THE EFFECTS OF GENDER INEQUITY ON GLOBAL FOOD INSECURITY

A Dissertation

by

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ABSTRACT

Women's role in agriculture largely went unacknowledged until the 1970s. Since that time, feminist researchers have revealed how female labor in the production of food is critical. Women not only grow, sell, buy, and prepare food, but are also involved in agricultural businesses. This dissertation includes (1) a scoping study identifying research-based literature that addresses the relationship between gender inequity and food insecurity, (2) a cross-sectional, nonexperimental study examining the effects of gender inequity on global food insecurity, and (3) an application piece with strategic teaching recommendations for postsecondary education in the food, agriculture, natural resources, and human (FANH) sciences.

The scoping study revealed a gap in research-based literature addressing a relationship between gender inequity and food insecurity in the disciplines of sociology, health, and agriculture. The cross-sectional, nonexperimental study presented empirical evidence on the relationship between gender inequity and food insecurity across 112 countries. The analyses treated gender inequity as the independent variable and food insecurity as the dependent variable. Findings revealed that countries with higher levels of gender inequity were more food insecure than countries with lower levels of gender inequity. Results also indicated that higher levels of gender inequity are associated with lower levels of basic human needs being met, higher levels of corruption, lower female education, and lower gross domestic product (GDP) per capita. To apply this research, recommendations were made to the FANH sciences postsecondary education.

This dissertation confirmed women's essential role in achieving food security. Gender inequity cannot be viewed as an unassociated factor in regard to food insecurity, but a predictor. In addition, this research builds on previous efforts to study the far-reaching effects of gender inequity on a global scale. More broadly, this research provides empirical results on which experts can base practice and policy decisions. Most importantly, this study treats women as a vital resource to achieving food security and improving holistic development.

DEDICATION

This dissertation is dedicated to strong women all over the world. To the mothers who love selflessly. To the men who are not bystanders. To people who value the lives of others. To my family, my father who demonstrates ethics and integrity, as well as unconditional love and truth, who always prioritizes people and is an excellent listener. To my mother, who is a strong woman, who values life, and who selflessly gives herself to others. This dissertation is also dedicated to my wonderful husband whom I love deeply. I was blessed to marry him halfway through my program. To my husband – you have pursued me with love and kindness to no end. You demonstrate abundant grace and stand by what is right in every situation. You are a man of noble character, integrity, and influence. I am forever thankful to have such an incredible partner in life. You helped me find grit when I was burnt out and continually encourage and support me in every area of life. You know me best. Fully known and fully loved. And finally, to my two daughters whom I endlessly love and adore. My precious girls - I will do my very best to love you both well, to lead by positive example, and to empower and embolden you both as you navigate this world. You are precious gifts given to me by our heavenly Father (Psalm 127:3) and you are both arrows (Psalm 127:4) who will go on to do many great things that will truly change the world (I know this because I've already seen you do it!) Katherine Grace (8) and Harper Hope (23 weeks in utero as I write). "I have told you these things, so that in me you may have peace. In this world you will have trouble. But take heart! I have overcome the world" (John 16:33).

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NOMENCLATURE

BHN	Basic Human Needs
C	Corruption
CPI	Corruption Perceptions Index
GDP	Gross Domestic Product
GFSI	Global Food Security Index
GI	Gender Inequity
FANH	Food, Agriculture, Natural Resources, and Human Sciences
FAO	Food and Agriculture Organization of the United Nations
FE	Female Education
FI	Food Insecurity
SPI	Social Progress Index
TI	Transparency International
USAID	United States Agency for International Development
WHO	World Health Organization

TABLE OF CONTENTS

Page

LIST OF FIGURES

Page

LIST OF TABLES

Page

1. INTRODUCTION

One out of every nine people in the world is undernourished (FAO, 2018; Senauer & Sur, 2001; Pinstrup-Andersen & Cheng, 2007). According to the Food and Agriculture Organization of the United Nations (FAO) and others, evidence indicates a rise in world hunger that has been increasing over the past three years. Food insecurity is an ever-growing issue with the total number of people suffering from undernourishment or chronic food deprivation increasing from "804 million in 2016 to nearly 821 million in 2017" (FAO, IFAD, UNICEF, WFP & WHO, p. xiii, 2018). A potential cause for this increase will be examined throughout this dissertation.

