on the other hand, is the "spontaneous and routinized reaction of people." Both coping strategies and adaptation strategies directly reflect previous experiences and knowledge (Cannon & Müller-Mahn, 2010, p. 7, as cited by Rademacher-Schulz et al., 2014, p. 47). They can allow scholars and practitioners to grasp better the "*why*" question on actions taken.

Like the other articles in this subtheme, Rademacher-Schulz et al. (2014) used mixed-method data collection, including a household survey, participatory rural approaches, and interviews. This allowed for a deep qualitative engagement in understanding the experiences of farmers in this region, their perceptions of the stressors, and their collective decisions around how to mitigate the risk posed by climate variability. From this qualitative data, Rademacher-Schulz et al. (2014) include personal narratives from the farmers interviewed, which provides an individual and cultural layer to the study. For example, one farmer is quoted:

> *Rainfall was very favorable in the last 10–20 years compared to today. One could cultivate small parcels of land and harvest a lot. Today, the rainfall is very*

unpredictable; we would rather farm larger land sizes and harvest little

(Rademacher-Schulz et al., 2014, p. 48).

This article should be considered an excellent blueprint for future scholarship and programs focused on climate change, coping mechanisms, and food security.

A genuinely unique article in this review is by N'Danikou et al. (2017) because it engages with coping strategies through seeking to determine the "most significant livelihood assets for [household food security] in dryland agriculture systems [of Mali]" (N'Danikou et al., 2017, p. 1). This article is unlike any other in this review as it presents a food security measurement that utilized livelihood assets as the explanatory variable to 14 short-term food-based coping strategies. Through this measurement, N'Danikou et al. (2017) captured the *why* behind the implementation of certain practices are implemented.

Finally, it is important to highlight Maconachie (2018) as it narrates personal experiences of people seeking to reestablish previous livelihoods disrupted by internal conflict. In this article, coping strategies are presented in a minor form through the lens of coping with a traumatic past and how communities fit pieces of history and the present together to build a sustainable, food-secure future. Maconachie (2018) engages with discussions on how displaced people cope with resettlement and navigate post-conflict territories. The article does an excellent job presenting coping strategies and experiences to a unique stressor.

Participation Around Agriculture Methods

The subtheme of decisions surrounding agriculture methods intersects with most of the subthemes found in this review, including economic capabilities, coping

mechanisms, access to resources, and components of the social and systems of meaning approaches to culture. Efforts toward building sustainable livelihoods often call for the integration of nontraditional farming methods into the daily agricultural practices of communities. This integration is often referred to as "sustainable agriculture." Advocates for sustainable agriculture believe that the practices allow farmers to plan for risk, maintain environmental quality, increase income-generating activities, and cultivate social networks (Altieri, 1987; Lightfoot and Noble, 1992, as cited by Hussein & Nelson, 1999, p.7). Zeweld et al. (2020) note that "along with improving agricultural productivity and increasing income, sustainable agricultural practices have reduced land degradation and soil erosion; and improve soil fertility, vegetation coverage and natural resource base and water table content" (Zeweld et al., 2020, p. 2). Both Hussein & Nelson (1999) and Zeweld et al. (2020) note that a critical component to understanding why or why not a farmer shifts their agricultural practices is understanding the attitudes and perceptions of risk of each farmer and the role the social networks play in the decision-making processes around agricultural practices. Being aware of these practices and their popularities within communities is essential for food security practitioners who seek to elevate food security experiences by increasing "sustainable agriculture practices."

All three articles for analysis within this subtheme illustrate the complex system of farmers and pastoralists living in a world deeply connected to traditional practices. Still, as global systems grow, economic instability increases, and the threat of climate instability puts pressure on communities" and "communities are being forced to turn to "new and unfamiliar ways [of livelihood] to mitigate risk or deal the 'new' consequences of using old strategies" (McKune & Silva, 2013, p.1723). McKune & Silva (2013)

present this narrative through their engagement with vulnerable pastoralists in Niger. McKune & Silva (2013). Kiba et al. (2020) illustrate this system through their study of crop adoption rates with traditional yam farmers. Lastly, Fouladbash & Currie (2015) relate local farmers' rooted connections to forests with their engagement rate with Western calls for conservation practices. It is also important to highlight that all three articles present a highly qualitative engagement. Yet, they are different in regards to the additional subthemes in which they engage.

McKune & Silva (2013) note that the pastoral livelihood is deeply in tune with the natural environment. In the present environmental instability, pastoralists are exceptionally vulnerable and seek alternative activities to mitigate risk. Some of these activities include migrating further with their herds to reach sustainable grazing lands, the abandonment of "traditional restocking system of *haba nai*" (McKune & Silva, 2013, p.1721) due to noticed inefficacy and ineffectiveness in the systems, and the integration of crop farming to increase economic capabilities. All actions are taken to improve the overall well-being of a community. For example,

> According to focus group respondents, when herds in Dareram and Abdounezé were decimated during the 1984 food crisis, the communities dispersed, and families fled to Nigeria. Upon returning, neither community was able to rebuild herds to a sufficient size, and by 1990, the remaining community around Abdounezé decided to settle and begin growing crops in addition to herding (McKune & Silva, 2013, p.1721).

This article presents a qualitative narrative around how traditional practitioners of livestock raising are put under pressure to pick up alternative agriculture practices to mitigate risk, maintain food security, and survive.

Similarly, Kiba et al. (2020) narrate this interaction between the traditional and the "modern" in their study around interventions implemented in local communities that engage with valued crops, like the yam. The yam is a crop cultivated in many countries of West Africa that holds value in "food security, income-generating, culture, and health" (Kiba et al., 2020, p. 2). In connection to the warning made by Alonso et al. 2018, Kiba et al. (2020) note that transforming agriculture practices are problematic, especially around a traditional crop like the yam. In their discussion and conclusion, Kiba et al. (2020) report these difficulties and connect their challenges to the deep cultural ties to the crop. One farmer is quoted as saying the following to the researchers, "*I was born with yam and have been producing it for decades! I do not think you can teach me more than what I know"* (Kiba et al., 2020, p. 12). This research is a prime example of why culture matters and why it needs to be considered in implementing agriculture interventions. These interventions may disrupt the traditional livelihood and practices of local people.

Like the previous two articles, Fouladbash & Currie (2015) also connect local communities to traditional livelihoods when noting the deep connection local communities in Liberia have to the forests. Their livelihoods and culture are dependent upon the health and abundance of these forests to support their "subsistence agriculture, hunting, timber, non-timber forest pro- ducts, and cultural and religious" (Wunder 2001, Sheil et al., 2006, as cited by Fouladbash & Currie, 2015, p.247) practices. These livelihoods are at odds now with the international call for conservation. Farmers are being

encouraged to lay down the plow and practice of their ancestors to adopt more "sustainable" methods that promote environmental stewardship. Similar to Kiba et al. (2020), Fouladbash & Currie (2015) show that "socio-cultural obstacles may impede the transition away from traditional shifting cultivation systems" (Fouladbash & Currie, 2015, p. 260). Unique to this article is their application of a gender lens when they include gender differences and the role of traditional land tenure beliefs and practices, and their influences on adopting "sustainable" agriculture methods.

All three articles apply qualitative methods, which elevate the translation of their findings. McKune & Silva (2013) utilize the application of the double exposure framework. The double exposure framework brings together "human and natural systems in a way that is more inclusive of political processes and power dynamics" (McKune & Silva, 2013, p. 1711). The double exposure framework allows for interdisciplinary collaboration and data collection. Kiba et al. utilized a mixed-methods approach which included Land Degradation Surveillance and Rapid Rural Appraisal. Rapid Rural Appraisal is a common method used within the articles of this review and includes the application of discussion groups of integral stakeholders within the region. For this specific study, stakeholders included “researchers (agronomists, economists, and sociologists), farmers, traders, transporters, processors, agricultural extension agents, input suppliers, media, microfinance institutions, and security agents as well as traditional, religious, and administrative authorities” (Kiba et al., 2020, p. 3). This review believes that the researcher's engagement with a diverse pool of respondents elevates their research findings. Lastly, Fouladbash & Currie (2015) employed a quantitative questionnaire. This article is unique to other articles in this review that only use

quantitative-based questionnaires. They present the implications of replacing traditional livelihood practices and encourage practitioners to integrate sustainable systems instead of fully replacing a system.

Access to Resources

Access to resources in relation to the livelihoods and practice application of culture is the next subtheme for discussion. Access to resources has a wide connection and intersection with the other subthemes within this application of culture; as it is seen from the previously analyzed articles in this review, individuals make decisions around migration, income-generating activities, shifts in agriculture practices, and other coping mechanisms due to their ability to access or not access specific essential resources. These resources can include but are not limited to land, labour, technologies, markets, education, networks of support, and credit (Zewld et al., 2020). The conversation around access to resources is also present in Hussein and Nelson (1999), in which resource access is a direct barrier of entry for many people seeking to sustain and diversify their livelihoods. There are also many layers to the access discussion in which the experience is amplified for some populations, including women, youth, the elderly, and those in remote areas. In the subtheme analysis that follows, two of the articles have previously been discussed in one or more subthemes. All three represent a narrative around how access or lack of access to certain resources challenges the ability of individuals and communities to practice sustainable livelihoods and ensure food security.

Maconachie (2018), Delvaux & Paloma (2018), Etongo et al. (2018) are articles from this review that showcase the role of access to resources in regards to developing livelihoods and well-being. However, it is essential to note that not all three of these

articles provide exemplary engagement with this subtheme. Maconachie (2018) and Delvaux & Paloma (2018) provide substantive engagement with the subtheme, whereas Etongo et al. (2018) briefly mention it. Maconachie (2018) and Delvaux & Paloma (2018) can serve as supporting material for future scholars whose work connects food security, well-being, and access to resources. Etongo et al. (2018) exemplify how essential information can be lost when this subtheme is not adequately engaged.

All three articles take a unique approach to this subtheme. Yet, they are all connected to the writing by Hussein and Nelson (1999), which suggests that resource access is a direct barrier of entry for people seeking to expand their livelihoods. Maconachie (2018) worked with people in Sierra Leone who sought to return to their ancestral lands. Upon return, one of the main challenges of developing a livelihood was accessing lands. Maconachie (2018) points out that since the end of the civil war, "the process obtaining and defending access to swampland has become complicated and politicized" (Maconachie, 2018, p. 247). A second challenge faced by the people in this study is the access to labor once the land is acquired. Many displaced people understand the difficulties of accessing land and thus are migrating to areas where off-farm labor opportunities are available, thus causing a labor shortage in rural areas. Those who return to rural areas and secure options for cultivation lack the access to labor groups necessary to clear, develop, irrigate, and fortify large-scale rice production. These two challenges directly affect a person's or community's ability to redevelop and sustain a food security livelihood. Maconachie's (2018) engagement around access to these resources and the constraints upon livelihoods one experiences if unable to access is thoughtful and a framework that can guide scholars in the future.

Delvaux & Paloma (2018) present a narration of the role of common resources in a community's ability to sustain food security and well-being. Similar to the findings by Maconachie (2018), Delvaux & Paloma (2018) note in their introduction that food security is directly linked to access to specific resources and that food insecurity is continued to be experienced "because of lack of access and entitlement to food (Sen 1981), conflict, lack of job opportunities, and lack of access to social services or land" (FAO et al., 2014, Food Security Information Network, 2017 as cited by Delvaux & Paloma, 2018, p.121). Instead of focusing on access to basic resources like land and labor as found in Maconachie (2018), Delvaux & Paloma (2018) engage with common resources, which tend to be wild and found within the forest landscapes (Scoones et al., 1992, as cited by Delvaux & Paloma, 2018). These common resources service local communities year long. However, they are especially desired during times of scarcity and stress. One of the outstanding aspects of this paper that should be noted for future scholarship is that it points out that standard quantitative household surveys have limits and gaps within questions around common resources. In their conclusion, Delvaux & Paloma (2018) highlight this when they write:

> This exploratory paper highlights the limitations of current standard population representative household surveys with regard to the role played by the hidden harvest (i.e., environmental income and source of subsistence for food security). If food security is to be addressed in a more effective way, the addition of complementary questionnaire modules to existing agriculture surveys is warranted. A more detailed record of access to the hidden harvest, aligned with both farm and non-farm activities, allows for a more coherent grasp of population

needs, and particularly those of the more vulnerable (Delvaux & Paloma, 2018, p.133).

Thus, to fill in these gaps and account for common resources in their data collection, Delvaux & Paloma (2018) takes the typical food security and household profile survey found in many of the articles of this study and incorporate inquiries around the forest and non-forest common resources, specifically "arable land, pasture, forest, and water" (Delvaux & Paloma, 2018, p.133). This article provides substance engagement around the role of common resources during challenging and non-challenging times within communities and should be used as a resource for future scholarship.

Lastly, future scholarship should look at Etongo et al. (2018) as a warning to the gaps that arise when this subtheme is not thoroughly presented. Similar to the education subtheme discussion of this review, access to resources in relation to food security and livelihoods is only minorly discussed within this article. Essentially, access to extension agents opens the door for opportunities to access other resources like agriculture inputs deemed necessary to engage in sustainable land management and elevate food security. It can be concluded that this minor engagement around access to resources is a wide gap in this research. Further data could and should have been collected to understand the different resources necessary to manage land and build sustainable livelihoods.

General Application of a Livelihood and Vulnerability Framework

The final subtheme for discussion within the livelihood and practice approach to culture is the application of the livelihood framework with an emphasis on vulnerability. This subtheme encapsulates all five of the previous subthemes discussed within this approach. When understanding this framework, it is essential to look to Yaro (2004).

Yaro (2004) notes that as the conceptual understanding around food in/security stretches beyond the global food supply network, more emphasis is being placed on the themes within the individual's and community's experiences of sustainability and vulnerability (Sen, 1981, Scoones, 1998, DFID, 2002b, Chambers, 1989, Watts & Bohle, 1993, as cited by Yaro, 2004). As sustainability and localized vulnerability become central components to food security, "contextual, proximate, and structural" (Yaro, 2004, p. 30) characteristics need to be considered and incorporated into the analysis frameworks. Thus, giving rise and support to the livelihood and vulnerability framework.

The livelihood and vulnerability framework engages with the values and practices within a localized context, including food-related ones. When applying a livelihood and vulnerability framework, researchers can better highlight the different paths towards well-being that include the situations and "abstract processes engaged in by various groups of people in making a living" (Yaro, 2004, p. 35). As mentioned in previous sections, food security is included in the well-being goals of people. Yaro (2004) stresses that for this framework to adequately measure experiences of well-being, especially in regards to food security, it "must recognize and incorporate the principles of dynamism, diversity, asymmetry of impacts, and political muscle in access to capital and provide [a] contextual analysis" (Yaro, 2004, p. 32). Policymakers and researchers who apply a livelihood and vulnerability framework to their work center the personal and local experiences and livelihoods while tailoring programs and policy to fit the specific needs of local people and mitigates their particular vulnerabilities. The livelihood and vulnerability framework allows qualitative data to become central to research and opens up conversations around personal beliefs and experiences. The following three articles

provide examples of research conducted through the lens of a livelihood and vulnerability framework. Hesselberg & Yaro (2006), N'Danikou et al. (2017), and Delvaux & Paloma (2018) are three articles from this review that provide a thorough presentation of the livelihood and vulnerability framework. Through individualized lenses, each article offers ways in which to interpret and apply the framework that can be useful to future scholarship.

Hesselberg & Yaro (2006) applies a livelihood framework in their article to highlight "that the high level of food insecurity in the study villages reflects not only problems of food production but also a general lack of livelihood opportunities" and that "secure livelihoods are prerequisites for ensuring food security" (Hesselberg & Yaro, 2006, p. 41-42). A livelihood and vulnerability framework is justified for this study because it encapsulates the "complex ecological, socio-cultural, and economic-political perspectives, which are more suitable than conventional poverty frameworks" (Hesselberg & Yaro, 2006, p. 42). Hesselberg & Yaro (2006) provide an extensive visual of the livelihood framework that highlights the variety of threats to livelihoods, the capabilities of local populations, and the potential outcomes from the choices made around livelihoods. A replication of this visual is provided in figure 3. Due to its highly thoughtful engagement around qualitative layers to livelihood and the complex components to a community's approach to their vulnerabilities, this visual should be consulted in future research that utilizes a livelihood and vulnerability framework.

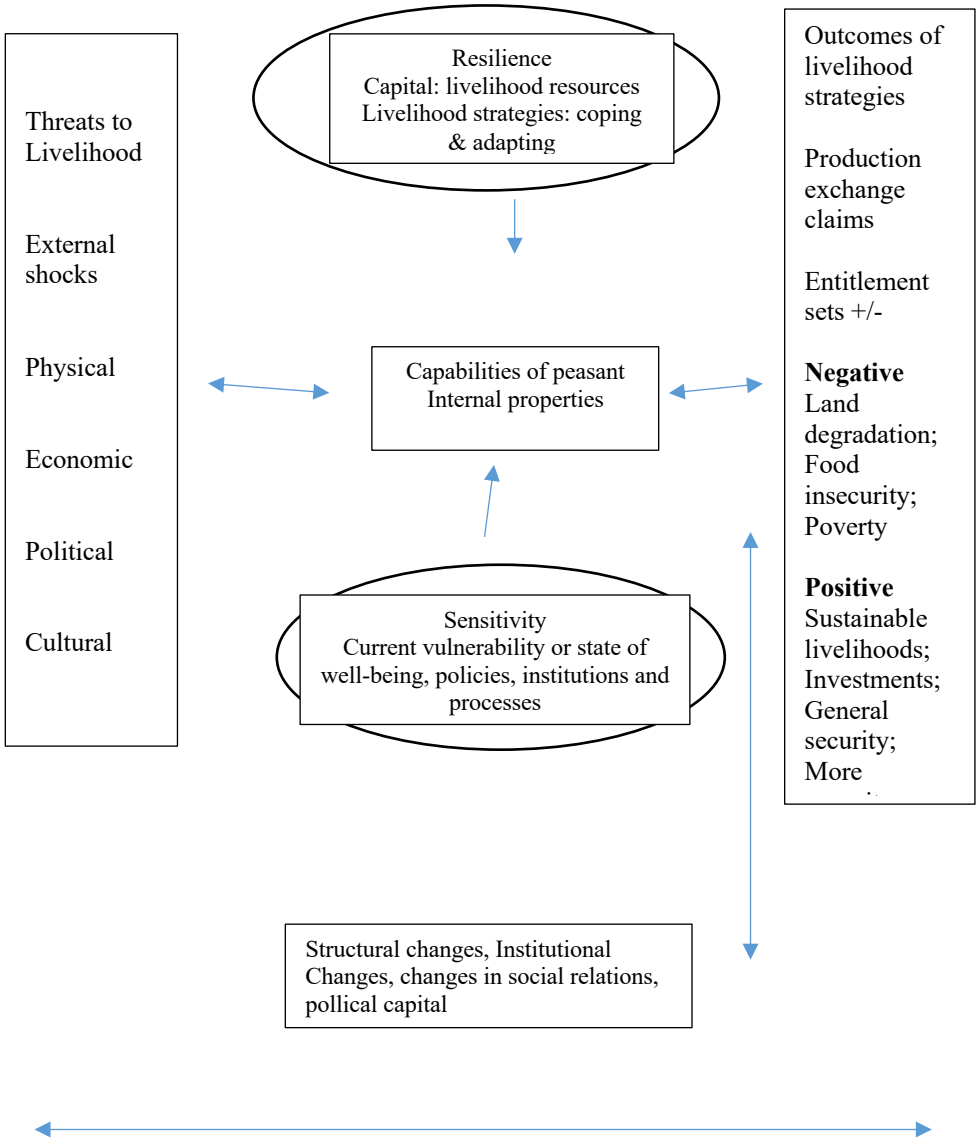

Figure 3: "The Livelihood Vulnerability Triad" (Hesselberg & Yaro, 2006, p. 42)

N'Danikou et al. (2017) use a livelihood framework similar to the one previously discussed in the Hasselberg & Yaro (2006) article. However, in N'Danikou et al. (2017), there is a heavy emphasis placed on livelihood assets, including five forms of capital that directly influence experiences of vulnerability and well-being, including food security.

These five forms of capital include natural (access to resources including land and water), financial (access to resources and income-generating activities), human (household dynamics), social (communal and cultural networks), and lastly, infrastructure (access to resources and institutional engagement). These five forms of capital all have connections to the many subthemes within this review.

In their engagement around the livelihood framework, N'Danikou et al. (2017) note that vulnerability around food security can be worked through via three different perspectives including the "economic (household budget and consumption surveys), nutritional (individual caloric intake data), household coping strategies" (N'Danikou et al., 2017, p. 4). N'Danikou et al. (2017) stress that each of the lenses or perspectives "capture different dimensions of vulnerability" and that engaging in questions and conversations around all three lenses provides clear indications of the holistic experience of food security. The research conducted by N'Danikou et al. (2017) and their engagement around livelihood components and vulnerability show a direct connection to qualitative measurements, including those around social and cultural contexts.

Delvaux & Paloma (2018) apply a sustainable livelihood framework to work through the connections between common resources and food security. The sustainable livelihood framework "comprises the capabilities, assets (including both material and social resources) and activities required for a means of living" (Delvaux & Paloma, 2018, p. 124). As found in the previous article by N'Danikou et al. (2017), different forms of capital play a vital role in the assessment of a livelihood and its ability to produce well-being in the form of food security. Delvaux & Paloma (2018) note that the sustainable livelihood framework has become popular by development practitioners, who in the UK

view the framework as the "the assets of people; (ii) the strategies developed; (iii) the context of the livelihood; and (iv) specific factors contributing to the vulnerability or resilience of livelihood to shock" (IRP, 2010, as cited by Delvaux & Paloma, 2018, p. 124). The livelihood approach can be seen as general, and there is a need to tailor the approach when engaging with food and nutrition. For this specific article, the authors incorporated "key characteristics and assets of households and their environment, including geographical proximity to commercial opportunities" (Delvaux & Paloma, 2018, p. 124). This article underscores previous claims by other articles in this review on the need to adapt measurements to specific locations or subject matter. It also supports the notion that qualitative measurements are essential when seeking to understand food security.

IV.II.III Culture as Belief- Systems of Meaning

The final approach to culture is culture as belief through systems of meaning. This approach to culture engages with the questions around *what and why.* Cultural theorist Stuart Hall addresses systems of meaning, who notes that cultures are systems of meaning that are practiced through social and livelihood patterns (Jackson, 2010). Thus, all of the previous subthemes discussed so far are the products of a pattern of meaning that are shared within a geographic space. Systems of meaning give reason to what actions take place and why they are taking place. It is essential to engage with the systems of meaning approach to culture because it can provide qualitative explanations around vulnerability, resilience, and adaptation (Fraser et al., 2008), as well as other choices around sustaining well-being, like food security.

The systems of meaning approach to culture was the least directly engaged approach. Only 17 out of the 71 eligible articles directly discussed this approach. Even the articles highlighted for discussion around systems of meaning only gave minor mentions to knowledge or perception. It is essential to note that every article engaged with this approach received a "3" or above rating. If the article gave a brief mention, it was rated as "3" because even a brief mention is better than no mention. Those articles that provided thorough systems of meaning analysis sourced primarily qualitative data and stressed the importance of local knowledge, experiences, and perceptions were rated as a "4" or "5." In this approach to culture, two subthemes are being analyzed, the value of local knowledge and local perceptions. Both subthemes are relatively similar. Knowledge and perceptions could be used interchangeably. However, as will be noticed in the following discussion, there are some differences in the ways in which the articles present the terms.