In many regions of the world women are the "primary growers of food, especially subsistence crops; according to FAO women produce about 80 percent of Africa's food and about 50 percent of food worldwide" (as cited in Hudson, Ballif-Spanvill, Caprioli, & Emmett, 2012, p. 14). According to the "Rural Women and the Millennium Development Goals" developed by the United Nations Inter-Agency Task Force on Rural Women, if women had equal access to the same resources as men, yields would increase by 20-30 percent. The yield increase would raise agricultural output by 2.5-4.0 percent in developing countries, decreasing the total number of hungry people by 12-17 percent worldwide (UN Women, 2012; O'Brien et. al., 2016).

1.1. Background

Women's role in agriculture largely went unacknowledged until the 1970s. Since that time, feminist researchers have revealed how female labor in the production of food is critical. Women not only grow, sell, buy, and prepare food, but also are involved in

agricultural businesses. Women contribute to the agricultural economy of developing countries and to the global world of commercial agriculture (Ransom & Bain, 2011). Starting in the 1970s, international agencies began to target women through their agricultural aid policies and programs in an effort to reduce poverty and improve food security. Critics argue that this gender mainstreaming has "been turned into a public management strategy by development bureaucracies focused on processes rather than results. That is, bureaucracies are willing to implement mainstreaming at the rhetorical and procedural level but not at the practical level, which would have more radical implications for gender relations" (Ransom & Bain, 2011, p. 49-50).

Barber Conable of the World Bank speculated 40 years ago that women do two-thirds of the world's work, an opinion still supported by evidence today (as cited in Hudson et al., 2012). In addition to women doing a majority of the world's work, Hudson et al. (2012) found the following:

> Feminist economists have rightly pointed out that capitalism could not even exist if women did not perform these labors with little or no remuneration. Apparently, in the thinking of most economists, women are like air and water, to be used for free. (p. 15)

As cited by Casserly (2011), the Thomson Reuters Foundation conducted a survey to determine the most dangerous countries in which to be born female. In response to the foundation's findings, CEO Monique Villa stated:

> This survey shows that 'hidden dangers' like a lack of education or terrible access to healthcare are as deadly, if not more so, than physical dangers like rape and murder. In Afghanistan, for instance, women have a one in 11 chance of dying in childbirth. In the top five countries, basic human rights are systematically denied to women. (para. 3)

Gender-based socio-cultural values in low-income countries have contributed to unequal female enrollment rates in higher education. These inequalities call for gender-sensitive action to correct gender bias and, thus, to ensure gender equity and equality (Barodia, 2015; Mlama et al., 2005; Kahamba, Massawe, & Kira, 2017; O'Brien, Gunaratna, & Gebreselassie, 2016; Karl, 2009). Gender-sensitive learning must first acknowledge that innovative development must meet the educational needs of today's and tomorrow's learners (Barodia, 2015; Lan, 2010; Kahamba et al., 2017; Assan, 2014). When young girls are denied access to education, it affects their economic status and potential to advance, it impacts their health, and it affects their political participation and decision-making abilities. Low education inhibits female's voices and makes them more vulnerable to violence. Gender-based violence is a global, cross-cutting issue affecting women and girl's ability to access their full range of human rights (Wolfe, 2014).

"If you educate a man you educate an individual, but if you educate a woman you educate a nation," according to Bernadette Lahai, a member of Sierra Leone's Parliamentary Committee on Agriculture and Food Security Member of the United Nations Commission on the Status of Women (as cited in Jackson, 2009, p. 1). When

women are educated, they have fewer children, they become empowered, and they are able to contribute more to their families and community. When women earn wages, their families have better health, nutrition, and education. Mothers have shown, through household financial decisions, that they prioritize the well-being of their children. So, when mothers are financially better off, children are less susceptible to social ills such as human trafficking (Cho, 2015; O'Brien, Gunaratna, & Gebreselassie, 2016).

The educational level of a mother correlates directly with the survival and developmental prospects of her children. Women's empowerment within their households increases the likelihood that their children will attend school; this is particularly crucial for their daughters (UNICEF, 2006). A cross-national study of 63 nations over a twenty-five-year period determined that women's education was the single most important factor in levels of malnutrition (Hudson et al., 2012). A study in the Philippines found that a mother's education was more of a contributing factor to her children's health status than was household income (Hudson et al., 2012).

1.2. Theoretical Framework

Socrates argued that if virtues could be taught, teachers of virtues would be universally recognized. Protagoras countered powerfully that virtues could and indeed are taught by parents, friends, spouses, and colleagues and through early childhood stories. Whereas Socrates appeared to argue that no one teaches virtues, Protagoras argued that everyone teaches them (Pence, 1983). U.S. President Theodore Roosevelt famously stated, "To educate a person in mind but not in morals is to educate a menace

to society" (Roosevelt, 2018). Similarly, philosopher Aristotle said, "Educating the mind without educating the heart is no education at all" (Goodreads, 2018).