Value of Local Knowledge

Local knowledge is the "dynamic and complex bodies of know-how, practices, and skills that are developed and sustained by peoples/communities with shared histories and experiences" (Beckford & Barker, 2007, p.118). Local knowledge provides the foundations to the what and why questions within daily livelihood practices and social interactions. Local knowledge is drawn from the lived histories of people and their interactions with their environments (Beckford & Barker, 2007). Local knowledge is often referred to as the traditions of a people. There are some overlaps here to previous sections, which is to be expected. Beckford & Barker (2007) note that three connected characteristics of local knowledge exist. They are: "localized in nature and, more often

than not, traditional in context," it is "unique to specific environmental and cultural conditions," and it "knowledge constructed in informal settings, it is orally transmitted and rarely documented" (Beckford & Barker, 2007, p.118). Local knowledge has played an essential role in the research of local people and practices. However, as will be discussed in the following articles, it is not always prioritized in development practices, especially in food security programs. Mathur (2019) notes that often local knowledge is viewed as inferior to Western "scientific" knowledge. Finding the intersection of local knowledge with development programs is essential to produce the most sustainable and effective outcomes.

The three articles reviewed for this subtheme, Naughton et al. (2017), Temudo (2011), and Towns et al. (2013), are all outstanding examples of cultural engagement around food, hunger, and well-being. All three articles should be used as resources for future research, especially those interested in applying qualitative-based research methods that include local knowledge and narrations. These three articles present a unique lens into the value of understanding and incorporating local knowledge into food studies. Naughton et al. (2017) engage with local knowledge and its role within the shea butter production of Mali. This article also presents evidence as to how knowledge is embedded in the systems of meaning of the villages. Temudo (2011) highlights how a cropping system becomes embedded in the cultural well-being of a local place and the knowledge developed around this system. Temudo (2011) stresses the importance of valuing local experience and knowledge as the innovations around local cropping systems are introduced. Lastly, Towns et al. (2013) provide an audit of culturally appropriate food in Tallé, Niger, while advocating for incorporating local knowledge

within food development programs. It is important to note that all three articles stress the value of local knowledge in the development interventions.

Local knowledge is deeply embedded in the cultural practices and beliefs around shea butter production within the communities found within Naughton et al. (2017). For example, Naughton et al. (2017) state that in regards to how profits from shea butter can be spent, "common knowledge is present in the community that women should not purchase animals (e.g., goats or chickens)" (Naughton et al., 2017, p. 776), citing a local proverb for this reasoning. In continuing with the cultural links found within shea butter production, Naughton et al. (2017) note, there is general knowledge of the consumption and production of shea butter and its role in cultural and social networks. In fact, there are four distinct "cultural components" to the shea butter production and consumption that include: "(1) giving shea butter to family and friends, (2) communal shea butter production in groups or cooperatives, (3) an annual shea ceremony, and (4) major holidays and traditional ceremonies" (Naughton et al., 2017, p. 778). When engaging with how this knowledge should be incorporated into development interventions, the authors warn of extensive livelihood stress on shea butter production due to the effects of climate change and a shifting global market. As communities experience these stressors, they must begin to make adaptations and adjustments that may question traditional practices around shea butter. Naughton et al. (2017) advocate the advancement of shea butter production to ensure efficiency and stability for rural communities. However, note that these advancements have the potential for "adverse cultural impact, increased food insecurity, or erosion of social capital" (Naughton et al., 2017, p. 782). It is important to

note that this article was one of the very few articles that connected all three approaches and warned about the potential consequences of modernization on culture.

Stress around understanding local knowledge can also be seen in Temudo (2011). In this article, Temudo (2011) notes that understanding local knowledge around rice production in a region is essential, especially when one seeks to incorporate innovation into farming methods seeded in historical tradition. In the engagement with local knowledge around rice, Temudo (2011) claims that "rice is the main staple of Guinea-Bissau, to the extent that farmers speak of 'hunger' when they face rice shortages, even if there are plenty of other food alternatives available (sorghum, millet, cassava, yams, taro, bananas, etc.)" (Temudo, 2011, p. 311). This is a similar narrative to that found in Phillips (2018) and Richards (1939). Thus, drawing direct connections to culturally valued crops and feelings of well-being. This narrative can also be found indirectly in Towns et al. (2013) when they present their findings on local and culturally appropriate foods, including the local names, what factors are involved in defining local foods, and policy recommendations in Niger.

Through qualitative-based data collection, Temudo (2011) analyzed the role of local knowledge within the innovation process of rice production methods. Temudo (2011) draws upon recollections by local elders who narrate the livelihood changes made in the 1900s to sustain different rice cropping methods. The research found that innovation continues to happen in rice-growing areas. These explorations into new varieties and techniques come in association with culture and knowledge through what Temudo (2011) calls informal channels. Temudo (2011) includes the following narrative around the selection process for a rice variety or technique from a local farmer:

> There are as many ‘races’ [varieties] of rice as of people, and their number is always increasing because when someone travels and finds a beautiful rice [variety], he asks for a handful of seeds. When he arrives, he tests it in different places of his own field, and if the rice and the soil “love” each other, rice is going to give “a good birth.” Then he asks his wife to cook it, and if she tells him that it has worth, and if they like to eat it, then in the following year he is going to multiply the seeds. If this variety begins to be famous, then other farmers are going to ask him for a handful of seeds. After some years, this rice “gives birth to” another variety and if he likes it he harvests it separately and repeats once again the same procedure” (Aladji Issufu Soare, 1995, as cited by Temudo, 2011, p. 316).

Like Naughton et al. (2017), Temudo (2011) uses these personal narratives to advocate for further research and development to consider local perspectives when implementing sustainable interventions.

Similar to Naughton et al. (2017) and Temudo (2011), Towns et al. (2013) present a critical lens on the engagement with local knowledge in development programs. The authors cite their own experiences of living full time in the study village and note that during this experience, “the absence of local foods and knowledge in development programmes became very evident” (Towns et al., 2013, p.171). They also advocate for incorporating local traditional knowledge into the “science” that development organizations promote to strengthen the introduced programs. In this article, the local knowledge is presented in connection to food and well-being through an audit of culturally appropriate food in Tallé, Niger.

This audit is conducted through qualitative data collection similar to Naughton et al. (2017) and Temudo (2011), in which local voices and perspectives are prioritized. Towns et al. (2013) extracted qualitative data through Participatory Action Research (PAR). Towns et al. (2013) justify the use of PAR, stating that:

> in contrast to other research methodologies where the researcher determines the course of the research, in PAR, the researcher, and the community form a partnership built on trust, cultural sensitivity, and equity, operating in a culturally and scientifically relevant methodology (Israel et al., 2005, as cited by Towns et al., 2013, p. 172).

By applying Participatory Action Research, Towns et al. (2013) ensured the preservation of local knowledge, which was the ultimate goal of the research. This goal should serve as a guide for future research that seeks to engage with local knowledge in connection to aspects of daily practices, like food.

Local Perceptions

The second subtheme of the systems of meaning application of culture and the final subtheme for discussion within this review is local perceptions. Local perceptions are a growing qualitative component of the sustainable livelihood approach previously discussed. Local perceptions illuminate drivers of "behaviours and practice, [that] are difficult to measure" (Swift & Kate, 2001, as cited by Yaro, 2004, p. 28) quantitatively. Local perceptions are often equated to personal stories and provide insight into the "less tangible aspects" (Swift & Kate, 2001, as cited by Yaro, 2004, p. 28) within livelihoods. Concerning food security, studies that engage with perception are often "affected by cultural factors" (Alonso et al. 2018, p.115). Thus, articles within this review that

provided insight into local perceptions of food and agriculture showcase a more in-depth cultural and qualitative engagement that should guide further studies.

For this final subtheme, it is essential to look at West et al. (2014), Nero et al. (2018), and Kpienbaareh & Luginaah (2019), three articles that present findings on how local perceptions can provide understanding around daily practices. Each of these articles employ mix-methods to collect data on local perceptions. A unifying quality of these articles is in their presentation of personal narratives to showcase these perspectives. However, the lens through which each article is constructed is unique and presents different strengths towards this subtheme.

West et al. (2014) utilized mix-methods, through Participatory Rapid Rural Appraisal, to understand why the saying "famines of the past could never happen again" is spoken throughout the country and if the state of food security is actually improving throughout the country. West et al. (2014) immediately stand out in their engagement with local and cultural understandings around famines when they begin their article with a Mossi folktale. This folktale provides qualitative and historical connections to the famines of the past and guides the actions of daily livelihood practices. The folktale reads as the following:

> *Mba-Katré, the hyena, and Mba-Soâmba, the hare were friends.*
>
> *There had been such a famine that no one had anything to eat.*
>
> *So, the hare made an offer to the hyena. He proposed to that each one of them sell this mother in order to buy some* grain (Sissao, 2010, p.29, as cited by West et al., 2014, p.340)

West et al. (2014) note that engaging with cultural narratives like folktales helps to "guide our investigation of regional trends in food security by focusing on current causes of food shortages, adaptive strategies, and changes in grain markets" (West et al., 2014, p.340). This qualitative guide allows West et al. (2014) to surpass the "temporal and spatial" limits often found within contemporary food security measurements. West et al. (2014) are one of the more culturally relevant articles in this review.

Nero et al. (2018) also use mixed-methods data collection to research practices around the composition of urban and peri-urban food trees in Accra. Nero et al. (2018) do not present as rich of a cultural application to their research like West et al. (2014) does in connection to famines. However, Nero et al. (2018) does highlight the role of location and experience within the construction of perceptions, which is unique to their article. Nero et al. (2018) does not present as strong of qualitative findings as West et al. (2014) or as Kpienbaareh & Luginaah (2019). Lastly, it is essential to note that Nero et al. (2018) does not provide a strong justification for incorporating local perspectives, whereas West al. (2014) does in their explained use of PAR. Nero et al. (2018) are still of value to engage, especially in understanding factors behind the construction of a perspective.

Lastly, it is essential to look at Kpienbaareh & Luginaah (2019), which was one of the handful of articles in this review that applied a livelihood framework in their research. Through this livelihood framework, Kpienbaareh & Luginaah (2019) employed mixed-methods data collection to explore the links between wildfires and rural food security in Ghana. One of the most outstanding findings of this research is the challenges local communities face when there are different perspectives around a matter.

Kpienbaareh & Luginaah (2019) begin this article by explaining the deeply rooted connection between practices around fire and livelihoods in the region. Many rural people who live off the land, including farmers, herdsmen, and hunters, utilize fire within their livelihood practices. However, these different applications of fire, fire mismanagement, and pressures of climate change often lead to conflict (Kpienbaareh & Luginaah, 2019). By understanding these different livelihood practices, Kpienbaareh & Luginaah (2019) can focus on the different perspectives of "how the perennial wildfires (a shock/pressure to the production process) and household food security are linked" (Kpienbaareh & Luginaah, 2019, p.614). Similar to West et al. (2014), perspectives were presented through some detailed narrations. Kpienbaareh & Luginaah (2019) incorporated perspectives around general fire observations, coping strategies, and connections to food insecurity. In contrast to the previous two articles, Kpienbaareh & Luginaah (2019) briefly engaged holistically on other cultural approaches. Because this article is more holistic and draws connections to the other approaches to culture, it serves as an exemplary example of cultural engagement within this review.

IV.III Methodology: How is Food Security Measured and What Methods Are More Useful for Qualitative Data Extraction

Within these 30 articles that were previously analyzed within the breakdown of subthemes, it is also essential to take a more sweeping exploration of the methods utilized to capture food security experiences. This focused look into how food security is measured within the articles will allow for conclusions to be drawn around how quantitative and qualitative data is produced and the utility around each type of data. This focused exploration will also shed light on what measurements and methods seem to be

most useful when seeking descriptions around culture. It is noticeable that those utilizing the more popular quantitative-based methods produce data that may not truly encapsulate the complete food security or insecurity experience of the region of study. As will be discussed below, there is still value in the quantitative-based measurements. However, those that are applied in a qualitative framework or in partnership with qualitative measures produce a more comprehensive picture of food security.

In Chapter II popular quantitative measurements of food security were explained. These included but are not limited to Famine Early Warning System (FEWS NET), Global Food Security Index (GFSI), Household Dietary Diversity Score (HDDS), Food Consumption Score (FCS), Household Consumption and Expenditure Survey (HCES), Comprehensive Food Security and Vulnerability Analysis (CFSVAS), Global Hunger Index (GHI), Household Hunger Scale (HHS), Household Food Insecurity Access Scale (HFIAS), Household Economy Approach (HEA), Coping Strategies Index (CSI) (Jones et al., 2013). These measurements are often compiled from surveys administered within the communities of the study and focus on respondent profiles and general economic experiences. Often these surveys are accompanied by anthropometric measurements.

Of the 30 articles from the analysis, only six directly measured food security through a popularized quantitative application. Table 3 highlights which articles utilized quantitative measurement and their respective rating for each application of culture. Two of these articles utilized the Household Food Insecurity Access Scale (HFIAS). Atuoye et al. (2017) believe that that the data collected through this questionnaire is much more manageable “relative to other food security measures such as dietary recalls or anthropometric indicators” (Coates et al., 2007, as cited by Atuoye et al., 2017, p.21).

Adesoye & Adepoju (2020) note their use of the HFIAS shows "true deprivation" because it is "based on the idea that the experience of food insecurity (access) causes predictable reactions and responses that can be captured and quantified through a survey and summarized in a scale" (Coates et al., 2003, as cited by Adesoye & Adepoju, 2020, p.585). Both of these articles cite scholar Jennifer Coates, who has written extensively on food security/insecurity quantitative indicators. Coates co-authors an article that notes that the HFIAS is one of the most widely used measurements of food security worldwide. The HFIAS was constructed "to capture household behaviors signifying insufficient quality, quantity, acceptability, and anxiety over insecure access" (Maxwell et al., 2014, p.109). These two articles that utilized the HFIAS had almost opposite ratings in regards to their applications of culture. These differences can be seen in their analysis and discussion of the data collected. Adesoye & Adepoju (2020) received a rating of "2" in both the social application and the livelihood and practice application. In their article, they left numerous qualitative gaps in regards to explanation and perceptions. They are critiqued in this review as merely presenting the household profile and general reporting from the HFIAS. In contrast, Atuoye et al. (2017) utilized a semi-structured interview in addition to the HFIAS, which allows for more detailed explanations and perspectives to be presented. As mentioned previously, this article was based on highly quantitative methods. However, it does provide extensive analysis around the livelihood and practice approach to culture.

The Household Hunger Scale (HHS), which was utilized by Asitik & Abu (2020), was adapted from the HFIAS and included "three specific questions that tend to represent the most severe manifestations of restricted access to food" (Maxwell et al., 2014, p.109).

Compared to HFIAS, “HHS captures the most extreme consequences of food insecurity” (Maxwell et al., 2014, p.110). Unlike the articles that utilized the HFIAS, Asitik & Abu (2020) do not justify their use of the HHS. Though the HHS is highly quantitative, this article did receive a rating of “5” in their engagement with the social application of culture. The collected quantitative data was easily translated and applied to qualitative explanations around gender empowerment and experiences of food security.

Kuwornu et al. (2018) utilized the Minimum Daily Energy Requirement (MDER) in the form of a semi-structured interview to quantify food security in their study region. The MDER is “the amount of energy needed for light activity and to maintain a minimum acceptable weight for attained height” (FAO and WFP, 2010, as cited by Kuwornu et al., 2018, p.727). To add supportive qualitative data, Kuwornu et al. (2018) conducted personal interviews with heads of households on “income-generating activities, food acquisition, and food consumption patterns” (Kuwornu et al., 2018, p.725). This mixed-methods approach enabled the authors to connect quantitative measurements of food security to lived experiences and perspectives around factors that influence these quantitative measurements. This allowed the article to be rated as “4” in the social and livelihood and practice approaches to culture.

The final two articles that utilize popular quantitative food security measurements are Olawuyi (2019) and Ikudayisi et al. (2019). These two articles do not use the listed popular measurements. However, their methods are closely related to the four articles discussed earlier. Through a food security framework, Olawuyi (2019) utilized the Foster–Greer–Thorbeck. The Foster–Greer–Thorbeck is a standardized poverty indicator “based on a single formula capable of incorporating any degree of concern about

poverty" (Kanu, 2020, p. 189). Via the Foster–Greer–Thorbeck, Olawuyi (2019) adopted the Household Food Consumption Expenditure Approach (HFE). This merging of approaches allowed Olawuyi (2019) to get past common information limitations like household income and individual daily caloric intake. Most of this information collected was highly qualitative. However, there was some descriptive information gathered around social networks that allowed for qualitative support. Because of this support, this article did earn a rating of "5" in regards to the social approach to culture.

Through a food access and food utilization lens, Ikudayisi et al. (2019) applied the Quadratic Almost Ideal Demand System and Berry Index in their measurement of food security. Ikudayisi et al. (2019) argue that these methods "provide information capable of quantifying the food security situation of urban households based on access to the number of food commodities consumed as well as the extent of caloric and micronutrient availability" (Hoddinott & Johannes, 2020, Jackson, 1984, as cited by Ikudayisi et al., 2019, p.337). Ikudayisi et al. (2019) produced highly quantitative results. However, there was a strong foundation established within the urban/rural nexus subtheme. Thus, it was rated as a "3." From the discussion of these six articles that engaged substantially with quantitative data, it is unclear if there is a strong correlation between the use of quantitative data and the article's ability to produce comprehensive discussions around culture and food security. Thus, it is essential to analyze articles that follow a more qualitative route of data collection.

Article	Utilized of Popular Food Security Measurements	Application of Culture and Rating
Adesoye, O. P., & Adepoju, A. O. (2020). Food insecurity status of the working poor households in south west Nigeria. *International Journal of Social Economics*.	Household Food Insecurity Access Scale (HFIAS)	Social (2); Livelihood and Practice (2)
Asitik, A. J., & Abu, B. M. (2020). Women empowerment in agriculture and food security in Savannah Accelerated Development Authority zone of Ghana. African Journal of Economic and Management Studies	Household Hunger Scale (HHS)	Social (5)
Kuwornu, J. K., Osei, E., Osei-Asare, Y. B., & Porgo, M. (2018). Off-farm work and food security status of farming households in Ghana. Development in practice, 28(6), 724-740.	Minimum Daily Energy Requirement (MDER)	Social (4); Livelihood and Practice (4)
Olawuyi, S. O. (2019). Building resilience against food insecurity through social networks. International Journal of Social Economics.	Households' Food Consumption Expenditure Approach (HFE) through Foster–Greer–Thorbecke	Social (5)
Atuoye, K. N., Kuuire, V. Z., Kangmennaang, J., Antabe, R., & Luginaah, I. (2017). Residential remittances and food security in the Upper West Region of Ghana. International Migration, 55(4), 18-34.	Household Food Insecurity Access Scale (HFIAS)	Livelihood and Practice (5)
Ikudayisi, A., Okoruwa, V., & Omonona, B. (2019). From the lens of food accessibility and dietary quality: Gaining insights from urban food security in Nigeria. *Outlook on Agriculture*, *48*(4), 336-343.	Quadratic Almost Ideal Demand System and Berry Index	Livelihood and Practice (3)

Table 3: Analyzed Articles and Their Use of Popular Quantitative Measurements for Food Security

The majority of the articles that were analyzed did not apply a popularized quantitative measurement of food security. Instead, the researches of these articles relied on more qualitative methods, like Participatory and Rapid Rural Appraisal (PRRA) and Participatory Action Research (PAR). Chambers (1994) describes PRRA as a methodological approach to research that enables "local people to share, enhance, and analyze their knowledge of life and conditions to plan and to act" (Chambers, 1994, p.953). Participatory Action Research (PAR) is similar to PRRA. However, PAR incorporates local participation and local expectation on a deeper level. Techniques applied under these approaches often include ethnographic techniques, like key informant interviews, participatory observation, focus groups, and semi-structured interviews. Notable articles from this review that utilized the PRRA (or an adaption of it) or PAR include the following.

West et al. (2014) applied a PRRA approach to their data collection to "quickly and effectively collect information on ecological and climatic changes for the" (West et al., 2014, p.342) region. They also incorporated quantitative information that was supportive of the perceptions documented from the qualitative methods. This intersection of qualitative and quantitative data provided an elaborate discussion around local perceptions and highlighted the benefits of mixed-methods designs highly weighted in qualitative data. As a reminder, this article was analyzed in the local perceptions subtheme of the systems of meaning approach to culture and earned a rating of "4."

Hesselberg & Yaro (2006) also utilize a version of PRRA. Their version of PRRA included the use of focus groups, in-depth interviews, and a workshop to better understand intra-household differences in decision-making around food. Like West et al.

(2014), Hesselberg & Yaro (2006) engaged with a mixed-methods design that synthesized the finding from the PRRA with a structured survey that was distributed throughout the research site. This mixed-methods approach allowed Hesselberg & Yaro (2006) to produce explanatory results that provided a thorough assessment of food insecurity in Ghana. This article also took a sustainable livelihoods approach to their research, which allowed for a more qualitative contextualization. Thus, it was rated as "5."

Towns et al. (2014) utilized Participatory Action Research (PAR). PAR is similar to PRRA in that it applies similar qualitative techniques. However, PAR is more inclusive to the local people and seeks to include communities in the design and implementation of the research. There is often an "action component to the research that meets specific needs of the community" (Towns et al. 2014, p. 172), which is viewed as one of the main differences of PAR to other participatory approaches. Towns et al. (2014) stress that PAR allows for the "researcher and the community to form a partnership built on trust, cultural sensitivity, and equity, operating in a culturally and scientifically relevant methodology (Israel et al., 2005, as cited by Towns et al. 2014, p. 172). Through PAR, Towns et al. (2014) utilized key informant interviews, focus groups, and semi-structured interviews to collect data on culturally relevant plants in relation to food security. Towns et al. (2014) provide an exemplary example of how inclusive and diverse the data collected from qualitative methods can be. This article was rated as a "5" in the systems of meaning approach to culture. The application of PAR served this article well. From the analysis of this review, this article is found to be one of the most outstanding articles that encompass cultural importance in relation to food security.

In conclusion, the articles that applied extensive qualitative methods or a mixed-methods design were seen to produce results that were comprehensives of the cultural experiences around food security. There are some benefits to quantitative methods, including HFIAS or HHS, like understanding personal or household caloric intake and the general profile of respondents. This quantitative data allows for researchers to build upon a standardized concept of food security. However, the quantitative data is limiting and includes gaps in descriptive data. If these gaps were filled with qualitative data derived for PRRA or PAR, this would allow for a more personalized narrative and produce a more realistic understanding. This conclusion aligns with what Camfield et al. (2009) advocates for in the discussion of well-being from Chapter II. Thus, this review shows that in order to ensure cultural well-being, it is necessary to use qualitative methods in partnership with or with minimal support of quantitative methods. Qualitative-based research or mixed-methods allow for humanistic data to be extracted, which provides a collective picture of well-being and tells a fuller story than solely quantitative measurements.

CHAPTER V

SUMMARY OF FINDINGS AND LIMITATIONS

V.I Culture and Food Security: How is culture visible?

This review set out to audit the presence of culture in West African food security literature from the past 15 years. From the discussion above, it can be concluded that culture is visible to a limited extent within this field of study. This visibility is illustrated through the three aspects of culture that answer questions around *who, what, and why.* It is necessary to note that the degree of engagement with these three cultural approaches is limited and skewed. The social approach to culture and the livelihood and practice approach to culture engaged more extensively than the systems of meaning approach to culture. This conclusion raises the question: *how can research conceptualize social practices or livelihood practices without a thorough analysis of the beliefs and meanings behind these practices?* The findings from the analysis should motivate future scholarship to prioritize cultural connections to food and food security, including the systems of meaning behind these connections, to capture an inclusive picture of an individual's or group's food security experience.

The livelihood and practice approach to culture was the most conceptualized approach from the 30 articles of this review. As noted in the discussion, all of the subthemes within this approach to culture were interconnected. Many of the livelihood choices presented in this review were decided upon as coping strategies sought to elevate the local people's social, economic, and cultural well-being. These choices were often experienced in the migration to urban spaces or through the incorporation of agriculture technologies. These experiences were practiced with the intention to either increase

income-generating opportunities, advance crop outputs, or increase access to necessary resources like land or credit. In both the urban/rural nexus subtheme and the participation around agriculture practices subtheme, the choices made within these articles had lasting effects on the food security experiences of the individuals and communities within the studies. One exceptional article to engage with is Maconachie (2018), as this article showcases many of the subthemes from the livelihood and practice approach to culture. Maconachie (2018) illustrates the connectivity of these subthemes and the valuable information that can be derived from these connections.