Women in Development Perspective

The foundation of the "women in development" (WID) perspective is traced back to the work of Ester Boserup (1970). Research from this perspective arrived at two general conclusions: "(i) development processes have not been as kind to women in that they have not had the same opportunities as their male counterparts being relegated to secondary status and exploitation, and (ii) that women play a key role in development, contributing greatly to economic and social well-being though being unacknowledged and unappreciated" (Scanlan, 2004, p. 1808-1809). This study focuses on the second primary concern confronting the fact that women make vital contributions toward development (Benavot,1989; Bhatti,1998; Boserup, 1970; Dixon-Mueller,1985; Kennedy & Peters,1992; Smith & Haddad, 2000; World Bank,2001; Scanlan, 2004).

Ester Boserup's seminal study focused attention on the invisibility of women. Boserup exposed the failure of national governments and international development agencies to incorporate women into development initiatives. She argued that foreign assistance was biased toward men because "the prevailing wisdom was that women were not involved in productive economic activities such as agriculture but were instead confined to the production of subsistence crops and food preparation within the home" (Ransom & Bain, 2011, p. 51). The motivating cause of Boserup and other WID scholars was to reform development programs to include women so that poverty, well-being, and equity issues related to women could be addressed (Ransom & Bain, 2011).

The WID perspective has specific importance to food security (Scanlan, 2004; Akinyele, 1997; Kennedy & Peters,1992; Patel, 1990; Smith & Haddad, 2000; United Nations Population Fund, 2002). International agencies such as, FAO (1997), the International Food Policy Research Institute (Quisumbing, Brown, Sims Feldstein, Haddad, & Peña, 1995), and the World Food Program (2002) have stated that women are key to achieving food security. The World Bank (2001) called for increased attention to gender issues, stating that gender inequity undermines the effectiveness of development policies in fundamental ways (Scanlan, 2004; Brown, Feldstein, Haddad, Peña, & Quisumbing, 1995; Riker, 2000; Save the Children, 2002; United Nations Population Fund, 2002).

Boserup's (1970) seminal work provided a foundational basis for the participation of women in decision-making and for mainstreaming gender into economic development. The WID approach treats women as a homogenous group and does not question the structural causes of oppression and sub-ordination (Boserup, 1970). It alerted the need of women's participation, with experiences, evidence, and lessons for developing the conceptual approach of "woman and development" (WAD) (Razavi & Miller, 1995). WAD enhanced thinking about women's empowerment beyond WID.

Gender and Development Theory

Razavi and Miller (1995) argued that the WAD approach provided the analytical and intellectual groundwork for the shift to "gender and development" (GAD). The theory of GAD was introduced to focus on empowerment and to challenge unequal gendered power relations, access to resources, and the value of women's roles and needs

across different societies (Ghale, 2010). This development framework also explores masculinity and ways in which men and women interact in different socio-cultural and politico-economic contexts.

GAD has shaped various development areas including food security (Patel, 2012). It is essential to analyze food systems using a holistic approach that includes legal policies, customary practices, social norms, economic opportunities, and political environments. It is also important to consider the psychological health of women and their social functions as defined by their local culture, values, norms, and practices. (Ghale, Pyakuryal, Devkota, Pant, & Timsina, 2018).

1.3. Problem Statement

The problem is that gender inequity impacts every social institution, ranging from individual family households to international development organizations and, therefore, if not addressed becomes a "stumbling block on the road to a sustainable economy" (Jacobson, 1992, p. 1). This three-article dissertation will address the problem with a primary scope on gender inequity and food insecurity by: (1) addressing the knowledge gap regarding the relationship between gender inequity and food insecurity, (2) recognizing factors influencing food insecurity, and (3) recommending strategies to incorporate gender inequity in the Food, Agriculture, Natural Resources, and Human (FANH) sciences at the postsecondary level.

More specifically, how does gender inequity influence female education, basic human needs, corruption, and gross domestic product (GDP); and, in turn, how do all of these factors impact food insecurity? What practical strategies can be implemented to

enhance postsecondary education to incorporate the impacts of gender inequity? This could answer the question of how we can elevate the standing and recognition of women worldwide, thus ensuring better social progress for everyone. If gender equity is related to a country's food security, then gender equity and methods to achieve gender equity must be addressed in scholarly literature and education within the FANH sciences.