Also, within the livelihood and practice approach to culture, articles that applied a livelihood and vulnerability framework were found to engage on a more in-depth level with the values and beliefs of the local people than articles that did not apply this framework. Articles like, Hesselberg & Yaro (2006), that utilized the livelihood and vulnerability framework emphasized personal narratives and perceptions and the interconnections between livelihood practices and social practices. The livelihood and vulnerability framework encourages qualitative methodologies, like PRRA or PAR, to capture these narratives and perceptions. There were still gaps present, as many of the articles that utilized this framework did not provide the rich analysis of the systems of meaning necessary to fully comprehend how these narratives and perceptions are derived and lived.

Similar to the subthemes of the livelihood and practice approach to culture, the subthemes of the social approach to culture were very much interconnected. The gender subtheme was the most applied cultural context of the social approach to culture and maintained a presence in the articles that discussed household dynamics, social networks,

and institutional engagement. The gender subtheme of culture is often applied to studies around income-generating practices and sustainable agriculture livelihoods. The role of women regarding food-based responsibilities is prominent, and they are often the primary decision-makers around meals and the allocation of food. Presenting perceptions and personal narratives around these responsibilities would have allowed for a more qualitative conceptualization of food security experiences in these communities. From this review, one should look to Naughton et al. (2017) as a model of prioritizing gender in food security and how to draw on personal narrative to produce substantive results. There are some personal narratives incorporated in the articles around income-generating practices. However, this review advocates for a more qualitative understanding of the women and their beliefs and values within their food practices. This conclusion can also be applied to the household dynamic subtheme as it is associated with the gendered role and responsibilities within a household.

The social networks subtheme provided rich context into how social networks support the achievement of food security. This subtheme was often found to be conceptualized through the lens of economic capabilities or general coping strategies. Social networks are often viewed as the support system of a community. It was surprising how little engagement was presented around the value of social networks. This review advocates for a more detailed understanding of the role of social networks and how these networks are positioned and navigated through periods of stress, especially around food.

The subtheme of education was a unique component to incorporate into the review. It was primarily seen in the articles as an explanatory variable like age, derived from surveys that summarized the profile of respondents. Education was included in the

review over the other popular variable, age, as there is an interesting intersection between education and coping strategies. If analyzed more deeply, this intersection could provide qualitative explanations around systems of meaning. For example, how do the choices of a "formally" educated community member illustrate the cultural beliefs or the cultural tensions around westernized agriculture technologies that promote "sustainable agriculture?" How does this educated person navigate preserving cultural practices while also elevating household or community well-being? These are necessary questions that were not answered in any of the articles that highlighted education.

Lastly, the subtheme of institutional engagement provided a brief picture of third-party institutions' role and how they influence the livelihood and well-being decisions made by individuals or communities. It was surprising how little engagement was present in the thirty articles around this subtheme. Though some articles, like Yekinni (2010), fundamentally provided context around this subtheme, the depth of analysis and discussion around these networks was minor. Expanding on these partnerships between local communities and governments, research institutions, or NGOs will highlight the effects of these partnerships on cultural food security. It can provide valuable feedback on how these partnerships should be cultivated to ensure inclusivity and cultural preservation.

The final approach to culture and the least conceptualized approach from these thirty articles is systems of meaning. It was surprising how little attention was given to local perceptions and local knowledge around food security practices and the social and livelihood components of these practices. The six articles presented under this subtheme, showcased the most substantive and layered engagement with these two subthemes. From

these six, West et al. (2014), Naughton et al. (2017) and Towns et al. (2913) provided the most guidance of thorough engagement. These six articles support the idea that no culture is the same, and each culture is developed through a rich history that supports today's people's beliefs and daily practices. Food practices are part of these daily practices and, if properly analyzed, can provide a detailed illustration of people's cultural values and beliefs. Illustrating the systems of meaning behind people's social and livelihood practices can provide a researcher or development practitioner with valuable cultural context. This cultural context can pave a path for successful interventions and understandings that ensures inclusivity.

V.II Limitations

There are limitations within this critical review that need to be addressed. It is essential to address these limitations so that readers better understand the results of this review. Addressing limitations also allows for future researchers to fill gaps or expand on the findings. Many of these limitations are due to time constraints and decisions made by the researcher. It is important to note that all limitations allowed for biases.

The first set of limitations of this review deals with the time constraint for completing this research. Because time constraint measures were taken, this review was limited to only be a critical review rather than a full PRISMA synthetic review. First, only three databases were utilized, and only 304 articles were pulled from these databases for review. Due to time constraints, the second limitation was the time frame in which articles needed to have been published to qualify for eligibility. The set 15 years limits the articles that could have been included. Articles published before 2005 may have provided exemplary examples of the intersection of food security and culture. However,

this would have set unattainable expectations for a completion date for the review; this 15-year time frame for publication allowed for the most recent articles to be included. As mentioned before, this set time frame includes major global economic transitions and events that significantly affected the experience and understanding of global food security.

The second set of limitations that need to be addressed are around decisions of eligibility decided upon by the researcher. First, only articles published in English were considered for analysis. Because the geographic focus of this review is West Africa, there is a chance that relevant articles were excluded because they were published in French. The second limitation of this group is the exclusion of articles that engaged with the topic of food sovereignty. Food sovereignty is a growing topic in the food security and sustainable agriculture field. Food sovereignty is the right of a nation to independently decide policy and practices around food production (Patel, 2009). During the database search aspect of this research, articles engaging with food sovereignty were prevalent. Food sovereignty is incredibly complex and could serve as the foundation for its own review in association with culture. A final limiting factor based on research decisions is that of the geographic focus. West Africa is composed of 16 countries. If an article included other countries outside of West Africa, it was deemed ineligible. Though this does limit the articles included, it enforced consistency and allowed for conclusions around shared history and cultures to be drawn.

Finally, limitations around how articles were rated should be addressed. The rating system used by the researcher, though inspired by similar reviews and aimed to follow the PRISMA process in regards to data collection, was highly subjective. Because

of the subjectivity of the rating process, the conclusions should be read for what they are. It is encouraged for future researchers to take these articles and rerate and analyze them. It could be beneficial for practitioners and policymakers to compare how the articles are reviewed to develop the most appropriate interventions and policies.

CHAPTER VI

CONCLUSION

A critical review is a valuable research tool that allows scholars to audit the intersection of concepts and identify gaps in these intersections. With the growing attention placed on global hunger alleviation, it is necessary to highlight gaps in the current literature, narrations, and interventions around food security development and hunger in order to promote more realistic and appropriate paths. The most significant gap this study of culture in the food security literature of West Africa found was in the engagement between cultural systems of meaning. Those few articles that articulated connections between culture and food often focused on the livelihood and practices or social approaches and paid little attention to the foundational approach, systems of meaning. Despite being acknowledged by scholars as significant for successful intervention, only seventeen out of the thirty articles looked at culture through the systems of meaning lens. Highlighting this gap can help to strengthen the proposed paths towards ending hunger and food insecurity like those found in the UN FAO (2021) report. It is important to recall that the UN FAO (2021) report calls for economic and nutritional-based paths towards ending hunger. These are paths that lack localized perspectives and knowledge. This gap encourages scholars to use a richer, more nuanced cultural lens on development practices.

As we conclude this study it is worthwhile to return to one of its key concerns: Why does culture matter? Why is it important to incorporate the three approaches to culture in development studies, especially those engaging with food? Why should systems of meaning play an important role in defining localized experiences of food

security and hunger? Many scholars and practitioners who support the integration of cultural studies into development studies and write about it like Mathur (2019), Alonso et al. (2018), Cidro et al. (2015), Power (2008), and Rao & Walton (2004) showcase the advantages of considering culture. As Rao & Walton (2004) note, "development would be better served by a cross-disciplinary dialogue among the social sciences on why and how culture matters for development" (Rao & Walton, 2004, vii). This cross-disciplinary dialogue is noticed in Richard's (1939) research that clearly illustrates the rooted connections between culture, food, and the experiences of hunger when she writes that hunger is clearly observed during certain months of the year. These "hunger months" are expected, and local people alter livelihood and social practices in order to accommodate this cycle. This observation is distinctly similar to that of Phillips (2018), who points out that many people who live in a cycle of hunger and food months adapt instead of yield. Phillips (2018) beautifully describes this cycle as a rhythm that dictates daily ways of being. Phillips writes,

> it is these concentric cycles of scarcity, and plenty, rain, heat, and wind, work and prayer, that are whittled into people's lives by the earth's daily rotation around the sun, the annual agricultural calendar, and years of food crisis that make time, organize labor, and produce particular ways of seeing, acting, and being in the world (Phillips, 2018, p. 40).

Understanding these woven lifeways around the experiences of hunger or food in/security sheds light on the culture of a people and their resilience. This review provides ample examples in which these livelihood practices and social dynamics are addressed. These examples include those articles that engaged with the urban/rural nexus, gender,

household dynamics, uses of different agriculture resources, social networks, and engagement with third-party institutions.

However, as mentioned earlier, it is necessary for scholars who study food and culture not to overlook systems of meaning as a foundational approach to culture. By first analyzing local histories, beliefs, values, and knowledge, scholars and development practitioners can further investigate other approaches to culture like livelihood and practice and social dynamics. Those interested in the role of culture within food security and hunger development should look at the following articles from this review as a guide. The following articles showcase how culture, food, and hunger intersect and how an analysis of systems of meaning can direct scholarship towards more inclusive and qualitative outcomes. Naughton et al. (2017) thoroughly engages with all three aspects of culture and emphasizes the value of local knowledge and beliefs and the deep cultural ties to different food products and agricultural practices. This value of local knowledge and beliefs provide a richer cultural context to further analyze subthemes like gender, social networks, and economic capabilities. Like Naughton et al. (2017), the article by Towns et al. (2013) highlights the cultural relevance around specific agriculture products and how a local region can use culture to define factors around food. Towns et al. (2013) echo similar dialogues found in Richards (1939) and Phillips (2018) in regards to what food makes up a meal and how and what people eat to feel "full." Lastly, West et al. (2014) highlight how local people describe experiences around hunger and food insecurity. This article articulates the unique perspectives around food similar to the discussion from this review's introduction around localized perspectives and experiences of hunger. All three of these articles showcase culture, through the application of systems of meanings, as the

center of food studies. Their results can be used to better support development studies and lead to intervention outcomes that are more likely to be successful and inclusive. This review, along with supportive literature, provides substantial evidence that culture and food intersect and are intensely woven together within the many layers of local livelihoods and social dynamics.

Lastly, this review recognizes the value of qualitative methodologies and the role these methods play in the extraction of cultural data in food security studies. Through qualitative-based data collection or a mixed-methods design, it is possible to collect data from a community that accurately illustrates the complex experiences around food security. Relying exclusively on quantitative methodologies is limiting and does not accurately capture the whole experience. Instead, these quantitative methods support western economic food security standards and ignore the humanistic aspect of food security and the localized realities of food.

In conclusion, this review finds the following statements as significant contributions to future scholarship and development practices. First, culture matters and should play a primary role in any development intervention. Second, culture should be analyzed thoroughly in any context. To analyze culture comprehensively, scholars and practitioners need to uncover the systems of meaning behind daily life and social dynamics. Third, the most appropriate method to engage with culture is through the application of qualitative methods. These methods will allow perspectives, histories, and narratives to penetrate scholarship and provide a more holistic illustration. This kind of work may need to be pursued through a teamwork approach where researchers with

complementary skills and training collaborate to produce a more complete analysis of local or regional dynamics.

VI.I Contributions

This critical review contributes to the developing knowledge around food security and culture and how these intersecting concepts support the well-being of an individual or community. The body of literature in this review outline the productive value of applying a cultural lens to food security studies. The extensive analysis of the three approaches to culture within the thirty articles highlights the exceptional and mediocre applications of these three approaches. Furthermore, this review underscores the value of qualitative research methods primarily through PRRA and PAR techniques. This review advocates for including qualitative methods into food security research to provide a comprehensive illustration of an individual's or community's food security experience.

This review supports the value of cultural context in development practices. It is possible that those who utilize the findings could build more tailored and inclusive interventions that place value on local perceptions and knowledge. It is important to note that scholars in the past have discussed the role of cultural beliefs and histories regarding food and cuisine. These scholars include Audrey Richards, Jack Goody, and Sidney Mintz. Along with the findings of modern scholars like Phillips (2018) and the findings from this review, these dated accounts should serve as a framework to encourage current and future research to prioritize local cultures and their systems of meaning. As critical scholarship has suggested, if culture matters to successful or practical interventions, we should expect to see more culturally sensitive interventions and studies. They will allow for a different a different and more impactful development technique or food security

intervention. The highly ranked studies identified here provide good models for such work in the future.

These findings encourage development practitioners to put aside the economic standards set around lifeways and consider the humanistic qualities of daily life, including food. This review encourages scholars to prioritize qualitative data over quantitative data and to include personal narratives into their data collection. These narratives are a window into the systems of meaning behind social and livelihood practices and can help shape more successful interventions.

VI.II Future Research

The findings of this research would have been more persuasive if more articles were included in the analysis. Due to time constraints, only thirty articles were analyzed. However, there were seventy-one articles eligible for analysis. Given extended time, more databases could have been utilized to collect other articles for possible eligibility. Analysis of studies published in French would help round out the review. Lastly, this review could have been more persuasive if the time frame under consideration was expanded.

Scholars may want to consider incorporating a food sovereignty component in future reviews around food security and culture. Food sovereignty is found to be deeply connected to culture and could provide more detailed insight into the relationship between food and culture. However, this may cause more of an unmanageable amount of work for a critical review.

APPENDICES

APPENDIX A: EXCLUDED ARTICLES

Study	Reason for Exclusion
Addison, M., Mujawamariya, G., & Bam, R. (2020). Gender considerations in development and utilisation of technological innovations: evidence from Ghana. *Development in Practice*, *30*(1), 15-26.	Not relevant - Food security is not a fundamental element of the article
Adigoun-Akotegnon, F. A., Adoukonou-Sagbadja, H., Fadinan, C., Tchougourou, A., Agassounon-Tchibozo, M., & Ahanhanzo, C. (2019). Diversity, distribution and ethnobotanical importance of cultivated and wild African trifoliate yam [Dioscorea dumetorum (Kunth) Pax] in Benin. *Genetic Resources and Crop Evolution*, *66*(3), 659-683.	Not relevant - Food security is not a fundamental element of the article
Adonteng-Kissi, O. (2017). Poverty and mine's compensation package: Experiences of local farmers in Prestea mining community. *Resources Policy*, *52*, 226-234.	Not relevant - Food security is not a fundamental element of the article
Adoukonou-Sagbadja, H., Dansi, A., Vodouhè, R., & Akpagana, K. (2006). Indigenous knowledge and traditional conservation of fonio millet (Digitaria exilis, Digitaria iburua) in Togo. Biodiversity & Conservation, 15(8), 2379-2395.	Not relevant - Food security is not a fundamental element of the article
Ahenkan, A., & Boon, E. (2011). Improving nutrition and health through non-timber forest products in Ghana. *Journal of health, population, and nutrition*, *29*(2), 141.	Not relevant - Little engagement with the three aspects of culture
Ajao, A. O., & Ogunniyi, L. T. (2011). Farmers' strategies for adapting to climate change in Ogbomoso agricultural zone of Oyo state. *Agris on-line Papers in Economics and Informatics*, *3*(665-2016-44832), 3-13.	Not relevant - Food security is not a fundamental element of the article
Aletor, O., Oboh, G., & Ojo, S. F. (2013). Antinutrient content, vitamin constituents and antioxidant properties in some value-added Nigerian traditional snacks. *WIT Transactions on Ecology and the Environment*, *170*, 209-220.	Not relevant – Too nutrition-focused
Alexander Nuetah, J., Zuo, T., & Xian, X. (2011). Agricultural export subsidies and domestic support reform under the WTO system: What does it mean	Unable to access

for welfare in West Africa?. *The World Economy*, *34*(12), 2044-2062.	
Allen, A., & Apsan Frediani, A. (2013). Farmers, not gardeners: The making of environmentally just spaces in Accra. City, 17(3), 365-381.	Not relevant - Food security is not a fundamental element of the article
Alobo, S., & Bignebat, C. (2017). Patterns and determinants of household income diversification in rural Senegal and Kenya. Journal of Poverty Alleviation and International Development, 8(1), 93-126.	Geographic scope is too broad or not West Africa focused
Alpha, A., & Fouilleux, E. (2018). How to diagnose institutional conditions conducive to inter-sectoral food security policies? The example of Burkina Faso. *NJAS-Wageningen Journal of Life Sciences*, *84*, 114-122.	Not relevant - Policy focused
Aluko, Y. A. (2016). Rural women's Indigenous knowledge of the nutritional and medicinal use of vegetables in southwest Nigeria. *Journal of Social Sciences*, *46*(2), 98-106.	Not relevant - Food security is not a fundamental element of the article
Arhin, A. (2016). Advancing post-2015 Sustainable Development Goals in a changing development landscape: Challenges of NGOs in Ghana. *Development in practice*, *26*(5), 555-568.	Not relevant - Food security is not a fundamental element of the article
Arku, F. S. (2013). Local creativity for adapting to climate change among rural farmers in the semi-arid region of Ghana. *International Journal of Climate Change Strategies and Managem*	Not relevant - Food security is not a fundamental element of the article
Asante, B. O., Villano, R. A., Patrick, I. W., & Battese, G. E. (2018). Determinants of farm diversification in integrated crop-livestock farming systems in Ghana. *Renewable Agriculture and Food Systems*, *33*(2), 131.	Not relevant - Food security is not a fundamental element of the article
Ashe, M. O. (2019). International agencies and the quest for food security in Nigeria, 1970-2015. African Journal of Peace and Conflict Studies, 251-274.	Research Methods-Based on secondary data collection
Atuoye, K. N., & Luginaah, I. (2017). Food as a social determinant of mental health among household heads in the Upper West Region of Ghana. Social science & medicine, 180, 170-180.	Not relevant - Little engagement with the three aspects of culture
Babalola, J. B., Oni, A., Atanda, A., & Oyejola-Oshodi, B. O. (2009). Poverty alleviation in Nigeria: lessons from socioeconomic thoughts of the Yoruba. *International Social Science Journal*, *60*(197-198), 403-410.	Not relevant - Food security is not a fundamental element of the article

Banerjee, A., Duflo, E., Goldberg, N., Karlan, D., Osei, R., Parienté, W., ... & Udry, C. (2015). A multifaceted program causes lasting progress for the very poor: Evidence from six countries. Science, 348(6236).	Geographic scope is too broad or not West Africa focused
Banson, K. E., Nguyen, N. C., & Bosch, O. J. (2018). A systems thinking approach to the structure, conduct and performance of the agricultural sector in Ghana. *Systems Research and Behavioral Science*, *35*(1), 39-57.	Not relevant - Food security is not a fundamental element of the article
Bell, P., Hattey, J., & Dicks, M. (2013). A Model for Service Abroad Courses: Agricultural Development in Sierra Leone. *NACTA Journal*, *57*(3a), 56.	Not relevant - Food security is not a fundamental element of the article
Béné, C., Evans, L., Mills, D., Ovie, S., Raji, A., Tafida, A., ... & Andrew, N. (2011). Testing resilience thinking in a poverty context: experience from the Niger River basin. Global Environmental Change, 21(4), 1173-1184.	Not relevant - Food security is not a fundamental element of the article
Bernholt, H., Kehlenbeck, K., Gebauer, J., & Buerkert, A. (2009). Plant species richness and diversity in urban and peri-urban gardens of Niamey, Niger. Agroforestry Systems, 77(3), 159	Not relevant - Food security is not a fundamental element of the article
Brondeau, F. (2018). The Office du Niger: an Agropole project for food security in Mali?. *Cybergeo: European Journal of Geography*.	Research Methods- Based on secondary data collection
Butt, T. A., McCarl, B. A., Angerer, J., Dyke, P. T., & Stuth, J. W. (2005). The economic and food security implications of climate change in Mali. *Climatic change*, *68*(3), 355-378.	Not relevant- Policy focused
Chadare, F. J., Fogny, N. F., Madode, Y. E., Ayosso, J. O. G., Honfo, S. H., Kayodé, F. P. P., ... & Hounhouigan, D. J. (2018). Local agro-ecological condition-based food resources to promote infant food security: a case study from Benin. *Food Security*, *10*(4), 1013-1031.	Not relevant - Little engagement with the three aspectsof culture
Chaudhury, A. S., Thornton, T. F., Helfgott, A., Ventresca, M. J., & Sova, C. (2017). Ties that bind: Local networks, communities and adaptive capacity in rural Ghana. *Journal of Rural Studies*, *53*, 214-228.	Not relevant -Food security is not a fundamental element of the article
Cooper, M., Brown, M. E., Azzarri, C., & Meinzen-Dick, R. (2019). Hunger, nutrition, and precipitation: evidence from Ghana and	Geographic scope is too broad or not West Africa focused

Bangladesh. Population and Environment, 41(2), 151-208.	
Cramer, L., Förch, W., Mutie, I., & Thornton, P. K. (2016). Connecting women, connecting men: how communities and organizations interact to strengthen adaptive capacity and food security in the face of climate change. Gender, Technology and Development, 20(2), 169-199.	Geographic scope is too broad or not West Africa focused
Craveiro, I., Alves, D., Amado, M., Santos, Z., Fortes, A. T., Delgado, A. P., ... & Gonçalves, L. (2016). Determinants, health problems, and food insecurity in urban areas of the largest city in Cape Verde. *International journal of environmental research and public health*, *13*(11), 1155.	Not relevant - Little engagement with the three aspects of culture
Crookston, B. T., Gray, B., Gash, M., Aleotti, V., Payne, H. E., & Galbraith, N. (2018). How Do You Know 'Resilience'When You See It? Characteristics of Self-perceived Household Resilience among Rural Households in Burkina Faso. *Journal of International Development*, *30*(6), 917-933.	Unable to access
Dansi, A., Adoukonou-Sagbadja, H., & Vodouhe, R. (2010). Diversity, conservation and related wild species of Fonio millet (Digitaria spp.) in the northwest of Benin. Genetic Resources and Crop Evolution, 57(6), 827-839.	Not relevant -Food security is not a fundamental element of the article
Dedehouanou, S. F., & McPeak, J. (2020). Diversify more or less? Household income generation strategies and food security in rural Nigeria. The Journal of Development Studies, 56(3), 560-577.	Research Methods-Based on secondary data collection
Doudou, M. H., Ouedraogo, O., Ouaro, B., Bidault, N., & Reinhardt, K. (2018). Mapping nutrition interventions, a key analytical tool for informing the multisectoral planning process: example from Burkina Faso. *Food and nutrition bulletin*, *39*(3), 449-464.	Not relevant - Food security is not a fundamental element of the article
Duku, C., Zwart, S. J., van Bussel, L. G., & Hein, L. (2018). Quantifying trade-offs between future yield levels, food availability and forest and woodland conservation in Benin. Science of the total environment, 610, 1581-1589.	Not relevant - Food security is not a fundamental element of the article
Egbendewe, A. Y., Lokonon, B. O. K., Atewemba, C., & Coulibaly, N. (2017). Can intra-regional food trade increase food availability in the context	Not relevant-Economic and Policy Based

of global climatic change in West Africa?. Climatic Change, 145(1), 101-116.	
Ehiakpor, D. S., Danso-Abbeam, G., Dagunga, G., & Ayambila, S. N. (2019). Impact of Zai technology on farmers' welfare: Evidence from northern Ghana. *Technology in Society*, *59*, 101189.	Not relevant - Food security is not a fundamental element of the article
Emaziye, P. O. (2013). Food security index and socio-economic effects of climate change on rural farming households in Delta State, Nigeria. Asian Journal of Agriculture and Rural Development, 3(393-2016-23976), 193-198	Not relevant - Little engagement with the three aspectsof culture
Etongo, D., Djenontin, I. N. S., Kanninen, M., & Fobissie, K. (2015). Smallholders' tree planting activity in the ziro province, southern Burkina Faso: Impacts on livelihood and policy implications. *Forests*, *6*(8), 2655-2677.	Not relevant - Food security is not a fundamental element of the article
Favretto, N., Stringer, L. C., & Dougill, A. J. (2014). Unpacking livelihood challenges and opportunities in energy crop cultivation: perspectives on Jatropha curcas projects in Mali. The Geographical Journal, 180(4), 365-376.	Not relevant - Food security is not a fundamental element of the article
Faye, M. D., Weber, J. C., Mounkoro, B., & Dakouo, J. M. (2010). Contribution of parkland trees to farmers' livelihoods: a case study from Mali. Development in Practice, 20(3), 428-434.	Not relevant - Food security is not a fundamental element of the article
Fernandes, M., Folson, G., Aurino, E., & Gelli, A. (2017). A free lunch or a walk back home? The school food environment and dietary behaviours among children and adolescents in Ghana. *Food Security*, *9*(5), 1073-1090.	Not relevant - Food security is not a fundamental element of the article
Fiamohe, R., Alia, D. Y., Bamba, I., Diagne, A., & Amovin-Assagba, E. (2015). Transmission of rice prices from Thailand into West African markets: The case of Benin, Mali, and Senegal. *Journal of African Business*, *16*(1-2), 128-143.	Not relevant- Policy focused
Gajigo, O., & Saine, A. (2011). The effects of government policies on cereal consumption pattern change in the Gambia. Review of African Political Economy, 38(130), 517-536.	Research Methods- Based on secondary data collection
Gatete, C., & Dabat, M. H. (2017). From the fuel versus food controversy to the institutional vacuum in biofuel policies: evidence from West African countries. Energy, Sustainability and Society, 7(1), 1-16.	Not relevant - Food security is not a fundamental element of the article