This study will provide answers to the following three research questions that will illuminate future action-oriented steps to respond to the problems:

1. What research-based literature exists regarding the effects of gender inequity on food insecurity?
2. What were the effects of gender inequity on food insecurity?
3. What are the strategy implications from this research on postsecondary education in the FANH sciences?

According to UN Women (2012), gender inequity is an underlying cause and effect of hunger and poverty. An estimated 60 percent of chronically hungry people are women and girls (Karl, 2009). The goal of gender advocacy is to transform economic policymaking so that the human rights dimensions are considered at the design stage of programs (Sadasivam, 1997; O'Brien et al., 2016; Assan, 2014). Men are more likely to have access to resources and earn cash wages; however, they are less likely to spend it on family needs: food, clothes, health care, and education. Such patterns are disturbingly prevalent across countries and cultures (Jacobson, 1992; O'Brien et al., 2016).

Female agriculturists account for 60 percent of the workforce in sub-Saharan Africa and nearly 70 percent in South Asia. "Developing policies and programs that

address [women's] needs, interests and constraints" (UN Women, 2012, para. 3), is crucial in ensuring food security (Assan, 2014; Karl, 2009). Despite women representing a majority of agricultural labors, fewer than 5 percent of landholders in North Africa and West Asia and 15 percent in sub-Saharan Africa are women (UN Women, 2012).

According to the United Nations (UN), the international community contributed an estimated 7.5 billion dollars to rural development assistance from 2008 to 2009. However, only 3 percent was allocated to gender equity programs where gender equity was the primary objective (Deen, 2012; O'Brien et al., 2016). Women are rarely involved in designing or implementing development programs. Consequently, the programs do not address women's actual needs (Jacobson, 1992; Assan, 2014). A healthy society requires that both males and females be valued for their contributions (MacLeod, 1996).

1.4. Significance of Research

Assisting in the aid of women has been viewed as separate from more "*strategic* issues of war, peace, and economic stability" (Verveer, 2012, para. 2). However, increasing the status of women is not simply a moral imperative, it is a *strategic* one. The equitable treatment of women is essential to economic prosperity and to global peace and security (Verveer, 2012; Assan, 2014).

Deputy Director-General of the Rome-based Food and Agriculture Organization (FAO), Ann Tutwiler, stated that the gap in agricultural production and productivity exists not because of rural women's incapability, but due to existing social constraints. "Conventional agriculture development has actually shifted resources *away* from female

farmers" (Jacobson, 1992, p. 7). Female farmers lack access to seeds and credit which greatly reduces their food security efforts (Deen, 2012; O'Brien et al., 2016).

Gender equity seeks to provide "equal value and recognition to the different natures, roles, and needs of women and men" (ILO, 2007, p. 13). Respective needs vary accordingly in many societies. Women may act in specific roles as mothers and providers of basic human needs. This role implies that they have a weaker position and more difficulty accessing jobs, training, rights to land, equal pay and other monetary assets. These imbalances must be addressed in the design of policies, programs, and projects in order to address gender inequity (ILO, 2007; Assan, 2014; Karl, 2009).

Agricultural extension has suffered from gender biases (Kahamba, Massawe, & Kira, 2017; Barodia, 2015). A majority of extension officers are male, and they are trained to deal only with male farmers (Jacobson, 1992; O'Brien et al., 2016; Assan, 2014). Due to a lack of gender-sensitive research and training, individuals entering into international development work have little to no awareness of gender roles in foreign countries. This lack of education leads to remaining gender blind or a persistence of a Western view of gender roles and stereotypes (Cornwall, 2003). Providing women with equitable access to resources and instituting policies that encourage domestic food production would contribute to ensuring food security (Jacobson, 1992; O'Brien et al., 2016; Karl, 2009).

Once students are made aware of the relation between women and development, they can become leaders capable of making substantive and sustainable changes. This study is pertinent to the FANH sciences in postsecondary education. Future leaders are

obtaining their education and must gain the highest education about methods to create sustainable change and improve the inequities ailing every society (Me-Nsope, 2015).

1.5. Definitions

Food security. As defined by the United Nations' Committee on World Food Security, food security is social, physical, and economic. Food security is access to sufficient, nutritious food that meets an individual's needs and preferences in order for that individual to maintain an active and healthy lifestyle. Indicators of food security are built on four pillars: availability, access, utilization, and stability (FAO 2006; Abiyev, Uyar, Ilhan, Imanov, & Abiyeva1, 2018).

Food insecurity. Food insecurity is the absence of one or more of the four pillars (i.e. availability, accessibility, stability, and utilization). Food insecurity indicates a high probability of randomly selecting an individual from a population who is consuming insufficient calories to cover their energy requirement for a healthy life (Social Progress Index Methodology, 2018).

Gender equity. The International Labor Organization (ILO) defines gender equity as the fair treatment for women and men according to respective needs and interests. This may include "equal treatment or treatment that is different but considered equivalent in terms of rights, benefits, obligations and opportunities" (ILO, 2007, p. 92). "When we talk about opportunity, we're talking about ensuring [that] opportunity is not limited simply on the basis of gender. We are talking about correcting for gender biases so that economic outcomes improve for all" (Roy, para. 2-3, 2017). Gender equity is the process of being fair to both women and men (UNFPO, 2005).

Gender inequity. Gender inequity is the idea that men and women are not equal. This results in different treatment or perceptions of individuals due to their sex. It derives from differences in biology and cultural norms. Inequity has damaging effects on the physical and mental health of millions of girls and women. It is also damaging for boys and men despite the perceived benefits it may give men (e.g. resources, power, authority, and control) (WHO, 2018). Men are more likely to have access to resources and earn cash wages; however, they are less likely to spend it on family needs (e.g. food, clothes, health care, and education). Such patterns are disturbingly prevalent across countries and cultures (Jacobson, 1992; O'Brien et al., 2016).

Gender equity/gender inequity. In this study, the terms "gender equity" and "gender inequity" will be used, as opposed to "gender equality" and "gender inequality." This was purposely chosen to avoid any confusion that may be associated with assuming that "equal" means "the same."

Postsecondary education. Postsecondary education refers to the education following secondary school or after graduating from high school. Students can pursue two- or four-year postsecondary degrees after finishing high school or completing their GED (USDA, 2018).

1.6. Assumptions

The following assumptions were made for the study:

1. The literature review is thoroughly completed, covering a general consensus of all relevant literature.
2. All secondary data being analyzed are reliable and current.

3. Countries excluded due to missing data would not change the findings (i.e. would not cause the available data from countries included in the study to produce false/inaccurate results.)
4. The strategy implications are unbiased and evidence-based.

1.7. Limitations

In chapter II, the scoping literature review is limited by research studies currently available. Future research can extend this review and include future studies. In chapter III, analyses are limited by the social and demographic variables used. This study is limited by the time period in which it takes place. The study provides a benchmark for future longitudinal studies that examine the changing status of women globally. Chapter IV is limited to the author's interpretations, perceptions, and views. Chapter IV is impacted by the way social issues are perceived, including perspectives on who merits treatment and best practices for instilling change. The author has chosen to focus on the topic of gender inequity and food insecurity worldwide.

1.8. Delimitations

In chapter II, the scoping review, literature is delimited by reviewing articles published from 1990 to 2019. Scholarly literature is also delimited by the number of search engines used for this study. In chapter III, secondary international open-access data were selected for use in this study. All variables were treated as observable variables. Variables were delimited within simple path models testing observable variables. In chapter IV, the strategy paper is delimited to postsecondary education.

1.9. Dissertation Organization and Research Questions

This research is a dissertation composed of three journal-ready manuscripts. The three articles are: (I) a scoping review identifying prior research related to gender inequity and food insecurity; (II) a statistical examination of the effects of gender inequity on food insecurity; and (III) a practical, evidence-based recommendation for curriculum development within the FANH sciences at the postsecondary level. The dissertation addresses the following research questions, each corresponding to one of the three articles:

1. What research-based literature exists regarding the effects of gender inequity on food insecurity?
2. What were the effects of gender inequity on food insecurity?
3. What are strategy implications from this research on postsecondary education in the FANH sciences?

Unlike a traditional five-chapter dissertation, a three-article, journal-ready format has been chosen; therefore, sections of the dissertation may be repeated in the dissertation. Chapter I is an overview and rationale, with literature citations over-arching the three manuscripts. Chapters II, III, and IV are written as three independent journal articles. Chapter V is a summary of conclusions across chapters II, III, and IV.

1.9.1. Chapter II

Chapter II is a scoping review of research-based literature. The review provided deep insight on the topics of *gender inequity* and *food insecurity*. Similar to a systematic review, a scoping review uses a methodical process to review scholarly literature.

Arksey and O'Malley (2005) define scoping as "an approach to reviewing the literature which to date has received little attention in the research methods literature" (p. 19). This method allows the researcher to identify available literature across multiple disciplines (Arksey & O'Malley, 2005).