Glew, R. S., Amoako-Atta, B., Ankar-Brewoo, G., Presley, J. M., Chang, Y. C., Chuang, L. T., ... & Glew, R. H. (2010). An indigenous plant food used by lactating mothers in West Africa: The nutrient composition of the leaves of Kigelia africana in Ghana. *Ecology of food and nutrition*, *49*(1), 72-83.	Not relevant - Food security is not a fundamental element of the article
Haider, H., Smale, M., & Theriault, V. (2018). Intensification and intrahousehold decisions: Fertilizer adoption in Burkina Faso. *World development*, *105*, 310-320.	Research Methods- Based on secondary data collection
Hausermann, H. (2018). "Ghana must progress, but we are really suffering": Bui Dam, antipolitics development, and the livelihood implications for rural people. Society & Natural Resources, 31(6), 633-648.	Not relevant - Food security is not a fundamental element of the article
Havik, P. J., Monteiro, F., Catarino, S., Correia, A. M., Catarino, L., & Romeiras, M. M. (2018). Agro-economic transitions in Guinea-Bissau (West Africa): Historical trends and current insights. *Sustainability*, *10*(10), 3408.	Not relevant - Food security is not a fundamental element of the article
Heucher, A. (2019, September). Evolving Order? Inter-Organizational Relations in the Organizational Field of Food Security Governance in Côte d'Ivoire. In Forum for Development Studies (Vol. 46, No. 3, pp. 501-526). Routledge.	Not relevant - Little engagement with the three aspects of culture
Iacoella, F., & Tirivayi, N. (2020). Child nutrition during conflict and displacement: Evidence from areas affected by the Boko Haram insurgency in Nigeria. *Public Health, 183*, 132. doi:http://dx.doi.org.libproxy.uoregon.edu/10.1016/j.puhe.2020.03.012	Not relevant - Food security is not a fundamental element of the article
Igbokwe-Ibeto, C. J. (2019). Climate change, food security and sustainable human development in Nigeria: A critical reflection. *Africa's Public Service Delivery & Performance Review*, *7*(1), 9.	Research Methods- Based on secondary data collection And Not relevant- Policy based
Ike, C. U., Jacobs, P. T., & Kelly, C. (2017). A multidimensional approach to measuring household food security in Taraba State, Nigeria: comparing key indicators. *Development in Practice*, *27*(2), 234-246.	

Johnson, J.,Samuel Wai. (2010). Post-conflict food security and peacebuilding in Liberia. Liberian Studies Journal, 35(2), 28-54.	Unable to access
Kansanga, M. M., & Luginaah, I. (2019). Agrarian livelihoods under siege: Carbon forestry, tenure constraints and the rise of capitalist forest enclosures in Ghana. World Development, 113, 131-142.	Not relevant - Food security is not a fundamental element of the article
Karg, H., Drechsel, P., Akoto-Danso, E. K., Glaser, R., Nyarko, G., & Buerkert, A. (2016). Foodsheds and city region food systems in two West African cities. *Sustainability*, *8*(12), 1175.	Not relevant - Food security is not a fundamental element of the article
Karimli, L., Bose, B., & Kagotho, N. (2020). Integrated Graduation Program and its Effect on Women and Household Economic Well-being: Findings from a Randomised Controlled Trial in Burkina Faso. *The Journal of Development Studies*, *56*(7), 1277-1294.	Not relevant - Food security is not a fundamental element of the article
Kassam, L., & Dorward, A. (2017). A comparative assessment of the poverty impacts of pond and cage aquaculture in Ghana. *Aquaculture*, *470*, 110-122.	Not relevant - Food security is not a fundamental element of the article
Kc, K. B., Legwegoh, A. F., Therien, A., Fraser, E. D., & Antwi-Agyei, P. (2018). Food price, food security and dietary diversity: A comparative study of urban Cameroon and Ghana. *Journal of International Development*, *30*(1), 42-60.	Geographic scope is too broad or not West Africa focused
Kimenyi, M. S., & Kuhlmann, K. (2012). African Union: Challenges and prospects for regional integration in Africa. *Whitehead J. Dipl. & Int'l Rel.*, *13*, 7.	Not relevant - Food security is not a fundamental element of the article
Kondo, K., Cacho, O., Fleming, E., Villano, R. A., & Asante, B. O. (2020). Dissemination strategies and the adoption of improved agricultural technologies: The case of improved cassava varieties in Ghana. Technology in Society, 63, 101408.	Not relevant - Food security is not a fundamental element of the article
La Rovere, R., Hiernaux, P., Van Keulen, H., Schiere, J. B., & Szonyi, J. A. (2005). Co-evolutionary scenarios of intensification and privatization of resource use in rural communities of south-western Niger. Agricultural Systems, 83(3), 251-276.	Not relevant - Food security is not a fundamental element of the article
Lam, V. W., Cheung, W. W., Swartz, W., & Sumaila, U. R. (2012). Climate change impacts on fisheries in West Africa: implications for	Geographic scope is too broad or not West Africa focused

economic, food and nutritional security. African Journal of Marine Science, 34(1), 103-117.	
Lindner, K., Chougourou, D., Ahoton, L., & Richert-Pöggeler, K. R. (2012). Potato production in Benin-its impact on fighting hunger and poverty in West Africa. *Journal für Kulturpflanzen*, *64*(8), 295-305.	Unable to access
Louhichi, K., & y Paloma, S. G. (2014). A farm household model for agri-food policy analysis in developing countries: Application to smallholder farmers in Sierra Leone. *Food Policy*, *45*, 1-13.	Not relevant - Little engagement with the three aspects of culture
Lynch, K., Maconachie, R., Binns, T., Tengbe, P., & Bangura, K. (2013). Meeting the urban challenge? Urban agriculture and food security in post-conflict Freetown, Sierra Leone. Applied Geography, 36, 31-39.	Research Methods- Unclear on source of data
Mabe, F. N., Nashiru, S., Mummuni, E., & Boateng, V. F. (2019). The nexus between land acquisition and household livelihoods in the northern region of Ghana. *Land Use Policy*, *85*, 357-367.	Not relevant - Food security is not a fundamental element of the article
Maconachie, R., Binns, T., & Tengbe, P. (2012). Urban farming associations, youth and food security in post-war Freetown, Sierra Leone. Cities, 29(3), 192-200.	Methods section is non-supportive
Magnani, S. D., Ancey, V., & Hubert, B. (2019). Dairy policy in Senegal: the need to overcome a technical mindset. *The European Journal of Development Research*, *31*(5), 1227-1245.	Not relevant- Policy focused
Maiga, A. A., Cartmell II, D. D., Edwards, M. C., & Robinson, J. S. (2013). Competencies needed by graduates of agricultural communications in Mali: Implications for developing countries. *NACTA Journal*, *57*(3a), 139.	Not relevant - Food security is not a fundamental element of the article
Mildon, A., Klaas, N., O'Leary, M., & Yiannakis, M. (2015). Can fortification be implemented in rural African communities where micronutrient deficiencies are greatest? Lessons from projects in Malawi, Tanzania, and Senegal. *Food and Nutrition Bulletin*, *36*(1), 3-13.	Geographic scope is too broad or not West Africa focused
Monteiro, F., Catarino, L., Batista, D., Indjai, B., Duarte, M. C., & Romeiras, M. M. (2017). Cashew as a high agricultural commodity in West Africa: insights towards sustainable production in Guinea-Bissau. Sustainability, 9(9), 1666.	Research Methods- Based on secondary data collection

Nkiru, T. M. (2008). Risks associated with agricultural product carrying in Nigeria: implication for policy on occupational safety and social well-being. *Journal of Human Ecology*, *23*(4), 355-361.	Not relevant - Food security is not a fundamental element of the article
Nwoye, M. (2007). Gender responsive entrepreneurial economy of Nigeria: Enabling women in a disabling environment. *Journal of International Women's Studies*, *9*(1), 167-175.	Not relevant - Food security is not a fundamental element of the article
Odijie, M. (2019). Environmental change and normalization of cash crop systems in Africa: preventing agrarian change in West Africa cocoa. InternatiA121onal Journal of Sustainable Development & World Ecology, 26(7), 597-611.	Not relevant - Food security is not a fundamental element of the article
Ogwumike, F., Ajimuda, S., & Aribatise, A. (2019). Determinants of Household Food Insecurity in Nigeria. Acta Universitatis Danubius. Œconomica, 15(7).	Research Methods-Based on secondary data collection
Oladele, A. T., Ofodile, E., Aiyeloja, A. A., & Oworen, U. I. (2016). Economic Evaluation of Wild Forest Spices in Ikot Ekpene, Nigeria. Agriculturae Conspectus Scientificus, 81(4), 213-223.	Unable to access
Omonona, B. T., Oni, O. A., & Uwagboe, A. O. (2006). Adoption of improved cassava varieties and its welfare impact on rural farming households in Edo State, Nigeria. Journal of agricultural & food information, 7(1), 39-55.	Not relevant - Food security is not a fundamental element of the article
Ouédraogo, D., Kaboré, M., & Kienou, B. (2007). Food Insecurity, Vulnerability, and Poverty in Rural Burkina Faso: Insights from an Approach Based on Energy Intakes. *Mondes en développement*, (4), 65-84.	Unable to access
Overå, R. (2011, November). Modernisation narratives and small-scale fisheries in Ghana and Zambia. In Forum for Development Studies (Vol. 38, No. 3, pp. 321-343). Routledge.	Geographic scope is too broad or not West Africa focused
Oyama, S. (2017). Hunger, poverty and economic differentiation generated by traditional custom in villages in the Sahel, West Africa. *Japanese Journal of Human Geography*, *69*(1), 27-42.	Not relevant - Food security is not a fundamental element of the article
Oyekale, A. S. (2013). Gender role in agriculture, climate change and food security in the Sahel Belt of West Africa: application of Poisson and negative binomial regression. Gender and Behaviour, 11(2), 5499-5511.	Research methodologies are not well explained

Palazzo, A., Vervoort, J. M., Mason-D'Croz, D., Rutting, L., Havlík, P., Islam, S., ... & Zougmore, R. (2017). Linking regional stakeholder scenarios and shared socioeconomic pathways: Quantified West African food and climate futures in a global context. Global Environmental Change, 45, 227-242.	Not relevant - Food security is not a fundamental element of the article
Popp, J., Oláh, J., Kiss, A., & Lakner, Z. (2019). Food security perspectives in sub-Saharan Africa. Amfiteatru Econ, 21(51), 361-376.	Geographic scope is too broad or not West Africa focused
Quaye, W., Frempong, G., Jongerden, J., & Ruivenkamp, G. (2009). Exploring possibilities to enhance food sovereignty within the cowpea production-consumption network in Northern Ghana. *Journal of Human Ecology*, *28*(2), 83-92.	Geographic scope is too broad or not West Africa focused
Rader, M., Kirshen, P., Roncoli, C., Hoogenboom, G., & Ouattara, F. (2009). Agricultural risk decision support system for resource-poor farmers in Burkina Faso, West Africa. Journal of Water Resources Planning and Management, 135(5), 323-333.	Not relevant - Food security is not a fundamental element of the article
Ragasa, C., & Chapoto, A. (2017). Limits to Green Revolution in rice in Africa: The case of Ghana. *Land use policy*, *66*, 304-321.	Not relevant - Little engagement with the three aspects of culture
Rigolot, C., De Voil, P., Douxchamps, S., Prestwidge, D., Van Wijk, M., Thornton, P. K., ... & Herrero, M. (2017). Interactions between intervention packages, climatic risk, climate change and food security in mixed crop–livestock systems in Burkina Faso. Agricultural Systems, 151, 217-224.	Not relevant - Little engagement with the three aspects of culture
Ritzema, R. S., Frelat, R., Douxchamps, S., Silvestri, S., Rufino, M. C., Herrero, M., ... & Van Wijk, M. T. (2017). Is production intensification likely to make farm households food-adequate? A simple food availability analysis across smallholder farming systems from East and West Africa. Food Security, 9(1), 115-131.	Geographic scope is too broad or not West Africa focused
Röling, N. (2010). The impact of agricultural research: evidence from West Africa. *Development in practice*, *20*(8), 959-971.	Research methodologies are not well explained
Rutherford, D. D., Burke, H. M., Cheung, K. K., & Field, S. H. (2016). Impact of an agricultural value chain project on smallholder farmers,	Not relevant - Little engagement with the three aspects of culture

households, and children in Liberia. *World Development*, *83*, 70-83.	
Saka, L. (2019). BRICS, land grabbing and the crisis of food security in sub-Saharan Africa: an assessment. African Renaissance, 16(Special 2), 33.	Research Methods- Based on secondary data collection
Sanchez, A. C., Fandohan, B., Assogbadjo, A. E., & Sinsin, B. (2012). A countrywide multi-ethnic assessment of local communities' perception of climate change in Benin (West Africa). *Climate and Development*, *4*(2), 114-128.	Not relevant - Food security is not a fundamental element of the article
Settle, W., & Garba, M. H. (2011). Sustainable crop production intensification in the Senegal and Niger River basins of francophone West Africa. International journal of agricultural sustainability, 9(1), 171-185.	Not relevant - Food security is not a fundamental element of the article AND Research Methods- Based on secondary data collection
Shepler, S. (2011). The real and symbolic importance of food in war: hunger pains and big men's bellies in Sierra Leone. Africa Today, 58(2), 43-56.	Not relevant - Food security is not a fundamental element of the article
Sissoko, M., Smale, M., Castiaux, A., & Theriault, V. (2019). Adoption of New Sorghum Varieties in Mali Through a Participatory Approach. *Sustainability*, *11*(17), 4780.	Not relevant - Food security is not a fundamental element of the article
Stenchly, K., Waongo, A., Schaeper, W., Nyarko, G., & Buerkert, A. (2019). Structural landscape changes in urban and peri-urban agricultural systems of two West African cities and their relations to ecosystem services provided by woody plant communities. Urban Ecosystems, 22(2), 397-408.	Not relevant - Food security is not a fundamental element of the article
Stevano, S., Johnston, D., & Codjoe, E. (2020). The urban food question in the context of inequality and dietary change: A study of schoolchildren in Accra. The Journal of Development Studies, 56(6), 1177-1189.	Not relevant - Little engagement with the three aspects of culture
Stewart, R., Langer, L., Da Silva, N. R., Muchiri, E., Zaranyika, H., Erasmus, Y., ... & de Wet, T. (2015). The Effects of training, innovation and new technology on African smallholder farmers' economic outcomes and food security: a	Methods: Systemic review

systematic review. *Campbell Systematic Reviews*, *11*(1), 1-224.	
Styger, E., Aboubacrine, G., Attaher, M. A., & Uphoff, N. (2011). The system of rice intensification as a sustainable agricultural innovation: introducing, adapting and scaling up a system of rice intensification practices in the Timbuktu region of Mali. International Journal of Agricultural Sustainability, 9(1), 67-75.	Not relevant - Food security is not a fundamental element of the article
Sumberg, J., Yeboah, T., Flynn, J., & Anyidoho, N. A. (2017). Young people's perspectives on farming in Ghana: a Q study. *Food security*, *9*(1), 151-161.	Not relevant - Food security is not a fundamental element of the article
Takahashi, K., Mano, Y., & Otsuka, K. (2019). Learning from experts and peer farmers about rice production: Experimental evidence from Cote d'Ivoire. *World Development*, *122*, 157-169.	Not relevant - Food security is not a fundamental element of the article
Tankari, M. R. (2017). Cash crops reduce the welfare of farm households in Senegal. *Food Security*, *9*(5), 1105-1115.	Not relevant - Food security is not a fundamental element of the article
Temudo, M. P., & Abrantes, M. B. (2013). Changing policies, shifting livelihoods: The fate of agriculture in Guinea-Bissau. Journal of Agrarian Change, 13(4), 571-589.	Research Methods-Based on secondary data collection
Teye, J. K., Yaro, J. A., & Bawakyillenuo, S. (2015). Local farmers' experiences and perceptions of climate change in the Northern Savannah zone of Ghana. International Journal of Climate Change Strategies and Management.	Not relevant - Food security is not a fundamental element of the article
Thorpe, A., Whitmarsh, D., Ndomahina, E., Baio, A., Kemokai, M., & Lebbie, T. (2009). Fisheries and failing states: The case of Sierra Leone. Marine Policy, 33(2), 393-400.	Not relevant - Food security is not a fundamental element of the article
Tranchant, J. P., Gelli, A., Bliznashka, L., Diallo, A. S., Sacko, M., Assima, A., ... & Masset, E. (2019). The impact of food assistance on food insecure populations during conflict: Evidence from a quasi-experiment in Mali. World Development, 119, 185-202.	Not relevant - Little engagement with the three aspects of culture
Traore, B., Descheemaeker, K., Van Wijk, M. T., Corbeels, M., Supit, I., & Giller, K. E. (2017). Modelling cereal crops to assess future climate risk for family food self-sufficiency in southern Mali. *Field Crops Research*, *201*, 133-145.	Not relevant - Food security is not a fundamental element of the article

Uduji, J. I., Okolo-Obasi, E. N., & Asongu, S. A. (2019). Corporate social responsibility and the role of rural women in sustainable agricultural development in sub-Saharan Africa: Evidence from the Niger Delta in Nigeria. *Sustainable Development*, *27*(4), 692-703.	Not relevant - Food security is not a fundamental element of the article
Ujoh, F., Igbawua, T., & Ogidi Paul, M. (2019). Suitability mapping for rice cultivation in Benue State, Nigeria using satellite data. *Geo-Spatial Information Science*, *22*(4), 332-344.	Not relevant - Food security is not a fundamental element of the article
Ujunwa, A., Okoyeuzu, C., & Kalu, E. U. (2019). Armed conflict and food security in West Africa: socioeconomic perspective. International Journal of Social Economics.	Not relevant - Little engagement with the three aspeccts of culture And Geographic Scope is too broad or not West Africa Focused
Usman, M., & Nichol, J. (2019). Trends in farmland tree stocks in the agroforestry landscape of northern Nigeria: Reconciling scientific and stakeholder perceptions. Journal of Rural Studies, 66, 87-94.	Not relevant - Food security is not a fundamental element of the article
Vom Brocke, K., Kondombo, C. P., Guillet, M., Kaboré, R., Sidibé, A., Temple, L., & Trouche, G. (2020). Impact of participatory sorghum breeding in Burkina Faso. *Agricultural Systems*, *180*, 102775.	Not relevant - Food security is not a fundamental element of the article
Wada, A. C., Gbabo, A., & Ndarubu, A. A. (2006). Cottage sugar industries as alternatives for meeting Nigeria's domestic sugar demands. Outlook on Agriculture, 35(1), 65-71.	Not relevant - Food security is not a fundamental element of the article
Wanvoeke, J., Venot, J. P., De Fraiture, C., & Zwarteveen, M. (2016). Smallholder drip irrigation in Burkina Faso: the role of development brokers. *The Journal of Development Studies*, *52*(7), 1019-1033.	Not relevant - Food security is not a fundamental element of the article
Wedin, A., Lundgren, M., Mushi, C., Suleiman, L., & Gustafsson, J. E. (2013). Food versus fuel: the case of the Makeni community in Sierra Leone. *WIT Transactions on Ecology and the Environment*, *170*, 37-48.	Research Methods- Based on secondary data collection And Not relevant - Little engagement with the three aspects of culture

Wellard, K., Rafanomezana, J., Nyirenda, M., Okotel, M., & Subbey, V. (2013). A review of community extension approaches to innovation for improved livelihoods in Ghana, Uganda and Malawi. The Journal of Agricultural Education and Extension, 19(1), 21-35.	Geographic scope is too broad or not West Africa focused
Zereyesus, Y. A., Embaye, W. T., Tsiboe, F., & Amanor-Boadu, V. (2017). Implications of non-farm work to vulnerability to food poverty-recent evidence from Northern Ghana. World Development, 91, 113-124.	Research Methods- Based on secondary data collection
Zidouemba, P. R., & Gerard, F. (2018). Does Agricultural Productivity Actually Matter for Food Security in a Landlocked Sub-Saharan African Country? The Case of Burkina Faso. Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie, 66(1), 103-142.	Not relevant- Policy Focused
Zoundji, G. C., Okry, F., Vodouhê, S. D., & Bentley, J. W. (2018). Towards sustainable vegetable growing with farmer learning videos in Benin. *International Journal of Agricultural Sustainability*, *16*(1), 54-63.	Not relevant - Food security is not a fundamental element of the article

APPENDIX B: ELIGIBLE ARTICLES AND THEMATIC ENGAGEMENT

Study	**Thematic Engagement**
Adeniyi, D. A., & Dinbabo, M. F. (2020). Efficiency, food security and differentiation in small-scale irrigation agriculture: Evidence from north west nigeria. Cogent Social Sciences, 6(1)	Livelihood and Practice;
Adesoye, O. P., & Adepoju, A. O. (2020). Food insecurity status of the working poor households in south west Nigeria. *International Journal of Social Economics*.	Livelihood and Practice; Social; Methods
Ado, A. M., Savadogo, P., & Abdoul-Azize, H. T. (2019). Livelihood strategies and household resilience to food insecurity: insight from a farming community in Aguie district of Niger. *Agriculture and Human Values*, *36*(4), 747-761.	Livelihood and Practice
Ahn, J., Briers, G., Kibriya, S., & Price, E. (2020). Case studies of female-headed farms and households in Liberia: a comparative analysis of Grand Bassa, Lofa, and Nimba counties. *The Journal of Agricultural Education and Extension*, *26*(1), 19-35.	Social; Systems of Meaning
Ajaero, C. K. (2017). A gender perspective on the impact of flood on the food security of households in rural communities of Anambra state, Nigeria. Food Security, 9(4), 685-695.	Livelihood and Practice; Social; Methods
Akerele, D., & Shittu, A. M. (2017). Can food production diversity influence farm households' dietary diversity? An appraisal from two-dimensional food diversity measures. International Journal of Social Economics.	Livelihood and Practice; Methods
Akuffo, A. S., & Quagrainie, K. K. (2019). Assessment of household food security in fish farming communities in Ghana. *Sustainability*, *11*(10), 2807.	Livelihood and Practice; Methods
Akukwe, T. I., Oluoko-Odingo, A. A., & Krhoda, G. O. (2020). Do floods affect food security? A before-and-after comparative study of flood-affected households' food security status in South-Eastern Nigeria. Bulletin of Geography. Socio-economic Series, 47(47), 115-131.	Livelihood and Practice; Methods
Anderman, T. L., Remans, R., Wood, S. A., DeRosa, K., & DeFries, R. S. (2014). Synergies and tradeoffs between cash crop production and food security: a case study in rural Ghana. Food security, 6(4), 541-554.	Livelihood and Practice
Asitik, A. J., & Abu, B. M. (2020). Women empowerment in agriculture and food security in Savannah Accelerated Development Authority zone of Ghana. African Journal of Economic and Management Studies.	Social; Methods

Atuoye, K. N., Kuuire, V. Z., Kangmennaang, J., Antabe, R., & Luginaah, I. (2017). Residential remittances and food security in the Upper West Region of Ghana. International Migration, 55(4), 18-34.	Livelihoods: Methods
Ayerakwa, H. (2018). Urban food security and multi-spatial livelihoods in Ghana's medium sized cities: does food transfer matter?. *International Development Planning Review*, *40*(4), 421-443.	Livelihood and Practice; Social; Methods
Babatunde, R. O., Omotesho, O. A., Olorunsanya, E. O., & Owotoki, G. M. (2008). Determinants of vulnerability to food insecurity: A genderbased analysis of farming households in Nigeria. *Indian Journal of Agricultural Economics*, *63*(902-2016-67954).	Livelihood and Practice; Social
Barad, R., Fletcher, E. K., & Hillbruner, C. (2020). Leveraging existing household survey data to map livelihoods in Nigeria. World Development, 126, 104727.	Livelihood and Practice; Methods
Beauchamp, E., Abdella, J., Fisher, S., McPeak, J., Patnaik, H., Koulibaly, P., ... & Deme, Y. (2019). Resilience from the ground up: how are local resilience perceptions and global frameworks aligned?. Disasters, 43, S295-S317.	Systems of Meaning
Binet, T., Failler, P., & Thorpe, A. (2012). Migration of Senegalese fishers: a case for regional approach to management. Maritime Studies, 11(1), 1.	Social
Binns, T., & Bateman, J. (2017). Rural livelihoods and food security: long-term insights from Sierra Leone's Eastern Province. *Geographical Research*, *55*(2), 156-165.	Livelihood and Practice; Social
Boedecker, J., Termote, C., Assogbadjo, A. E., Van Damme, P., & Lachat, C. (2014). Dietary contribution of Wild Edible Plants to women's diets in the buffer zone around the Lama forest, Benin–an underutilized potential. *Food Security*, *6*(6), 833-849.	Systems of Meaning
Chagomoka, T., Drescher, A., Glaser, R., Marschner, B., Schlesinger, J., & Nyandoro, G. (2015). Contribution of urban and periurban agriculture to household food and nutrition security along the urban–rural continuum in Ouagadougou, Burkina Faso. *Renewable Agriculture and Food Systems*, *32*(1), 5-20.	Livelihood and Practice; Methods
Chagomoka, T., Drescher, A., Glaser, R., Marschner, B., Schlesinger, J., Abizari, A. R., ... & Nyandoro, G. (2018). Urban and peri-urban agriculture and its implication on food and nutrition insecurity in northern Ghana: a socio-spatial analysis along the urban–rural continuum. Population and Environment, 40(1), 27-46.	Livelihood and Practice; Methods
Coker, A. A. A., Akogun, E. O., Adebayo, C. O., Mohammed, S., Nwojo, M., Sanusi, H., & Jimoh, H. O. (2017). Gender differentials among subsistence rice farmers and willingness to	Livelihood and Practice; Social

undertake agribusiness in Africa: evidence and Issues from Nigeria. African Development Review, 29(S2), 198-212.	
Comas, J., Connor, D., Isselmou, M. E. M., Mateos, L., & Gómez-Macpherson, H. (2012). Why has small-scale irrigation not responded to expectations with traditional subsistence farmers along the Senegal River in Mauritania?. *Agricultural Systems*, *110*, 152-161.	Livelihood and Practice
Delvaux, P. A. G., & y Paloma, S. G. (2018). Access to common resources and food security: Evidence from National Surveys in Nigeria. Food security, 10(1), 121-140.	Livelihood and Practice Social; Methods
Diallo, A., Donkor, E., & Owusu, V. (2020). Climate change adaptation strategies, productivity and sustainable food security in southern Mali. Climatic Change, 1-19.	Livelihood and Practice; Methods
Etongo, D., Epule, T. E., Djenontin, I. N. S., & Kanninen, M. (2018, August). Land management in rural Burkina Faso: the role of socio-cultural and institutional factors. In Natural resources forum (Vol. 42, No. 3, pp. 201-213). Oxford, UK: Blackwell Publishing Ltd.	Livelihood and Practice; Social
Fawole, O. P., & Oladele, O. I. (2007). Sustainable food crop production through multiple cropping patterns among farmers in South Western Nigeria. *Journal of Human Ecology*, *21*(4), 245-2	Livelihood and Practice
Fouladbash, L., & Currie, W. S. (2015). Agroforestry in Liberia: household practices, perceptions and livelihood benefits. Agroforestry Systems, 89(2), 247-266.	Livelihood and Practice; Systems of Meaning
Glenna, L., Ader, D., Bauchspies, W., Traoré, A., & Agboh-Noameshi, R. A. (2012). The Efficacy of a Program Promoting Rice Self-Sufficiency in Ghana during a Period of Neoliberalism. Rural sociology, 77(4), 520-546.	Livelihood and Practice; Social
Hampshire, K., Casiday, R., Kilpatrick, K., & Panter-Brick, C. (2009). The social context of childcare practices and child malnutrition in Niger's recent food crisis. *Disasters*, *33*(1), 132-151.	Social; Methods
Haruna, O. I., Asogwa, V. C., & Ezhim, I. A. (2019). Challenges and Enhancement of Youth Participation in Agricultural Education for Sustainable Food Security. African Educational Research Journal, 7(4), 174-182.	Livelihood and Practice
Hesselberg, J., & Yaro, J. A. (2006). An assessment of the extent and causes of food insecurity in northern Ghana using a livelihood vulnerability framework. GeoJournal, 67(1), 41-55.	Livelihood and Practice
Ikudayisi, A., Okoruwa, V., & Omonona, B. (2019). From the lens of food accessibility and dietary quality: Gaining insights from urban food security in Nigeria. *Outlook on Agriculture*, *48*(4), 336-343.	Livelihood and Practice

Iruonagbe, T. C. (2011). Gender equity and food security: lessons from Ozalla community, Edo State, Nigeria. *Gender and Behaviour*, *9*(1), 3543-3565.	Social; Systems of Meaning
Kansanga, M., Andersen, P., Kpienbaareh, D., Mason-Renton, S., Atuoye, K., Sano, Y., ... & Luginaah, I. (2019). Traditional agriculture in transition: examining the impacts of agricultural modernization on smallholder farming in Ghana under the new Green Revolution. *International Journal of Sustainable Development & World Ecology*, *26*(1), 11-24.	Livelihood and Practice; Social; Systems of Meaning
Kiba, D. I., Hgaza, V. K., Aighewi, B., Aké, S., Barjolle, D., Bernet, T., ... & Ouattara, F. Y. (2020). A Transdisciplinary Approach for the Development of Sustainable Yam (Dioscorea sp.) Production in West Africa. *Sustainability*, *12*(10), 4016.	Livelihood and Practice; Systems of Meaning
Koopman, J. E. (2009). Globalization, gender, and poverty in the Senegal River Valley. Feminist Economics, 15(3), 253-285.	Livelihood and Practice; Social
Kpienbaareh, D., & Luginaah, I. (2019). After the flames then what? exploring the linkages between wildfires and household food security in the northern Savannah of Ghana. International Journal of Sustainable Development & World Ecology, 26(7), 612-624.	Livelihood and Practice; Systems of Meaning
Kuusaana, E. D., & Eledi, J. A. (2015, December). As the city grows, where do the farmers go? Understanding Peri-urbanization and food systems in Ghana-Evidence from the Tamale Metropolis. In *Urban Forum* (Vol. 26, No. 4, pp. 443-465). Springer Netherlands.	Livelihood and Practice; Social
Kuwornu, J. K., Osei, E., Osei-Asare, Y. B., & Porgo, M. (2018). Off-farm work and food security status of farming households in Ghana. Development in practice, 28(6), 724-740.	Livelihood and Practice; Social
Maconachie, R. (2008). New agricultural frontiers in post-conflict Sierra Leone? Exploring institutional challenges for wetland management in the Eastern Province. The Journal of Modern African Studies, 235-266.	Livelihood and Practice; Social
Mariwah, S., Evans, R., & Antwi, K. B. (2019). Gendered and generational tensions in increased land commercialisation: Rural livelihood diversification, changing land use, and food security in Ghana's Brong-Ahafo region. *Geo: Geography and Environment*, *6*(1), e00073.	Livelihood and Practice; Social
McKune, S. L., & Silva, J. A. (2013). Pastoralists under pressure: double exposure to economic and environmental change in Niger. Journal of development studies, 49(12), 1711-1727.	Livelihood and Practice; Methods
Muller, J., & Almedom, A. M. (2008). What is “famine food”? Distinguishing between traditional vegetables and special	Livelihood and Practice;

foods for times of hunger/scarcity (Boumba, Niger). *Human Ecology*, *36*(4), 599-607.	Systems of Meaning
N'Danikou, S., Vodouhe, R. S., Bellon, M. R., Sidibé, A., & Coulibaly, H. (2017). Foraging is determinant to improve smallholders' food security in rural areas in Mali, West Africa. Sustainability, 9(11), 2074.	Livelihood and Practice; Systems of Meaning; Methods
Nanama, S., & Frongillo, E. A. (2012). Altered social cohesion and adverse psychological experiences with chronic food insecurity in the non-market economy and complex households of Burkina Faso. *Social science & medicine*, *74*(3), 444-451.	Livelihood and Practice; Social
Naughton, C. C., Deubel, T. F., & Mihelcic, J. R. (2017). Household food security, economic empowerment, and the social capital of women's shea butter production in Mali. *Food Security*, *9*(4), 773-784.	Livelihood and Practice; Social; Systems of Meaning
Nero, B. F., Kwapong, N. A., Jatta, R., & Fatunbi, O. (2018). Tree species diversity and socioeconomic perspectives of the urban (food) forest of Accra, Ghana. *Sustainability*, *10*(10), 3417.	Livelihood and Practice; Systems of Meaning
Nonvide, G. M. A. (2018). Irrigation adoption: A potential avenue for reducing food insecurity among rice farmers in Benin. *Water resources and economics*, *24*, 40-52.	Livelihood and Practice
Obayelu, O. A., & Onasanya, O. A. (2016). Maize biodiversity and food security status of rural households in the derived Guinea savannah of Oyo state, Nigeria. *Agriculturae Conspectus Scientificus*, *81*(4), 241-250.	Livelihood and Practice; Social; Methods
Obodai, J., Adjei, P. O. W., Hamenoo, S. V. Q., & Abaitey, A. K. A. (2018). Towards household food security in Ghana: assessment of Ghana's expanded forest plantation programme in Asante Akim South District. *GeoJournal*, *83*(2), 365-380.	Livelihood and Practice
Ofuoku, A. U. (2017). Contributions of Rural-Urban Migrants' Remittances to Farming Household (HH) Food Security in Delta Central Agriculture Zone, Detla State Nigeria. Journal of Agribusiness and Rural Development, 45(3), 655-663.	Livelihood and Practice
Olawuyi, S. O. (2019). Building resilience against food insecurity through social networks. International Journal of Social Economics.	Social; Methods
Omotayo, A. O., Ogunniyi, A. I., Tchereni, B. H., & Nkonki-Mandleni, B. (2018). Understanding the link between households' poverty and food security in South West Nigeria. The Journal of Developing Areas, 52(3), 27-38.	Livelihood and Practice; Social
Peeters, L. E., & Maxwell, D. G. (2011). Characteristics and strategies favouring sustained food access during Guinea's food-price crisis. Development in Practice, 21(4-5), 613-628.	Livelihood and Practice;

	Systems of Meaning
Poole, N., Audia, C., Kaboret, B., & Kent, R. (2016). Tree products, food security and livelihoods: a household study of Burkina Faso. Environmental Conservation, 43(4), 359-367.	Livelihood and Practice; Social
Rademacher-Schulz, C., Schraven, B., & Mahama, E. S. (2014). Time matters: shifting seasonal migration in Northern Ghana in response to rainfall variability and food insecurity. Climate and Development, 6(1), 46-52.	Livelihood and Practice
Rivers III, L., Sanga, U., Sidibe, A., Wood, A., Paudel, R., Marquart-Pyatt, S. T., ... & Liverpool-Tasie, S. (2018). Mental models of food security in rural Mali. *Environment Systems and Decisions*, *38*(1), 33-51.	Livelihood and Practice; Social; Systems of Mean; Methods
Rogé, P., Diarisso, T., Diallo, F., Boiré, Y., Goïta, D., Peter, B., ... & Snapp, S. (2017). Perennial grain crops in the West Soudanian Savanna of Mali: perspectives from agroecology and gendered spaces. *International Journal of Agricultural Sustainability*, *15*(5), 555-574.	Social
Sidibé, A., Totin, E., Thompson-Hall, M., Traoré, O. T., Traoré, P. C. S., & Olabisi, L. S. (2018). Multi-scale governance in agriculture systems: Interplay between national and local institutions around the production dimension of food security in Mali. NJAS-Wageningen Journal of Life Sciences, 84, 94-102.	Social
Sohoulande Djebou, D. C., Price, E., Kibriya, S., & Ahn, J. (2017). Comparative analysis of agricultural assets, incomes and food security of rural households in Ghana, Senegal and Liberia. Agriculture, 7(5), 38.	Livelihood and Practice
Tambo, J. A., & Wünscher, T. (2017). Farmer-led innovations and rural household welfare: evidence from Ghana. Journal of Rural Studies, 55, 263-274.	Livelihood and Practice; Methods
Temudo, M. P. (2011). Planting knowledge, harvesting agro-biodiversity: a case study of Southern Guinea-Bissau rice farming. Human Ecology, 39(3), 309-321.	Livelihood and Practice; Social; Systems of Meaning
Temudo, M. P., & Abrantes, M. (2014). The cashew frontier in Guinea-Bissau, West Africa: changing landscapes and livelihoods. Human ecology, 42(2), 217-230.	Livelihood and Practice
Tougiani, A., Guero, C., & Rinaudo, T. (2009). Community mobilization for improved livelihoods through tree crop management in Niger. GeoJournal, 74(5), 377.	Livelihood and Practice; Social; Methods

Towns, A. M., Potter, D., & Idrissa, S. (2013). Cultivated, caught, and collected: defining culturally appropriate foods in Tallé, Niger. *Development in Practice*, *23*(2), 169-183.	Systems of Meaning; Methods
Tuholske, C., Andam, K., Blekking, J., Evans, T., & Caylor, K. (2020). Comparing measures of urban food security in Accra, Ghana. Food Security, 1-15.	Livelihood and Practice; Methods
West, C., Somé, A., & Nebié, E. (2014). Famines are a thing of the past: Food security trends in Northern Burkina Faso. *Human organization*, *73*(4), 340-350.	Systems of Meaning; Methods
Yaro, J. A., Teye, J. K., & Torvikey, G. D. (2017). Agricultural commercialization models, agrarian dynamics and local development in Ghana. *The Journal of Peasant Studies*, *44*(3), 538-554.	Livelihood and Practice
Yekinni, O. T. (2010). Women's Participation in Development Programs and Food Security Status. Journal of Agricultural & Food Information, 11(1), 28-35.	Social
Yengoh, G. T., & Armah, F. A. (2015). Effects of large-scale acquisition on food insecurity in Sierra Leone. *Sustainability*, *7*(7), 9505-9539.	Livelihood and Practice
Yiridoe, E. K., & Anchirinah, V. M. (2005). Garden production systems and food security in Ghana: Characteristics of traditional knowledge and management systems. *Renewable agriculture and food systems*, 168-180.	Livelihood and Practice; Social; Methods

APPENDIX C: ARTICLES BY THEMATIC APPLICATION, IDENTIFIED SUBTHEMES AND OVERALL RATING

Livelihood and Practice:

Citation	Rating	Sub themes
Adeniyi, D. A., & Dinbabo, M. F. (2020). Efficiency, food security and differentiation in small-scale irrigation agriculture: Evidence from north west nigeria. Cogent Social Sciences, 6(1) doi:http://dx.doi.org.libproxy.uoregon.edu/10.1080/23311886.2020.	2	Economic capabilities
Adesoye, O. P., & Adepoju, A. O. (2020). Food insecurity status of the working poor households in south west Nigeria. *International Journal of Social Economics*.	2	Economic capabilities
Ado, A. M., Savadogo, P., & Abdoul-Azize, H. T. (2019). Livelihood strategies and household resilience to food insecurity: insight from a farming community in Aguie district of Niger. *Agriculture and Human Values*, *36*(4), 747-761.	5	Economic capabilities; General application of a livelihood and vulnerability framework
Ajaero, C. K. (2017). A gender perspective on the impact of flood on the food security of households in rural communities of Anambra state, Nigeria. Food Security, 9(4), 685-695.	4	Economic capabilities; General coping mechanism
Akerele, D., & Shittu, A. M. (2017). Can food production diversity influence farm households' dietary diversity? An appraisal from two-dimensional food diversity measures. International Journal of Social Economics.	2	General coping mechanism; Participation around agriculture methods
Akuffo, A. S., & Quagrainie, K. K. (2019). Assessment of household food security in fish farming communities in Ghana. *Sustainability*, *11*(10), 2807.	4	An urban/rural nexus; Economic capabilities
Akukwe, T. I., Oluoko-Odingo, A. A., & Krhoda, G. O. (2020). Do floods affect food security? A before-and-after comparative study of flood-affected households' food security status in South-	1	General coping mechanism

Eastern Nigeria. Bulletin of Geography. Socio-economic Series, 47(47), 115-131.		
Anderman, T. L., Remans, R., Wood, S. A., DeRosa, K., & DeFries, R. S. (2014). Synergies and tradeoffs between cash crop production and food security: a case study in rural Ghana. Food security, 6(4), 541-554.	5	Economic capabilities; Participation around agriculture methods
Atuoye, K. N., Kuuire, V. Z., Kangmennaang, J., Antabe, R., & Luginaah, I. (2017). Residential remittances and food security in the Upper West Region of Ghana. International Migration, 55(4), 18-34.	5	An urban/rural nexus; Economic capabilities
Ayerakwa, H. (2018). Urban food security and multi-spatial livelihoods in Ghana's medium sized cities: does food transfer matter?. *International Development Planning Review*, *40*(4), 421-443.	5	An urban/rural nexus; Economic capabilities,
Babatunde, R. O., Omotesho, O. A., Olorunsanya, E. O., & Owotoki, G. M. (2008). Determinants of vulnerability to food insecurity: A genderbased analysis of farming households in Nigeria. *Indian Journal of Agricultural Economics*, *63*(902-2016-67954).	3	General coping mechanism
Barad, R., Fletcher, E. K., & Hillbruner, C. (2020). Leveraging existing household survey data to map livelihoods in Nigeria. World Development, 126, 104727.	1	General application of a livelihood and vulnerability framework
Bernholt, H., Kehlenbeck, K., Gebauer, J., & Buerkert, A. (2009). Plant species richness and diversity in urban and peri-urban gardens of Niamey, Niger. *Agroforestry Systems*, *77*(3), 159.	4	An urban/rural nexus; Economic capabilities; Participation around agriculture methods

Binns, T., & Bateman, J. (2017). Rural livelihoods and food security: long-term insights from Sierra Leone's Eastern Province. *Geographical Research*, *55*(2), 156-165.	4	General coping mechanism
Chagomoka, T., Drescher, A., Glaser, R., Marschner, B., Schlesinger, J., & Nyandoro, G. (2015). Contribution of urban and periurban agriculture to household food and nutrition security along the urban–rural continuum in Ouagadougou, Burkina Faso. *Renewable Agriculture and Food Systems*, *32*(1), 5-20.	3	An urban/rural nexus; Participation around agriculture methods
Chagomoka, T., Drescher, A., Glaser, R., Marschner, B., Schlesinger, J., Abizari, A. R., ... & Nyandoro, G. (2018). Urban and peri-urban agriculture and its implication on food and nutrition insecurity in northern Ghana: a socio-spatial analysis along the urban–rural continuum. Population and Environment, 40(1), 27-46.	3	An urban/rural nexus; Access to resources
Coker, A. A. A., Akogun, E. O., Adebayo, C. O., Mohammed, S., Nwojo, M., Sanusi, H., & Jimoh, H. O. (2017). Gender differentials among subsistence rice farmers and willingness to undertake agribusiness in Africa: evidence and Issues from Nigeria. African Development Review, 29(S2), 198-212.	4	Economic capabilities
Comas, J., Connor, D., Isselmou, M. E. M., Mateos, L., & Gómez-Macpherson, H. (2012). Why has small-scale irrigation not responded to expectations with traditional subsistence farmers along the Senegal River in Mauritania?. *Agricultural Systems*, *110*, 152-161.	4	Participation around agriculture methods
Delvaux, P. A. G., & y Paloma, S. G. (2018). Access to common resources and food security: Evidence from National Surveys in Nigeria. Food security, 10(1), 121-140.	5	Access to resources; General application of a livelihood and vulnerability framework
Diallo, A., Donkor, E., & Owusu, V. (2020). Climate change adaptation strategies, productivity	5	General coping mechanism

and sustainable food security in southern Mali. Climatic Change, 1-19.		
Etongo, D., Epule, T. E., Djenontin, I. N. S., & Kanninen, M. (2018, August). Land management in rural Burkina Faso: the role of socio-cultural and institutional factors. In Natural resources forum (Vol. 42, No. 3, pp. 201-213). Oxford, UK: Blackwell Publishing Ltd.	5	Access to resources; Participation around agriculture methods
Fawole, O. P., & Oladele, O. I. (2007). Sustainable food crop production through multiple cropping patterns among farmers in South Western Nigeria. *Journal of Human Ecology*, *21*(4), 245-2	1	Participation around agriculture methods
Fouladbash, L., & Currie, W. S. (2015). Agroforestry in Liberia: household practices, perceptions and livelihood benefits. Agroforestry Systems, 89(2), 247-266.	5	Participation around agriculture methods
Glenna, L., Ader, D., Bauchspies, W., Traoré, A., & Agboh-Noameshi, R. A. (2012). The Efficacy of a Program Promoting Rice Self-Sufficiency in Ghana during a Period of Neoliberalism. Rural sociology, 77(4), 520-546.	5	Participation around agriculture methods
Haruna, O. I., Asogwa, V. C., & Ezhim, I. A. (2019). Challenges and Enhancement of Youth Participation in Agricultural Education for Sustainable Food Security. African Educational Research Journal, 7(4), 174-182.	2	Participation around agriculture methods
Hesselberg, J., & Yaro, J. A. (2006). An assessment of the extent and causes of food insecurity in northern Ghana using a livelihood vulnerability framework. GeoJournal, 67(1), 41-55.	5	Economic capabilities; General application of a livelihood and vulnerability framework
Ikudayisi, A., Okoruwa, V., & Omonona, B. (2019). From the lens of food accessibility and dietary quality: Gaining insights from urban food security in Nigeria. *Outlook on Agriculture*, *48*(4), 336-343.	3	An urban/rural nexus
Kansanga, M., Andersen, P., Kpienbaareh, D., Mason-Renton, S., Atuoye, K., Sano, Y., ... & Luginaah, I. (2019). Traditional agriculture in transition: examining the impacts of agricultural	5	Participation around agriculture methods

modernization on smallholder farming in Ghana under the new Green Revolution. *International Journal of Sustainable Development & World Ecology*, *26*(1), 11-24.		
Kiba, D. I., Hgaza, V. K., Aighewi, B., Aké, S., Barjolle, D., Bernet, T., ... & Ouattara, F. Y. (2020). A Transdisciplinary Approach for the Development of Sustainable Yam (Dioscorea sp.) Production in West Africa. *Sustainability*, *12*(10), 4016.	5	Participation around agriculture methods
Koopman, J. E. (2009). Globalization, gender, and poverty in the Senegal River Valley. Feminist Economics, 15(3), 253-285.	5	Access to resources; Participation around agriculture methods
Kpienbaareh, D., & Luginaah, I. (2019). After the flames then what? exploring the linkages between wildfires and household food security in the northern Savannah of Ghana. International Journal of Sustainable Development & World Ecology, 26(7), 612-624.	5	General application of a livelihood and vulnerability framework; Participation around agriculture methods
Kuusaana, E. D., & Eledi, J. A. (2015, December). As the city grows, where do the farmers go? Understanding Peri-urbanization and food systems in Ghana-Evidence from the Tamale Metropolis. In *Urban Forum* (Vol. 26, No. 4, pp. 443-465). Springer Netherlands.	4	Participation around agriculture methods; An urban/rural nexus
Kuwornu, J. K., Osei, E., Osei-Asare, Y. B., & Porgo, M. (2018). Off-farm work and food security status of farming households in Ghana. Development in practice, 28(6), 724-740.	4	Economic capabilities; Access to resources
Maconachie, R. (2008). New agricultural frontiers in post-conflict Sierra Leone? Exploring institutional challenges for wetland management in the Eastern Province. The Journal of Modern African Studies, 235-266.	5	Access to resources; General coping mechanism

Mariwah, S., Evans, R., & Antwi, K. B. (2019). Gendered and generational tensions in increased land commercialisation: Rural livelihood diversification, changing land use, and food security in Ghana's Brong-Ahafo region. *Geo: Geography and Environment*, *6*(1), e00073.	5	Economic capabilities; Participation around agriculture methods
McKune, S. L., & Silva, J. A. (2013). Pastoralists under pressure: double exposure to economic and environmental change in Niger. Journal of development studies, 49(12), 1711-1727.	5	General application of a livelihood and vulnerability framework; Participation around agriculture methods
Muller, J., & Almedom, A. M. (2008). What is "famine food"? Distinguishing between traditional vegetables and special foods for times of hunger/scarcity (Boumba, Niger). *Human Ecology*, *36*(4), 599-607.	3	General coping mechanism
N'Danikou, S., Vodouhe, R. S., Bellon, M. R., Sidibé, A., & Coulibaly, H. (2017). Foraging is determinant to improve smallholders' food security in rural areas in Mali, West Africa. Sustainability, 9(11), 2074.	5	General coping mechanism; General application of a livelihood and vulnerability framework
Nanama, S., & Frongillo, E. A. (2012). Altered social cohesion and adverse psychological experiences with chronic food insecurity in the non-market economy and complex households of Burkina Faso. *Social science & medicine*, *74*(3), 444-451.	2	General coping mechanism
Naughton, C. C., Deubel, T. F., & Mihelcic, J. R. (2017). Household food security, economic empowerment, and the social capital of women's shea butter production in Mali. *Food Security*, *9*(4), 773-784.	5	Economic capabilities

Nero, B. F., Kwapong, N. A., Jatta, R., & Fatunbi, O. (2018). Tree species diversity and socioeconomic perspectives of the urban (food) forest of Accra, Ghana. *Sustainability*, *10*(10), 3417.	3	Economic capabilities; Participation around agriculture methods
Nonvide, G. M. A. (2018). Irrigation adoption: A potential avenue for reducing food insecurity among rice farmers in Benin. *Water resources and economics*, *24*, 40-52.	3	Participation around agriculture methods
Obayelu, O. A., & Onasanya, O. A. (2016). Maize biodiversity and food security status of rural households in the derived Guinea savannah of Oyo state, Nigeria. *Agriculturae Conspectus Scientificus*, *81*(4), 241-250.	2	Participation around agriculture methods
Obodai, J., Adjei, P. O. W., Hamenoo, S. V. Q., & Abaitey, A. K. A. (2018). Towards household food security in Ghana: assessment of Ghana's expanded forest plantation programme in Asante Akim South District. *GeoJournal*, *83*(2), 365-380.	3	Participation around agriculture methods
Ofuoku, A. U. (2017). Contributions of rural migrants' remittances to farming household (HH) food security in Delta Central agriculture zon. Delta State, Nigeria. Journal of Agribusiness and Rural Development, 45(3), 655-663.	5	An urban/rural nexus; Economic capabilities,
Omotayo, A. O., Ogunniyi, A. I., Tchereni, B. H., & Nkonki-Mandleni, B. (2018). Understanding the link between households' poverty and food security in South West Nigeria. The Journal of Developing Areas, 52(3), 27-38.	1	Economic capabilities
Peeters, L. E., & Maxwell, D. G. (2011). Characteristics and strategies favouring sustained food access during Guinea's food-price crisis. Development in Practice, 21(4-5), 613-628.	3	General coping mechanism
Poole, N., Audia, C., Kaboret, B., & Kent, R. (2016). Tree products, food security and livelihoods: a household study of Burkina Faso. Environmental Conservation, 43(4), 359-367.	5	General coping mechanism
Rademacher-Schulz, C., Schraven, B., & Mahama, E. S. (2014). Time matters: shifting seasonal migration in Northern Ghana in response to rainfall variability and food insecurity. Climate and Development, 6(1), 46-52.	4	An urban/rural nexus; Economic capabilities; General coping mechanism

Rivers III, L., Sanga, U., Sidibe, A., Wood, A., Paudel, R., Marquart-Pyatt, S. T., ... & Liverpool-Tasie, S. (2018). Mental models of food security in rural Mali. *Environment Systems and Decisions*, *38*(1), 33-51.	5	General coping mechanism
Sohoulande Djebou, D. C., Price, E., Kibriya, S., & Ahn, J. (2017). Comparative analysis of agricultural assets, incomes and food security of rural households in Ghana, Senegal and Liberia. Agriculture, 7(5), 38.	4	Access to resources; Economic capabilities
Tambo, J. A., & Wünscher, T. (2017). Farmer-led innovations and rural household welfare: evidence from Ghana. Journal of Rural Studies, 55, 263-274.	3	Economic capabilities; Participation around agriculture methods
Temudo, M. P. (2011). Planting knowledge, harvesting agro-biodiversity: a case study of Southern Guinea-Bissau rice farming. Human Ecology, 39(3), 309-321.	5	Participation around agriculture methods
Temudo, M. P., & Abrantes, M. (2014). The cashew frontier in Guinea-Bissau, West Africa: changing landscapes and livelihoods. Human ecology, 42(2), 217-230.	5	Economic capabilities; Participation around agriculture methods
Tougiani, A., Guero, C., & Rinaudo, T. (2009). Community mobilisation for improved livelihoods through tree crop management in Niger. GeoJournal, 74(5), 377.	4	Participation around agriculture methods
Tuholske, C., Andam, K., Blekking, J., Evans, T., & Caylor, K. (2020). Comparing measures of urban food security in Accra, Ghana. Food Security, 1-15.	3	An urban/rural nexus; Economic capabilities; Access to resources
Yaro, J. A., Teye, J. K., & Torvikey, G. D. (2017). Agricultural commercialisation models, agrarian dynamics and local development in Ghana. *The Journal of Peasant Studies*, *44*(3), 538-554.	4	Participation around agriculture methods; Economic capabilities
Yengoh, G. T., & Armah, F. A. (2015). Effects of large-scale acquisition on food insecurity in Sierra Leone. *Sustainability*, *7*(7), 9505-9539.	5	Economic capabilities; Participation

		around agriculture methods
Yiridoe, E. K., & Anchirinah, V. M. (2005). Garden production systems and food security in Ghana: Characteristics of traditional knowledge and management systems. *Renewable agriculture and food systems*, 168-180.	5	Participation around agriculture methods

Social:

Citation	**Level of Engagement**	**General sub themes**
Adesoye, O. P., & Adepoju, A. O. (2020). Food insecurity status of the working poor households in south west Nigeria. *International Journal of Social Economics*.	2	Education; Household dynamic
Ado, A. M., Savadogo, P., & Abdoul-Azize, H. T. (2019). Livelihood strategies and household resilience to food insecurity: insight from a farming community in Aguie district of Niger. *Agriculture and Human Values*, *36*(4), 747-761.	5	Gender; Social network
Ahn, J., Briers, G., Kibriya, S., & Price, E. (2020). Case studies of female-headed farms and households in Liberia: a comparative analysis of Grand Bassa, Lofa, and Nimba counties. *The Journal of Agricultural Education and Extension*, *26*(1), 19-35.	5	Gender
Ajaero, C. K. (2017). A gender perspective on the impact of flood on the food security of households in rural communities of Anambra state, Nigeria.	5	Gender; Education

Food Security, 9(4), 685-695.		
Asitik, A. J., & Abu, B. M. (2020). Women empowerment in agriculture and food security in Savannah Accelerated Development Authority zone of Ghana. African Journal of Economic and Management Studies.	5	Gender
Ayerakwa, H. (2018). Urban food security and multi-spatial livelihoods in Ghana's medium sized cities: does food transfer matter?. *International Development Planning Review*, *40*(4), 421-443.	5	Gender; Social networks
Babatunde, R. O., Omotesho, O. A., Olorunsanya, E. O., & Owotoki, G. M. (2008). Determinants of vulnerability to food insecurity: A gender based analysis of farming households in Nigeria. *Indian Journal of Agricultural Economics*, *63*(902-2016-67954).	3	Gender
Binet, T., Failler, P., & Thorpe, A. (2012). Migration of Senegalese fishers: a case for regional approach to management. Maritime Studies, 11(1), 1.	2	Social networks; Institutional engagement
Binns, T., & Bateman, J. (2017). Rural livelihoods and food security: long-term insights from Sierra Leone's Eastern Province. *Geographical Research*, *55*(2), 156-165.	4	Gender

Boedecker, J., Termote, C., Assogbadjo, A. E., Van Damme, P., & Lachat, C. (2014). Dietary contribution of Wild Edible Plants to women's diets in the buffer zone around the Lama forest, Benin–an underutilized potential. *Food Security*, *6*(6), 833-849.	4	Gender
Coker, A. A. A., Akogun, E. O., Adebayo, C. O., Mohammed, S., Nwojo, M., Sanusi, H., & Jimoh, H. O. (2017). Gender differentials among subsistence rice farmers and willingness to undertake agribusiness in Africa: evidence and Issues from Nigeria. African Development Review, 29(S2), 198-212.	5	Gender
Delvaux, P. A. G., & y Paloma, S. G. (2018). Access to common resources and food security: Evidence from National Surveys in Nigeria. Food security, 10(1), 121-140.	3	Education
Etongo, D., Epule, T. E., Djenontin, I. N. S., & Kanninen, M. (2018, August). Land management in rural Burkina Faso: the role of socio-cultural and institutional factors. In Natural resources forum (Vol. 42, No. 3, pp. 201-213). Oxford, UK: Blackwell Publishing Ltd.	5	Education; Social networks
Glenna, L., Ader, D., Bauchspies, W., Traoré, A., & Agboh-Noameshi, R. A. (2012). The Efficacy of a Program Promoting Rice Self-Sufficiency in Ghana	5	Gender

during a Period of Neoliberalism. Rural sociology, 77(4), 520-546.		
Hampshire, K., Casiday, R., Kilpatrick, K., & Panter-Brick, C. (2009). The social context of childcare practices and child malnutrition in Niger's recent food crisis. *Disasters*, *33*(1), 132-151.	2	Social networks; Gender
Iruonagbe, T. C. (2011). Gender equity and food security: lessons from Ozalla community, Edo State, Nigeria. *Gender and Behaviour*, *9*(1), 3543-3565.	5	Gender
Kansanga, M., Andersen, P., Kpienbaareh, D., Mason-Renton, S., Atuoye, K., Sano, Y., ... & Luginaah, I. (2019). Traditional agriculture in transition: examining the impacts of agricultural modernization on smallholder farming in Ghana under the new Green Revolution. *International Journal of Sustainable Development & World Ecology*, *26*(1), 11-24.	5	Social networks
Koopman, J. E. (2009). Globalization, gender, and poverty in the Senegal River Valley. Feminist Economics, 15(3), 253-285.	5	Gender
Kuusaana, E. D., & Eledi, J. A. (2015, December). As the city grows, where do the farmers go? Understanding Peri-urbanization and food systems in Ghana-Evidence from the Tamale Metropolis. In *Urban Forum* (Vol. 26,	5	Institutional engagement

No. 4, pp. 443-465). Springer Netherlands.		
Kuwornu, J. K., Osei, E., Osei-Asare, Y. B., & Porgo, M. (2018). Off-farm work and food security status of farming households in Ghana. Development in practice, 28(6), 724-740.	4	Gender; Education
Maconachie, R. (2008). New agricultural frontiers in post-conflict Sierra Leone? Exploring institutional challenges for wetland management in the Eastern Province. The Journal of Modern African Studies, 235-266.	5	Institutional engagement
Mariwah, S., Evans, R., & Antwi, K. B. (2019). Gendered and generational tensions in increased land commercialisation: Rural livelihood diversification, changing land use, and food security in Ghana's Brong-Ahafo region. *Geo: Geography and Environment*, *6*(1), e00073.	5	Gender
Nanama, S., & Frongillo, E. A. (2012). Altered social cohesion and adverse psychological experiences with chronic food insecurity in the non-market economy and complex households of Burkina Faso. *Social science & medicine*, *74*(3), 444-451.	5	Social networks; Household dynamic
Naughton, C. C., Deubel, T. F., & Mihelcic, J. R. (2017). Household food security, economic empowerment, and the social capital of women's shea butter production in Mali. *Food Security*, *9*(4), 773-784.	5	Gender; Social networks

Obayelu, O. A., & Onasanya, O. A. (2016). Maize biodiversity and food security status of rural households in the derived Guinea savannah of Oyo state, Nigeria. *Agriculturae Conspectus Scientificus*, *81*(4), 241-250.	1	Education
Olawuyi, S. O. (2019). Building resilience against food insecurity through social networks. International Journal of Social Economics.	5	Social networks
Omotayo, A. O., Ogunniyi, A. I., Tchereni, B. H., & Nkonki-Mandleni, B. (2018). Understanding the link between households' poverty and food security in South West Nigeria. The Journal of Developing Areas, 52(3), 27-38.	1	Household dynamic; Education
Poole, N., Audia, C., Kaboret, B., & Kent, R. (2016). Tree products, food security and livelihoods: a household study of Burkina Faso. Environmental Conservation, 43(4), 359-367.	5	Household dynamic; Gender
Rivers III, L., Sanga, U., Sidibe, A., Wood, A., Paudel, R., Marquart-Pyatt, S. T., ... & Liverpool-Tasie, S. (2018). Mental models of food security in rural Mali. *Environment Systems and Decisions*, *38*(1), 33-51.	5	Household dynamic; Gender
Rogé, P., Diarisso, T., Diallo, F., Boiré, Y., Goïta, D., Peter, B., ... & Snapp, S. (2017). Perennial grain crops in the West Soudanian Savanna of Mali:	5	Gender

perspectives from agroecology and gendered spaces. *International Journal of Agricultural Sustainability*, *15*(5), 555-574.		
Sidibé, A., Totin, E., Thompson-Hall, M., Traoré, O. T., Traoré, P. C. S., & Olabisi, L. S. (2018). Multi-scale governance in agriculture systems: Interplay between national and local institutions around the production dimension of food security in Mali. NJAS-Wageningen Journal of Life Sciences, 84, 94-102.	4	Social networks; Institutional engagement
Temudo, M. P. (2011). Planting knowledge, harvesting agro-biodiversity: a case study of Southern Guinea-Bissau rice farming. Human Ecology, 39(3), 309-321.	3	Gender
Tougiani, A., Guero, C., & Rinaudo, T. (2009). Community mobilisation for improved livelihoods through tree crop management in Niger. GeoJournal, 74(5), 377.	4	Social networks; Gender
West, C., Somé, A., & Nebié, E. (2014). Famines are a thing of the past: Food security trends in Northern Burkina Faso. *Human organization*, *73*(4), 340-350.	5	Gender
Yaro, J. A., Teye, J. K., & Torvikey, G. D. (2017). Agricultural commercialisation models, agrarian dynamics and local development in Ghana. *The*	2	Gender

Journal of Peasant Studies, *44*(3), 538-554.		
Yekinni, O. T. (2010). Women's Participation in Development Programs and Food Security Status. Journal of Agricultural & Food Information, 11(1), 28-35.	5	Gender; Institutional engagement
Yiridoe, E. K., & Anchirinah, V. M. (2005). Garden production systems and food security in Ghana: Characteristics of traditional knowledge and management systems. *Renewable agriculture and food systems*, 168-180.	5	Gender

Systems of Meaning:

Citation	**Level of Engagement**	**Subthemes**
Beauchamp, E., Abdella, J., Fisher, S., McPeak, J., Patnaik, H., Koulibaly, P., ... & Deme, Y. (2019). Resilience from the ground up: how are local resilience perceptions and global frameworks aligned?. Disasters, 43, S295-S317.	5	Value of local knowledge
Boedecker, J., Termote, C., Assogbadjo, A. E., Van Damme, P., & Lachat, C. (2014). Dietary contribution of Wild Edible Plants to women's diets in the buffer zone around the Lama forest, Benin–an underutilized potential. *Food Security*, *6*(6), 833-849.	3	Value of local knowledge; Local perceptions
Fouladbash, L., & Currie, W. S. (2015). Agroforestry in Liberia: household practices, perceptions and livelihood benefits. Agroforestry Systems, 89(2), 247-266.	5	Local perceptions
Hesselberg, J., & Yaro, J. A. (2006). An assessment of the extent and causes of food insecurity in northern	5	Local perceptions

Ghana using a livelihood vulnerability framework. GeoJournal, 67(1), 41-55.		
Iruonagbe, T. C. (2011). Gender equity and food security: lessons from Ozalla community, Edo State, Nigeria. *Gender and Behaviour*, *9*(1), 3543-3565.	3	Value of local knowledge
Kansanga, M., Andersen, P., Kpienbaareh, D., Mason-Renton, S., Atuoye, K., Sano, Y., ... & Luginaah, I. (2019). Traditional agriculture in transition: examining the impacts of agricultural modernization on smallholder farming in Ghana under the new Green Revolution. *International Journal of Sustainable Development & World Ecology*, *26*(1), 11-24.	5	Local perceptions
Kiba, D. I., Hgaza, V. K., Aighewi, B., Aké, S., Barjolle, D., Bernet, T., ... & Ouattara, F. Y. (2020). A Transdisciplinary Approach for the Development of Sustainable Yam (Dioscorea sp.) Production in West Africa. *Sustainability*, *12*(10), 4016.	5	Value of local knowledge; Local perceptions
Kpienbaareh, D., & Luginaah, I. (2019). After the flames then what? exploring the linkages between wildfires and household food security in the northern Savannah of Ghana. International Journal of Sustainable Development & World Ecology, 26(7), 612-624.	5	Local perceptions
Kuusaana, E. D., & Eledi, J. A. (2015, December). As the city grows, where do the farmers go? Understanding Peri-urbanization and food systems in Ghana-Evidence from the Tamale Metropolis. In *Urban Forum* (Vol. 26, No. 4, pp. 443-465). Springer Netherlands.	4	Value of local knowledge; Local perceptions
Muller, J., & Almedom, A. M. (2008). What is "famine food"? Distinguishing between traditional	5	Value of local knowledge; Local perceptions

vegetables and special foods for times of hunger/scarcity (Boumba, Niger). *Human Ecology*, *36*(4), 599-607.		
Naughton, C. C., Deubel, T. F., & Mihelcic, J. R. (2017). Household food security, economic empowerment, and the social capital of women's shea butter production in Mali. *Food Security*, *9*(4), 773-784.	5	Value of local knowledge; Local perceptions
Nero, B. F., Kwapong, N. A., Jatta, R., & Fatunbi, O. (2018). Tree species diversity and socioeconomic perspectives of the urban (food) forest of Accra, Ghana. *Sustainability*, *10*(10), 3417.	4	Local perceptions
Peeters, L. E., & Maxwell, D. G. (2011). Characteristics and strategies favouring sustained food access during Guinea's food-price crisis. Development in Practice, 21(4-5), 613-628.	3	Local perceptions
Rivers III, L., Sanga, U., Sidibe, A., Wood, A., Paudel, R., Marquart-Pyatt, S. T., ... & Liverpool-Tasie, S. (2018). Mental models of food security in rural Mali. *Environment Systems and Decisions*, *38*(1), 33-51.	4	Local perceptions
Temudo, M. P. (2011). Planting knowledge, harvesting agro-biodiversity: a case study of Southern Guinea-Bissau rice farming. Human Ecology, 39(3), 309-321.	5	Value of local knowledge; Local perceptions
Towns, A. M., Potter, D., & Idrissa, S. (2013). Cultivated, caught, and collected: defining culturally appropriate foods in Tallé, Niger. *Development in Practice*, *23*(2), 169-183.	5	Value of local knowledge; Local perceptions
West, C., Somé, A., & Nebié, E. (2014). Famines are a thing of the past: Food security trends in Northern Burkina Faso. *Human organization*, *73*(4), 340-350.	4	Value of local knowledge; Local perceptions

REFERENCES CITED

Addison, M., Mujawamariya, G., & Bam, R. (2020). Gender considerations in development and utilisation of technological innovations: evidence from Ghana. Development in Practice, 30(1), 15-26.

Adeniyi, D. A., & Dinbabo, M. F. (2020). Efficiency, food security and differentiation in small- scale irrigation agriculture: Evidence from north west Nigeria. Cogent Social Sciences, 6(1)

Adesoye, O. P., & Adepoju, A. O. (2020). Food insecurity status of the working poor households in south west Nigeria. International Journal of Social Economics.

Adigoun-Akotegnon, F. A., Adoukonou-Sagbadja, H., Fadinan, C., Tchougourou, A., Agassounon- Tchibozo, M., & Ahanhanzo, C. (2019). Diversity, distribution and ethnobotanical importance of cultivated and wild African trifoliate yam [Dioscorea dumetorum (Kunth) Pax] in Benin. Genetic Resources and Crop Evolution, 66(3), 659-683.

Ado, A. M., Savadogo, P., & Abdoul-Azize, H. T. (2019). Livelihood strategies and household resilience to food insecurity: insight from a farming community in Aguie district of Niger. Agriculture and Human Values, 36(4), 747-761.

Adonteng-Kissi, O. (2017). Poverty and mine's compensation package: Experiences of local farmers in Prestea mining community. Resources Policy, 52, 226-234.

Adoukonou-Sagbadja, H., Dansi, A., Vodouhè, R., & Akpagana, K. (2006). Indigenous knowledge and traditional conservation of fonio millet (Digitaria exilis, Digitaria iburua) in Togo. Biodiversity & Conservation, 15(8), 2379-2395.

Ahenkan, A., & Boon, E. (2011). Improving nutrition and health through non-timber forest products in Ghana. Journal of health, population, and nutrition, 29(2), 141.

Ahn, J., Briers, G., Kibriya, S., & Price, E. (2020). Case studies of female-headed farms and households in Liberia: a comparative analysis of Grand Bassa, Lofa, and Nimba counties. The Journal of Agricultural Education and Extension, 26(1), 19-35.

Ajaero, C. K. (2017). A gender perspective on the impact of flood on the food security of households in rural communities of Anambra state, Nigeria. Food Security, 9(4), 685-695.

Ajao, A. O., & Ogunniyi, L. T. (2011). Farmers' strategies for adapting to climate change in Ogbomoso agricultural zone of Oyo state. Agris on-line Papers in Economics and Informatics, 3(665-2016-44832), 3-13.

Akerele, D., & Shittu, A. M. (2017). Can food production diversity influence farm households' dietary diversity? An appraisal from two-dimensional food diversity measures. International Journal of Social Economics.

Akuffo, A. S., & Quagrainie, K. K. (2019). Assessment of household food security in fish farming communities in Ghana. Sustainability, 11(10), 2807.

Akukwe, T. I., Oluoko-Odingo, A. A., & Krhoda, G. O. (2020). Do floods affect food security? A before-and-after comparative study of flood-affected households' food security status in South-Eastern Nigeria. Bulletin of Geography. Socio-economic Series, 47(47), 115-131.

Aletor, O., Oboh, G., & Ojo, S. F. (2013). Antinutrient content, vitamin constituents and antioxidant properties in some value-added Nigerian traditional snacks. WIT Transactions on Ecology and the Environment, 170, 209-220.

Alexander Nuetah, J., Zuo, T., & Xian, X. (2011). Agricultural export subsidies and domestic support reform under the WTO system: What does it mean for welfare in West Africa?. The World Economy, 34(12), 2044-2062.

Allen, A., & Apsan Frediani, A. (2013). Farmers, not gardeners: The making of environmentally just spaces in Accra. City, 17(3), 365-381.

Alobo, S., & Bignebat, C. (2017). Patterns and determinants of household income diversification in rural Senegal and Kenya. Journal of Poverty Alleviation and International Development, 8(1), 93-126.

Alonso, E. B., Cockx, L., & Swinnen, J. (2018). Culture and food security. *Global food security*, *17*, 113-127.

Alpha, A., & Fouilleux, E. (2018). How to diagnose institutional conditions conducive to inter-sectoral food security policies? The example of Burkina Faso. NJAS-Wageningen Journal of Life Sciences, 84, 114-122.

Aluko, Y. A. (2016). Rural women's Indigenous knowledge of the nutritional and medicinal use of vegetables in southwest Nigeria. Journal of Social Sciences, 46(2), 98-106.

Anderman, T. L., Remans, R., Wood, S. A., DeRosa, K., & DeFries, R. S. (2014). Synergies and tradeoffs between cash crop production and food security: a case study in rural Ghana. Food security, 6(4), 541-554.

Arhin, A. (2016). Advancing post-2015 Sustainable Development Goals in a changing development landscape: Challenges of NGOs in Ghana. Development in practice, 26(5), 555-568.

Arku, F. S. (2013). Local creativity for adapting to climate change among rural farmers in the semi-arid region of Ghana. International Journal of Climate Change Strategies and Managem

Arzoaquoi, S. K., Essuman, E. E., Gbagbo, F. Y., Tenkorang, E. Y., Soyiri, I., & Laar, A. K. (2015). Motivations for food prohibitions during pregnancy and their enforcement mechanisms in a rural Ghanaian district. *Journal of ethnobiology and ethnomedicine*, *11*(1), 1-9.

Asante, B. O., Villano, R. A., Patrick, I. W., & Battese, G. E. (2018). Determinants of farm diversification in integrated crop-livestock farming systems in Ghana. Renewable Agriculture and Food Systems, 33(2), 131.

Ashe, M. O. (2019). International agencies and the quest for food security in Nigeria, 1970- 2015. African Journal of Peace and Conflict Studies, 251-274.

Asitik, A. J., & Abu, B. M. (2020). Women empowerment in agriculture and food security in Savannah Accelerated Development Authority zone of Ghana. African Journal of Economic and Management Studies.

Assembly, G. (2015). Sustainable development goals. *SDGs Transform Our World*, *2030*.

Atuoye, K. N., & Luginaah, I. (2017). Food as a social determinant of mental health among household heads in the Upper West Region of Ghana. Social science & medicine, 180, 170-180.

Atuoye, K. N., Kuuire, V. Z., Kangmennaang, J., Antabe, R., & Luginaah, I. (2017). Residential remittances and food security in the Upper West Region of Ghana. International Migration, 55(4), 18-34.

Ayerakwa, H. (2018). Urban food security and multi-spatial livelihoods in Ghana's medium sized cities: does food transfer matter?. International Development Planning Review, 40(4), 421-443.

Babalola, J. B., Oni, A., Atanda, A., & Oyejola-Oshodi, B. O. (2009). Poverty alleviation in Nigeria: lessons from socioeconomic thoughts of the Yoruba. International Social Science Journal, 60(197-198), 403-410.

Babatunde, R. O., Omotesho, O. A., Olorunsanya, E. O., & Owotoki, G. M. (2008). Determinants of vulnerability to food insecurity: A gender based analysis of farming households in Nigeria. Indian Journal of Agricultural Economics, 63(902-2016-67954).

Banerjee, A., Duflo, E., Goldberg, N., Karlan, D., Osei, R., Parienté, W., ... & Udry, C. (2015). A multifaceted program causes lasting progress for the very poor: Evidence from six countries. Science, 348(6236).

Banson, K. E., Nguyen, N. C., & Bosch, O. J. (2018). A systems thinking approach to the structure, conduct and performance of the agricultural sector in Ghana. Systems Research and Behavioral Science, 35(1), 39-57.

Barad, R., Fletcher, E. K., & Hillbruner, C. (2020). Leveraging existing household survey data to map livelihoods in Nigeria. World Development, 126, 104727.

Beauchamp, E., Abdella, J., Fisher, S., McPeak, J., Patnaik, H., Koulibaly, P., ... & Deme, Y. (2019). Resilience from the ground up: how are local resilience perceptions and global frameworks aligned?. Disasters, 43, S295-S317.

Beckford, C., & Barker, D. (2007). The role and value of local knowledge in Jamaican agriculture: adaptation and change in small-scale farming. Geographical Journal, 173(2), 118-128.

Bell, P., Hattey, J., & Dicks, M. (2013). A Model for Service Abroad Courses: Agricultural Development in Sierra Leone. NACTA Journal, 57(3a), 56.

Béné, C., Evans, L., Mills, D., Ovie, S., Raji, A., Tafida, A., ... & Andrew, N. (2011). Testing resilience thinking in a poverty context: experience from the Niger River basin. Global Environmental Change, 21(4), 1173-1184.

Bernholt, H., Kehlenbeck, K., Gebauer, J., & Buerkert, A. (2009). Plant species richness and diversity in urban and peri-urban gardens of Niamey, Niger. Agroforestry Systems, 77(3), 159

Binet, T., Failler, P., & Thorpe, A. (2012). Migration of Senegalese fishers: a case for regional approach to management. Maritime Studies, 11(1), 1.

Binns, T., & Bateman, J. (2017). Rural livelihoods and food security: long-term insights from Sierra Leone's Eastern Province. Geographical Research, 55(2), 156-165.

Boedecker, J., Termote, C., Assogbadjo, A. E., Van Damme, P., & Lachat, C. (2014). Dietary contribution of Wild Edible Plants to women's diets in the buffer zone around the Lama forest, Benin–an underutilized potential. Food Security, 6(6), 833-849.

Brondeau, F. (2018). The Office du Niger: an Agropole project for food security in Mali?. Cybergeo: European Journal of Geography.

Butt, T. A., McCarl, B. A., Angerer, J., Dyke, P. T., & Stuth, J. W. (2005). The economic and food security implications of climate change in Mali. Climatic change, 68(3), 355-378.

Camfield, L., Crivello, G., & Woodhead, M. (2009). Wellbeing research in developing countries: Reviewing the role of qualitative methods. *Social Indicators Research*, *90*(1), 5-31.

Chadare, F. J., Fogny, N. F., Madode, Y. E., Ayosso, J. O. G., Honfo, S. H., Kayodé, F. P. P., ... & Hounhouigan, D. J. (2018). Local agro-ecological condition-based food resources to promote infant food security: a case study from Benin. Food Security, 10(4), 1013-1031.

Chagomoka, T., Drescher, A., Glaser, R., Marschner, B., Schlesinger, J., & Nyandoro, G. (2015). Contribution of urban and periurban agriculture to household food and nutrition security along the urban–rural continuum in Ouagadougou, Burkina Faso. Renewable Agriculture and Food Systems, 32(1), 5-20.

Chagomoka, T., Drescher, A., Glaser, R., Marschner, B., Schlesinger, J., Abizari, A. R., ... & Nyandoro, G. (2018). Urban and peri-urban agriculture and its implication on food and nutrition insecurity in northern Ghana: a socio-spatial analysis along the urban–rural continuum. Population and Environment, 40(1), 27-46.

Chambers, R. (1994). The origins and practice of participatory rural appraisal. *World development*, *22*(7), 953-969.

Charlton, K. E., Russell, J., Gorman, E., Hanich, Q., Delisle, A., Campbell, B., & Bell, J. (2016). Fish, food security and health in Pacific Island countries and territories: a systematic literature review. BMC Public Health, 16(1), 1-26.

Chaudhury, A. S., Thornton, T. F., Helfgott, A., Ventresca, M. J., & Sova, C. (2017). Ties that bind: Local networks, communities and adaptive capacity in rural Ghana. Journal of Rural Studies, 53, 214-228.

Cidro, J., Adekunle, B., Peters, E., & Martens, T. (2015). Beyond food security: Understanding access to cultural food for urban Indigenous people in Winnipeg as Indigenous food sovereignty. *Canadian Journal of Urban Research*, *24*(1), 24-43.

Coker, A. A. A., Akogun, E. O., Adebayo, C. O., Mohammed, S., Nwojo, M., Sanusi, H., & Jimoh, H. O. (2017). Gender differentials among subsistence rice farmers and willingness to undertake agribusiness in Africa: evidence and Issues from Nigeria. African Development Review, 29(S2), 198-212.

Colby, B. N. (2009). Is A Measure of Cultural Well-being Possible Or Desirable. In G. Mathews & C. Izquierdo (Eds.), *Pursuits of Happiness: Well-Being in Anthropological Perspective*. New York, NY: Berghahn.

Comas, J., Connor, D., Isselmou, M. E. M., Mateos, L., & Gómez-Macpherson, H. (2012). Why as small-scale irrigation not responded to expectations with traditional subsistence farmers along the Senegal River in Mauritania?. Agricultural Systems, 110, 152-161.

Cooper, M., Brown, M. E., Azzarri, C., & Meinzen-Dick, R. (2019). Hunger, nutrition, and precipitation: evidence from Ghana and Bangladesh. Population and Environment, 41(2), 151-208.

Cramer, L., Förch, W., Mutie, I., & Thornton, P. K. (2016). Connecting women, connecting men: how communities and organizations interact to strengthen adaptive capacity and food security in the face of climate change. Gender, Technology and Development, 20(2), 169- 199.

Craveiro, I., Alves, D., Amado, M., Santos, Z., Fortes, A. T., Delgado, A. P., ... & Gonçalves, L. (2016). Determinants, health problems, and food insecurity in urban areas of the largest city in Cape Verde. International journal of environmental research and public health, 13(11), 1155.

Crookston, B. T., Gray, B., Gash, M., Aleotti, V., Payne, H. E., & Galbraith, N. (2018). How Do You Know 'Resilience'When You See It? Characteristics of Self-perceived Household Resilience among Rural Households in Burkina Faso. Journal of International Development, 30(6), 917-933.

Dansi, A., Adoukonou-Sagbadja, H., & Vodouhe, R. (2010). Diversity, conservation and related wild species of Fonio millet (Digitaria spp.) in the northwest of Benin. Genetic Resources and Crop Evolution, 57(6), 827-839.

Dedehouanou, S. F., & McPeak, J. (2020). Diversify more or less? Household income generation strategies and food security in rural Nigeria. The Journal of Development Studies, 56(3), 560-577.

Delvaux, P. A. G., & y Paloma, S. G. (2018). Access to common resources and food security: Evidence from National Surveys in Nigeria. Food security, 10(1), 121-140.

Diallo, A., Donkor, E., & Owusu, V. (2020). Climate change adaptation strategies, productivity and sustainable food security in southern Mali. Climatic Change, 1-19.

Diener, E., & Suh, E. M. (Eds.). (2000). *Culture and Subjective Well-being*. Massachusetts Institute of Technology.

Doudou, M. H., Ouedraogo, O., Ouaro, B., Bidault, N., & Reinhardt, K. (2018). Mapping nutrition interventions, a key analytical tool for informing the multisectoral planning process: example from Burkina Faso. Food and nutrition bulletin, 39(3), 449-464.

Duku, C., Zwart, S. J., van Bussel, L. G., & Hein, L. (2018). Quantifying trade-offs between future yield levels, food availability and forest and woodland conservation in Benin. Science of the total environment, 610, 1581-1589.

Egbendewe, A. Y., Lokonon, B. O. K., Atewemba, C., & Coulibaly, N. (2017). Can intra-regional food trade increase food availability in the context of global climatic change in West Africa?. Climatic Change, 145(1), 101-116.

Ehiakpor, D. S., Danso-Abbeam, G., Dagunga, G., & Ayambila, S. N. (2019). Impact of Zai technology on farmers' welfare: Evidence from northern Ghana. Technology in Society, 59, 101189.

Emaziye, P. O. (2013). Food security index and socio-economic effects of climate change on rural farming households in Delta State, Nigeria. Asian Journal of Agriculture and Rural Development, 3(393-2016-23976), 193-198

Etongo, D., Djenontin, I. N. S., Kanninen, M., & Fobissie, K. (2015). Smallholders' tree planting activity in the ziro province, southern Burkina Faso: Impacts on livelihood and policy implications. Forests, 6(8), 2655-2677.

Etongo, D., Epule, T. E., Djenontin, I. N. S., & Kanninen, M. (2018, August). Land management in rural Burkina Faso: the role of socio-cultural and institutional factors. In Natural resources forum (Vol. 42, No. 3, pp. 201-213). Oxford, UK: Blackwell Publishing Ltd.

Favretto, N., Stringer, L. C., & Dougill, A. J. (2014). Unpacking livelihood challenges and opportunities in energy crop cultivation: perspectives on Jatropha curcas projects in Mali. The Geographical Journal, 180(4), 365-376.

Fawole, O. P., & Oladele, O. I. (2007). Sustainable food crop production through multiple cropping patterns among farmers in South Western Nigeria. Journal of Human Ecology, 21(4), 245-2

Faye, M. D., Weber, J. C., Mounkoro, B., & Dakouo, J. M. (2010). Contribution of parkland trees to farmers' livelihoods: a case study from Mali. Development in Practice, 20(3), 428-434.

Fernandes, M., Folson, G., Aurino, E., & Gelli, A. (2017). A free lunch or a walk back home? The school food environment and dietary behaviours among children and adolescents in Ghana. Food Security, 9(5), 1073-1090.

Fiamohe, R., Alia, D. Y., Bamba, I., Diagne, A., & Amovin-Assagba, E. (2015). Transmission of rice prices from Thailand into West African markets: The case of Benin, Mali, and Senegal. Journal of African Business, 16(1-2), 128-143.

Fouladbash, L., & Currie, W. S. (2015). Agroforestry in Liberia: household practices, perceptions and livelihood benefits. Agroforestry Systems, 89(2), 247-266.

Fraser, E. D., Dougill, A. J., Hubacek, K., Quinn, C. H., Sendzimir, J., & Termansen, M. (2011). Assessing vulnerability to climate change in dryland livelihood systems: conceptual challenges and interdisciplinary solutions. *Ecology and Society*, *16*(3).

Gajigo, O., & Saine, A. (2011). The effects of government policies on cereal consumption pattern change in the Gambia. Review of African Political Economy, 38(130), 517-536.

Gatete, C., & Dabat, M. H. (2017). From the fuel versus food controversy to the institutional vacuum in biofuel policies: evidence from West African countries. Energy, Sustainability and Society, 7(1), 1-16.

General FAQs. (n.d.). Retrieved April 12, 2021, from https://www.un.org/en/food-systems-summit/frequently-asked-questions

Glenna, L., Ader, D., Bauchspies, W., Traoré, A., & Agboh-Noameshi, R. A. (2012). The Efficacy of a Program Promoting Rice Self-Sufficiency in Ghana during a Period of Neoliberalism. Rural sociology, 77(4), 520-546.

Glew, R. S., Amoako-Atta, B., Ankar-Brewoo, G., Presley, J. M., Chang, Y. C., Chuang, L. T., ... & Glew, R. H. (2010). An indigenous plant food used by lactating mothers in West Africa: The nutrient composition of the leaves of Kigelia africana in Ghana. Ecology of food and nutrition, 49(1), 72-83.

Goody, J. (1982). *Cooking, Cuisine and Class: A study in comparative sociology*.

Hadley, C., Weaver, L. J., Tesema, F., & Tessema, F. (2019). Do people agree on what foods are prestigious? Evidence of a single, shared cultural model of food in urban Ethiopia and rural Brazil. *Ecology of food and nutrition*, *58*(2), 93-103.

Haider, H., Smale, M., & Theriault, V. (2018). Intensification and intrahousehold decisions: Fertilizer adoption in Burkina Faso. World development, 105, 310-320.

Hampshire, K., Casiday, R., Kilpatrick, K., & Panter-Brick, C. (2009). The social context of childcare practices and child malnutrition in Niger's recent food crisis. Disasters, 33(1), 132-151.

Haruna, O. I., Asogwa, V. C., & Ezhim, I. A. (2019). Challenges and Enhancement of Youth Participation in Agricultural Education for Sustainable Food Security. African Educational Research Journal, 7(4), 174-182.

Hausermann, H. (2018). “Ghana must progress, but we are really suffering”: Bui Dam, antipolitics development, and the livelihood implications for rural people. Society & Natural Resources, 31(6), 633-648.

Havik, P. J., Monteiro, F., Catarino, S., Correia, A. M., Catarino, L., & Romeiras, M. M. (2018). Agro-economic transitions in Guinea-Bissau (West Africa): Historical trends and current insights. Sustainability, 10(10), 3408.

Hesselberg, J., & Yaro, J. A. (2006). An assessment of the extent and causes of food insecurity in northern Ghana using a livelihood vulnerability framework. GeoJournal, 67(1), 41-55.

Heucher, A. (2019, September). Evolving Order? Inter-Organizational Relations in the Organizational Field of Food Security Governance in Côte d’Ivoire. In Forum for Development Studies (Vol. 46, No. 3, pp. 501-526). Routledge.

Hussein, K. and J. Nelson. 1999. Sustainable Livelihoods and Livelihood Diversification. IDS Working Paper 69. Brighton: Institute for Development Studies.

Iacoella, F., & Tirivayi, N. (2020). Child nutrition during conflict and displacement: Evidence from areas affected by the Boko Haram insurgency in Nigeria. Public Health, 183, 132. doi:http://dx.doi.org.libproxy.uoregon.edu/10.1016/j.puhe.2020.03.012

Igbokwe-Ibeto, C. J. (2019). Climate change, food security and sustainable human development in Nigeria: A critical reflection. Africa’s Public Service Delivery & Performance Review, 7(1), 9.

Ike, C. U., Jacobs, P. T., & Kelly, C. (2017). A multidimensional approach to measuring household food security in Taraba State, Nigeria: comparing key indicators. Development in Practice, 27(2), 234-246.

Ikudayisi, A., Okoruwa, V., & Omonona, B. (2019). From the lens of food accessibility and dietary quality: Gaining insights from urban food security in Nigeria. Outlook on Agriculture, 48(4), 336-343.

Iruonagbe, T. C. (2011). Gender equity and food security: lessons from Ozalla community, Edo State, Nigeria. Gender and Behaviour, 9(1), 3543-3565.

Islam, M. T., & Nursey-Bray, M. (2017). Adaptation to climate change in agriculture in Bangladesh: The role of formal institutions. Journal of environmental management, 200, 347-358.

Jackson, M. (1989). *Paths toward a clearing: Radical empiricism and ethnographic inquiry*. Bloomington: Indiana Univ. Press.

Jackson, P. (2010). Food stories: consumption in an age of anxiety. *Cultural geographies*, *17*(2), 147-165.

Jaron, D., & Galal, O. (2009). Food security and population health and well being. Asia Pacific journal of clinical nutrition, 18(4), 684.

Johnson, J.,Samuel Wai. (2010). Post-conflict food security and peacebuilding in Liberia. Liberian Studies Journal, 35(2), 28-54.

Jones, A. D., Ngure, F. M., Pelto, G., & Young, S. L. (2013). What are we assessing when we measure food security? A compendium and review of current metrics Advances in Nutrition, 4(5), 481-505..pdf

Kansanga, M. M., & Luginaah, I. (2019). Agrarian livelihoods under siege: Carbon forestry, tenure constraints and the rise of capitalist forest enclosures in Ghana. World Development, 113, 131-142.

Kansanga, M., Andersen, P., Kpienbaareh, D., Mason-Renton, S., Atuoye, K., Sano, Y., ... & Luginaah, I. (2019). Traditional agriculture in transition: examining the impacts of agricultural modernization on smallholder farming in Ghana under the new Green Revolution. International Journal of Sustainable Development & World Ecology, 26(1), 11-24.

Kanu, I. M. (2020). Analysis of cocoa farmer's poverty status in Abia State, Nigeria: The Foster, Greer and Thorbeck (FGT) decomposable poverty measure. *International Journal of Agriculture Environment and Food Sciences*, *4*(2), 188-199.

Karg, H., Drechsel, P., Akoto-Danso, E. K., Glaser, R., Nyarko, G., & Buerkert, A. (2016). Foodsheds and city region food systems in two West African cities. Sustainability, 8(12), 1175.

Karimli, L., Bose, B., & Kagotho, N. (2020). Integrated Graduation Program and its Effect on Women and Household Economic Well-being: Findings from a Randomised Controlled Trial in Burkina Faso. The Journal of Development Studies, 56(7), 1277-1294.

Kassam, L., & Dorward, A. (2017). A comparative assessment of the poverty impacts of pond and cage aquaculture in Ghana. Aquaculture, 470, 110-122.

Kc, K. B., Legwegoh, A. F., Therien, A., Fraser, E. D., & Antwi-Agyei, P. (2018). Food price, food security and dietary diversity: A comparative study of urban Cameroon and Ghana. Journal of International Development, 30(1), 42-60.

Kiba, D. I., Hgaza, V. K., Aighewi, B., Aké, S., Barjolle, D., Bernet, T., ... & Ouattara, F. Y. (2020). A Transdisciplinary Approach for the Development of Sustainable Yam (Dioscorea sp.) production in West Africa. Sustainability, 12(10), 4016."

Kimenyi, M. S., & Kuhlmann, K. (2012). African Union: Challenges and prospects for regional integration in Africa. Whitehead J. Dipl. & Int'l Rel., 13, 7.

Kondo, K., Cacho, O., Fleming, E., Villano, R. A., & Asante, B. O. (2020). Dissemination strategies and the adoption of improved agricultural technologies: The case of improved cassava varieties in Ghana. Technology in Society, 63, 101408.

Koopman, J. E. (2009). Globalization, gender, and poverty in the Senegal River Valley. Feminist Economics, 15(3), 253-285.

Kpienbaareh, D., & Luginaah, I. (2019). After the flames then what? exploring the linkages between wildfires and household food security in the northern Savannah of Ghana. International Journal of Sustainable Development & World Ecology, 26(7), 612-624.

Kuusaana, E. D., & Eledi, J. A. (2015, December). As the city grows, where do the farmers go? Understanding Peri-urbanization and food systems in Ghana-Evidence from the Tamale Metropolis. In Urban Forum (Vol. 26, No. 4, pp. 443-465). Springer Netherlands.

Kuwornu, J. K., Osei, E., Osei-Asare, Y. B., & Porgo, M. (2018). Off-farm work and food security status of farming households in Ghana. Development in practice, 28(6), 724-740.

La Rovere, R., Hiernaux, P., Van Keulen, H., Schiere, J. B., & Szonyi, J. A. (2005). Co-evolutionary scenarios of intensification and privatization of resource use in rural communities of south-western Niger. Agricultural Systems, 83(3), 251-276.

Lam, V. W., Cheung, W. W., Swartz, W., & Sumaila, U. R. (2012). Climate change impacts on fisheries in West Africa: implications for economic, food and nutritional security. African Journal of Marine Science, 34(1), 103-117.

Lawlis, T., Islam, W., & Upton, P. (2018). Achieving the four dimensions of food security for resettled refugees in Australia: A systematic review. *Nutrition & Dietetics*, *75*(2), 182-192.

Lindner, K., Chougourou, D., Ahoton, L., & Richert-Pöggeler, K. R. (2012). Potato production in Benin-its impact on fighting hunger and poverty in West Africa. Journal für Kulturpflanzen, 64(8), 295-305.

Louhichi, K., & y Paloma, S. G. (2014). A farm household model for agri-food policy analysis in developing countries: Application to smallholder farmers in Sierra Leone. Food Policy, 45, 1-13.

Lynch, K., Maconachie, R., Binns, T., Tengbe, P., & Bangura, K. (2013). Meeting the urban challenge? Urban agriculture and food security in post-conflict Freetown, Sierra Leone. Applied Geography, 36, 31-39.

Mabe, F. N., Nashiru, S., Mummuni, E., & Boateng, V. F. (2019). The nexus between land acquisition and household livelihoods in the northern region of Ghana. Land Use Policy, 85, 357-367.

Maconachie, R. (2008). New agricultural frontiers in post-conflict Sierra Leone? Exploring institutional challenges for wetland management in the Eastern Province. The Journal of Modern African Studies, 235-266.

Maconachie, R., Binns, T., & Tengbe, P. (2012). Urban farming associations, youth and food security in post-war Freetown, Sierra Leone. Cities, 29(3), 192-200.

Magnani, S. D., Ancey, V., & Hubert, B. (2019). Dairy policy in Senegal: the need to overcome a technical mindset. The European Journal of Development Research, 31(5), 1227-1245.

Maiga, A. A., Cartmell II, D. D., Edwards, M. C., & Robinson, J. S. (2013). Competencies needed by graduates of agricultural communications in Mali: Implications for developing countries. NACTA Journal, 57(3a), 139.

Manley, J., Gitter, S., & Slavchevska, V. (2013). How effective are cash transfers at improving nutritional status?. *World development*, *48*, 133-155.

Mariwah, S., Evans, R., & Antwi, K. B. (2019). Gendered and generational tensions in increased land commercialisation: Rural livelihood diversification, changing land use, and food security in Ghana's Brong-Ahafo region. Geo: Geography and Environment, 6(1), e00073.

Mathur, H. M. (2019). *Development Anthropology: Putting Culture First*. London: Lexington Books.

Maxwell, D., Vaitla, B., & Coates, J. (2014). How do indicators of household food insecurity measure up? An empirical comparison from Ethiopia. *Food policy*, *47*, 107-116.

McDonald, B. (2010). *Food security*. Cambridge: Polity.

McKune, S. L., & Silva, J. A. (2013). Pastoralists under pressure: double exposure to economic and environmental change in Niger. Journal of development studies, 49(12), 1711-1727.

Mertens, F., Fillion, M., Saint-Charles, J., Mongeau, P., Távora, R., Passos, C. J. S., & Mergler, D. (2015). The role of strong-tie social networks in mediating food security of fish resources by a traditional riverine community in the Brazilian Amazon. *Ecology and Society*, *20*(3).

Mildon, A., Klaas, N., O'Leary, M., & Yiannakis, M. (2015). Can fortification be implemented in rural African communities where micronutrient deficiencies are greatest? Lessons from projects in Malawi, Tanzania, and Senegal. Food and Nutrition Bulletin, 36(1), 3-13.

Mintz, S. (1996). *Tasting Food, Tasting Freedom: Excursions into Eating, Culture and the Past*. Boston Beacon Press.

Molnar, J. J. (2010). Climate change and societal response: Livelihoods, communities, and the environment. *Rural Sociology*, *75*(1), 1-16.

Monteiro, F., Catarino, L., Batista, D., Indjai, B., Duarte, M. C., & Romeiras, M. M. (2017). Cashew as a high agricultural commodity in West Africa: insights towards sustainable production in Guinea-Bissau. Sustainability, 9(9), 1666.

Muller, J., & Almedom, A. M. (2008). What is "famine food"? Distinguishing between traditional vegetables and special foods for times of hunger/scarcity (Boumba, Niger). Human Ecology, 36(4), 599-607.

N'Danikou, S., Vodouhe, R. S., Bellon, M. R., Sidibé, A., & Coulibaly, H. (2017). Foraging is determinant to improve smallholders' food security in rural areas in Mali, West Africa. Sustainability, 9(11), 2074.

Nanama, S., & Frongillo, E. A. (2012). Altered social cohesion and adverse psychological experiences with chronic food insecurity in the non-market economy and complex households of Burkina Faso. Social science & medicine, 74(3), 444-451.

Naughton, C. C., Deubel, T. F., & Mihelcic, J. R. (2017). Household food security, economic empowerment, and the social capital of women's shea butter production in Mali. Food Security, 9(4), 773-784.

Nero, B. F., Kwapong, N. A., Jatta, R., & Fatunbi, O. (2018). Tree species diversity and socioeconomic perspectives of the urban (food) forest of Accra, Ghana. Sustainability, 10(10), 3417.

Nkiru, T. M. (2008). Risks associated with agricultural product carrying in Nigeria: implication for policy on occupational safety and social well-being. Journal of Human Ecology, 23(4), 355-361.

Nonvide, G. M. A. (2018). Irrigation adoption: A potential avenue for reducing food insecurity among rice farmers in Benin. Water resources and economics, 24, 40-52.

Nwoye, M. (2007). Gender responsive entrepreneurial economy of Nigeria: Enabling women in a disabling environment. Journal of International Women's Studies, 9(1), 167-175.

Obayelu, O. A., & Onasanya, O. A. (2016). Maize biodiversity and food security status of rural households in the derived Guinea savannah of Oyo state, Nigeria. Agriculturae Conspectus Scientificus, 81(4), 241-250.

Obodai, J., Adjei, P. O. W., Hamenoo, S. V. Q., & Abaitey, A. K. A. (2018). Towards household food security in Ghana: assessment of Ghana's expanded forest plantation programme in Asante Akim South District. GeoJournal, 83(2), 365-380.

Odijie, M. (2019). Environmental change and normalization of cash crop systems in Africa: preventing agrarian change in West Africa cocoa. International Journal of Sustainable Development & World Ecology, 26(7), 597-611.

Ofuoku, A. U. (2017). Contributions of Rural-Urban Migrants' Remittances to Farming Household (HH) Food Security in Delta Central Agriculture Zone, Delta State Nigeria. Journal of Agribusiness and Rural Development, 45(3), 655-663.

Ogwumike, F., Ajimuda, S., & Aribatise, A. (2019). Determinants of Household Food Insecurity in Nigeria. Acta Universitatis Danubius. Œconomica, 15(7).

Oladele, A. T., Ofodile, E., Aiyeloja, A. A., & Oworen, U. I. (2016). Economic Evaluation of Wild Forest Spices in Ikot Ekpene, Nigeria. Agriculturae Conspectus Scientificus, 81(4), 213-223.

Olawuyi, S. O. (2019). Building resilience against food insecurity through social networks. International Journal of Social Economics.

Omonona, B. T., Oni, O. A., & Uwagboe, A. O. (2006). Adoption of improved cassava varieties and its welfare impact on rural farming households in Edo State, Nigeria. Journal of agricultural & food information, 7(1), 39-55.

Omotayo, A. O., Ogunniyi, A. I., Tchereni, B. H., & Nkonki-Mandleni, B. (2018). Understanding the link between households' poverty and food security in South West Nigeria. The Journal of Developing Areas, 52(3), 27-38.

Ohna, I., Kaarhus, R., & Kinabo, J. (2012). No meal without ugali? Social significance of food and consumption in a Tanzanian village. *Culture, Agriculture, Food and Environment*, *34*(1), 3-14.

Ouédraogo, D., Kaboré, M., & Kienou, B. (2007). Food Insecurity, Vulnerability, and Poverty in Rural Burkina Faso: Insights from an Approach Based on Energy Intakes. Mondes en développement, (4), 65-84.

Overå, R. (2011, November). Modernisation narratives and small-scale fisheries in Ghana and Zambia. In Forum for Development Studies (Vol. 38, No. 3, pp. 321-343). Routledge.

Oyama, S. (2017). Hunger, poverty and economic differentiation generated by traditional custom in villages in the Sahel, West Africa. Japanese Journal of Human Geography, 69(1), 27-42.

Oyekale, A. S. (2013). Gender role in agriculture, climate change and food security in the Sahel Belt of West Africa: application of Poisson and negative binomial regression. Gender and Behaviour, 11(2), 5499-5511.

Palazzo, A., Vervoort, J. M., Mason-D'Croz, D., Rutting, L., Havlík, P., Islam, S., ... & Zougmore, R. (2017). Linking regional stakeholder scenarios and shared socioeconomic pathways: Quantified West African food and climate futures in a global context. Global Environmental Change, 45, 227-242.

Patel, R. (2009). Food sovereignty. *The journal of peasant studies*, *36*(3), 663-706.

Peeters, L. E., & Maxwell, D. G. (2011). Characteristics and strategies favouring sustained food access during Guinea's food-price crisis. Development in Practice, 21(4-5), 613-628.

Poole, N., Audia, C., Kaboret, B., & Kent, R. (2016). Tree products, food security and livelihoods: a household study of Burkina Faso. Environmental Conservation, 43(4), 359-367.

Popp, J., Oláh, J., Kiss, A., & Lakner, Z. (2019). Food security perspectives in sub-Saharan Africa. Amfiteatru Econ, 21(51), 361-376.

Power, E. M. (2008). Conceptualizing food security for Aboriginal people in Canada. Canadian Journal of Public Health, 99(2), 95-97.

Quaye, W., Frempong, G., Jongerden, J., & Ruivenkamp, G. (2009). Exploring possibilities to enhance food sovereignty within the cowpea production-consumption network in Northern Ghana. Journal of Human Ecology, 28(2), 83-92.

Rademacher-Schulz, C., Schraven, B., & Mahama, E. S. (2014). Time matters: shifting seasonal migration in Northern Ghana in response to rainfall variability and food insecurity. Climate and Development, 6(1), 46-52.

Rader, M., Kirshen, P., Roncoli, C., Hoogenboom, G., & Ouattara, F. (2009). Agricultural risk decision support system for resource-poor farmers in Burkina Faso, West Africa. Journal of Water Resources Planning and Management, 135(5), 323-333.

Ragasa, C., & Chapoto, A. (2017). Limits to Green Revolution in rice in Africa: The case of Ghana. Land use policy, 66, 304-321.

Rao, V., & Walton, M. (2004). *Culture and Public Action*. Stanford, Calif.: Stanford University Press: Stanford Social Sciences.

Richards, A. I. (1939). *Land, Labour and Diet in Northern Rhodesia: An Economic Study of the Bemba Tribe*. Oxford University Press.

Rigolot, C., De Voil, P., Douxchamps, S., Prestwidge, D., Van Wijk, M., Thornton, P. K., ... & Herrero, M. (2017). Interactions between intervention packages, climatic risk, climate change and food security in mixed crop–livestock systems in Burkina Faso. Agricultural Systems, 151, 217-224.

Ritzema, R. S., Frelat, R., Douxchamps, S., Silvestri, S., Rufino, M. C., Herrero, M., ... & Van Wijk, M. T. (2017). Is production intensification likely to make farm households food-adequate? A simple food availability analysis across smallholder farming systems from East and West Africa. Food Security, 9(1), 115-131.

Rivers III, L., Sanga, U., Sidibe, A., Wood, A., Paudel, R., Marquart-Pyatt, S. T., ... & Liverpool-Tasie, S. (2018). Mental models of food security in rural Mali. Environment Systems and Decisions, 38(1), 33-51.

Rogé, P., Diarisso, T., Diallo, F., Boiré, Y., Goïta, D., Peter, B., ... & Snapp, S. (2017). Perennial grain crops in the West Soudanian Savanna of Mali: perspectives from agroecology and gendered spaces. International Journal of Agricultural Sustainability, 15(5), 555-574.

Röling, N. (2010). The impact of agricultural research: evidence from West Africa. Development in practice, 20(8), 959-971.

Rutherford, D. D., Burke, H. M., Cheung, K. K., & Field, S. H. (2016). Impact of an agricultural value chain project on smallholder farmers, households, and children in Liberia. World Development, 83, 70-83.

Saka, L. (2019). BRICS, land grabbing and the crisis of food security in sub-Saharan Africa: an assessment. African Renaissance, 16(Special 2), 33.

Sanchez, A. C., Fandohan, B., Assogbadjo, A. E., & Sinsin, B. (2012). A countrywide multi-ethnic assessment of local communities' perception of climate change in Benin (West Africa). Climate and Development, 4(2), 114-128.

Schech, S., & Haggis, J. (2002). Introduction: Pathways to Culture and Development. In *Development: A cultural studies reader*. Blackwell.

Settle, W., & Garba, M. H. (2011). Sustainable crop production intensification in the Senegal and Niger River basins of francophone West Africa. International journal of agricultural sustainability, 9(1), 171-185.

Shamseer, L., Moher, D., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M.,PRISMA-P Group. (2014). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: Elaboration and explanation. *BMJ: British Medical Journal, 349*. Retrieved May 5, 2020, from www.jstor.org/stable/26517740

Shaw, D. J. (2007). *World food security: A history since 1945*. Basingstoke England: Palgrave Macmillan.

Shepler, S. (2011). The real and symbolic importance of food in war: hunger pains and big men's bellies in Sierra Leone. Africa Today, 58(2), 43-56.

Sidibé, A., Totin, E., Thompson-Hall, M., Traoré, O. T., Traoré, P. C. S., & Olabisi, L. S. (2018). Multi-scale governance in agriculture systems: Interplay between national and local institutions around the production dimension of food security in Mali. NJAS-Wageningen Journal of Life Sciences, 84, 94-102.

Sissoko, M., Smale, M., Castiaux, A., & Theriault, V. (2019). Adoption of New Sorghum Varieties in Mali Through a Participatory Approach. Sustainability, 11(17), 4780.

Sohoulande Djebou, D. C., Price, E., Kibriya, S., & Ahn, J. (2017). Comparative analysis of agricultural assets, incomes and food security of rural households in Ghana, Senegal and Liberia. Agriculture, 7(5), 38.

Stenchly, K., Waongo, A., Schaeper, W., Nyarko, G., & Buerkert, A. (2019). Structural landscape changes in urban and peri-urban agricultural systems of two West African cities and their relations to ecosystem services provided by woody plant communities. Urban Ecosystems, 22(2), 397-408.

Stevano, S., Johnston, D., & Codjoe, E. (2020). The urban food question in the context of inequality and dietary change: A study of schoolchildren in Accra. The Journal of Development Studies, 56(6), 1177-1189.

Stewart, R., Langer, L., Da Silva, N. R., Muchiri, E., Zaranyika, H., Erasmus, Y., ... & de Wet, T. (2015). The Effects of training, innovation and new technology on African smallholder farmers' economic outcomes and food security: a systematic review. Campbell Systematic Reviews, 11(1), 1-224.

Stoll, L. (2014). A short history of wellbeing research. In P. Chen & C. Cooper (Authors), *Wellbeing: A Complete Reference Guide* (Vol. III, pp. 1-19). Wiley-Blackwell.

Styger, E., Aboubacrine, G., Attaher, M. A., & Uphoff, N. (2011). The system of rice intensification as a sustainable agricultural innovation: introducing, adapting and scaling up a system of rice intensification practices in the Timbuktu region of Mali. International Journal of Agricultural Sustainability, 9(1), 67-75.

Sumberg, J., Yeboah, T., Flynn, J., & Anyidoho, N. A. (2017). Young people's perspectives on farming in Ghana: a Q study. Food security, 9(1), 151-161.

Takahashi, K., Mano, Y., & Otsuka, K. (2019). Learning from experts and peer farmers about rice production: Experimental evidence from Cote d'Ivoire. World Development, 122, 157-169.

Tambo, J. A., & Wünscher, T. (2017). Farmer-led innovations and rural household welfare: Evidence from Ghana. Journal of Rural Studies, 55, 263-274.

Tankari, M. R. (2017). Cash crops reduce the welfare of farm households in Senegal. Food Security, 9(5), 1105-1115.

Temudo, M. P. (2011). Planting knowledge, harvesting agro-biodiversity: a case study of Southern Guinea-Bissau rice farming. Human Ecology, 39(3), 309-321.

Temudo, M. P., & Abrantes, M. (2013). Changing policies, shifting livelihoods: The fate of agriculture in Guinea-Bissau. Journal of Agrarian Change, 13(4), 571-589.

Temudo, M. P., & Abrantes, M. (2014). The cashew frontier in Guinea-Bissau, West Africa: changing landscapes and livelihoods. Human ecology, 42(2), 217-230.

Teye, J. K., Yaro, J. A., & Bawakyillenuo, S. (2015). Local farmers' experiences and perceptions of climate change in the Northern Savannah zone of Ghana. International Journal of Climate Change Strategies and Management.

Thorpe, A., Whitmarsh, D., Ndomahina, E., Baio, A., Kemokai, M., & Lebbie, T. (2009). Fisheries and failing states: The case of Sierra Leone. Marine Policy, 33(2), 393-400.

Tougiani, A., Guero, C., & Rinaudo, T. (2009). Community mobilisation for improved livelihoods through tree crop management in Niger. GeoJournal, 74(5), 377.

Towns, A. M., Potter, D., & Idrissa, S. (2013). Cultivated, caught, and collected: defining culturally appropriate foods in Tallé, Niger. Development in Practice, 23(2), 169-183.

Tranchant, J. P., Gelli, A., Bliznashka, L., Diallo, A. S., Sacko, M., Assima, A., ... & Masset, E. (2019). The impact of food assistance on food insecure populations during conflict: Evidence from a quasi-experiment in Mali. World Development, 119, 185-202.

Traore, B., Descheemaeker, K., Van Wijk, M. T., Corbeels, M., Supit, I., & Giller, K. E. (2017). Modelling cereal crops to assess future climate risk for family food self-sufficiency in southern Mali. Field Crops Research, 201, 133-145.

Trefry, A., Parkins, J. R., & Cundill, G. (2014). Culture and food security: a case study of homestead food production in South Africa. *Food security*, *6*(4), 555-565.

Tuholske, C., Andam, K., Blekking, J., Evans, T., & Caylor, K. (2020). Comparing measures of urban food security in Accra, Ghana. Food Security, 1-15.

Uchida, Y., Norasakkunkit, V., & Kitayama, S. (2004). Cultural constructions of happiness: Theory and empirical evidence. *Journal of Happiness Studies, 5*(3), 223-239.

Uduji, J. I., Okolo-Obasi, E. N., & Asongu, S. A. (2019). Corporate social responsibility and the role of rural women in sustainable agricultural development in sub-Saharan Africa: Evidence from the Niger Delta in Nigeria. Sustainable Development, 27(4), 692-703.

Ujoh, F., Igbawua, T., & Ogidi Paul, M. (2019). Suitability mapping for rice cultivation in Benue State, Nigeria using satellite data. Geo-Spatial Information Science, 22(4), 332-344.

Ujunwa, A., Okoyeuzu, C., & Kalu, E. U. (2019). Armed conflict and food security in West Africa: socioeconomic perspective. International Journal of Social Economics.

UNOWA. (n.d.). Retrieved from https://unowa.unmissions.org/

UN FAO. (2002). *The State of Food Insecurity in the World 2001*. Rome

UN FAO. (2021). *The State of Food Security and Nutrition in the World 2021: The World is at a Critical Juncture*.

UN FAO, IFAD, UNICEF, WFP and WHO. 2019. The State of Food Security and Nutrition in the World 2019. Safeguarding against economic slowdowns and downturns. Rome, FAO. License: CC BY-NC-SA 3.0 IGO.

Usman, M., & Nichol, J. (2019). Trends in farmland tree stocks in the agroforestry landscape of northern Nigeria: Reconciling scientific and stakeholder perceptions. Journal of Rural Studies, 66, 87-94.

Vom Brocke, K., Kondombo, C. P., Guillet, M., Kaboré, R., Sidibé, A., Temple, L., & Trouche, G. (2020). Impact of participatory sorghum breeding in Burkina Faso. Agricultural Systems, 180, 102775.

Wada, A. C., Gbabo, A., & Ndarubu, A. A. (2006). Cottage sugar industries as alternatives for meeting Nigeria's domestic sugar demands. Outlook on Agriculture, 35(1), 65-71.

Wanvoeke, J., Venot, J. P., De Fraiture, C., & Zwarteveen, M. (2016). Smallholder drip irrigation in Burkina Faso: the role of development brokers. The Journal of Development Studies, 52(7), 1019-1033.

Weaver, L. J., Meek, D., & Hadley, C. (2014). Exploring the role of culture in the link between mental health and food insecurity: A case study from Brazil. *Annals of Anthropological Practice*, *38*(2), 250-268.

Wedin, A., Lundgren, M., Mushi, C., Suleiman, L., & Gustafsson, J. E. (2013). Food versus fuel: the case of the Makeni community in Sierra Leone. WIT Transactions on Ecology and the Environment, 170, 37-48.

Wellard, K., Rafanomezana, J., Nyirenda, M., Okotel, M., & Subbey, V. (2013). A review of community extension approaches to innovation for improved livelihoods in Ghana, Uganda and Malawi. The Journal of Agricultural Education and Extension, 19(1), 21-35.

West, C., Somé, A., & Nebié, E. (2014). Famines are a thing of the past: Food security trends in Northern Burkina Faso. Human organization, 73(4), 340-350.

World Food Program. (2006) *Food security* (Policy brief 2). Retrieved from http://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf

World Food Summit (Rep.). (1996). Rome: World Food Program.

Yami, M., Vogl, C., & Hausera, M. (2009). Comparing the effectiveness of informal and formal institutions in sustainable common pool resources management in Sub-Saharan Africa.

Yaro, J. A. (2004). Theorizing food insecurity: building a livelihood vulnerability framework for researching food insecurity. Norsk Geografisk Tidsskrift-Norwegian Journal of Geography, 58(1), 23-37

.

Yaro, J. A., Teye, J. K., & Torvikey, G. D. (2017). Agricultural commercialization models, agrarian dynamics and local development in Ghana. The Journal of Peasant Studies, 44(3), 538-554.

Yekinni, O. T. (2010). Women's Participation in Development Programs and Food Security Status. Journal of Agricultural & Food Information, 11(1), 28-35.

Yengoh, G. T., & Armah, F. A. (2015). Effects of large-scale acquisition on food insecurity in Sierra Leone. Sustainability, 7(7), 9505-9539.

Yiridoe, E. K., & Anchirinah, V. M. (2005). Garden production systems and food security in Ghana: Characteristics of traditional knowledge and management systems. Renewable agriculture and food systems, 168-180.

Zereyesus, Y. A., Embaye, W. T., Tsiboe, F., & Amanor-Boadu, V. (2017). Implications of non-farm work to vulnerability to food poverty-recent evidence from Northern Ghana. World Development, 91, 113-124.

Zeweld, W., Van Huylenbroeck, G., Tesfay, G., Azadi, H., & Speelman, S. (2020). Sustainable agricultural practices, environmental risk mitigation and livelihood improvements: Empirical evidence from Northern Ethiopia. Land use policy, 95, 103799.

Zidouemba, P. R., & Gerard, F. (2018). Does Agricultural Productivity Actually Matter for Food Security in a Landlocked Sub-Saharan African Country? The Case of Burkina Faso. Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie, 66(1), 103-142.

Zoundji, G. C., Okry, F., Vodouhê, S. D., & Bentley, J. W. (2018). Towards sustainable vegetable growing with farmer learning videos in Benin. International Journal of Agricultural Sustainability, 16(1), 54-63.