This method was selected upon consultation with the Center for Systematic Reviews at Texas A&M University, because of the multidisciplinary, global aspect of this study and the intent of identifying gaps in the prevailing and contemporary literature. The purpose of chapter II is to identify research-based literature related to gender inequity and food insecurity. More specifically, the purpose of chapter II is to provide an overview of the research related to the relationship between gender inequity and food insecurity. This scoping review sought out to answer this research question: What research-based literature exists regarding the effects of gender inequity on food insecurity? Furthermore, five additional research questions guided this chapter's findings:

1. How does gender inequity relate to food insecurity?
2. Where are gender inequity and food insecurity addressed in the literature?
3. Where are gender inequity and food insecurity not addressed in the literature (where are the gaps)?
4. How often is gender inequity a predictor of food insecurity?
5. What variables are most commonly addressed for improving food insecurity?

The literature review was conducted using the following EBSCOhost databases: Gender Studies, Sociology Source Ultimate, Medline, and AGRICOLA. The search

terms included: *gender equity, gender inequity, gender equality, gender inequality, woman, women, female, mothers, food security, food insecurity,* and *food sovereignty.* The results of this study confirmed a gap in the literature regarding the research topic and identified existing information about the relationship between gender inequity and food insecurity.

1.9.2. Chapter III

Chapter III is a cross-sectional, non-experimental, multinational quantitative analysis examining the effects of gender inequity on food insecurity. The effects of gender inequity on food insecurity were examined using a simple linear regression of gender inequity and food insecurity which was followed by hierarchical structural equation modeling (SEM) using gender inequity as the independent variable, food insecurity as the dependent variable, and basic human needs, corruption, female education, and gross domestic product (GDP) as mediating variables. Each mediator was added one at a time, followed by a path analysis using SEM incorporating all six variables. Five research questions guided this chapter's findings:

1. What are the effects of gender inequity on food insecurity?
2. How does gender inequity relate to basic human needs and food insecurity?
3. How does gender inequity relate to corruption and food insecurity?
4. How does gender inequity relate to GDP and food insecurity?
5. How does gender inequity relate to female education and food insecurity?

The variables to be analyzed are observable variables taken from five different databases: WomanStats Project, Social Progress Index, Transparency International,

World Bank, and the Global Food Security Index. The final analytic method was a path model using SEM with the variables: Gender Inequity (GI) (WomanStats Project); Basic Human Needs (BHN) (Social Progress Index); Corruption (C) (Transparency International); Female Education (FE) (Social Progress Index); Gross Domestic Product (GDP) (World Bank); and Food Insecurity (FI) (Global Food Security Index). The variables for this study were selected based on research-based findings from an initial exploratory scoping review. While other variables were found, the selected variables best fit the intent of this study.

WomanStats aims to investigate "the link between the security and behavior of states and the situation and security of the women within them" (WomanStats Project, 2018, para. 1). WomanStats research has been published in leading journals such as *International Security* and the *Journal of Peace Research*, and has also been vetted at the United Nations, the Central Intelligence Agency (CIA), the US Department of Defense, and the Senate Foreign Relations Committee (WomanStats Project, 2018). When examining women's association with social, economic, or agricultural development, Multivariate Scale #6 (Patrilineality/Fraternity Syndrome Scale) was selected from the WomanStats database as it pertains to women's household-level disempowerment. This multivariate scale from WomanStats operationalizes the variable *gender equity*.

The Global Food Security Index (GFSI) considers the issues of affordability, availability, and quality and safety of food across 112 countries. "The index is a quantitative benchmarking model constructed from 28 unique indicators that measure the drivers of food security across both developing and developed countries. The GFSI

also includes a category that assesses countries' exposure to the impacts of a climate change their susceptibility to natural resource risks and how countries are adapting to these risks" (GFSI, 2018, para. 1). Therefore, GFSI defines operationally the variable *food insecurity* in this study.

The Social Progress Imperative is a global nonprofit organization based in Washington, DC. The organization launched the Social Progress Index in 2014 with efforts to face social challenges and drive efforts to create equitable, inclusive, and prosperous societies (Social Progress Imperative, 2018). The index is a comprehensive measure of a country's quality of life. The Social Progress Index provided data quantifying *female education* and *basic human needs*.

The Corruption Perceptions Index (CPI) is an index developed and maintained by Transparency International (Saisana & Saltelli, 2012). The index measures perceptions of corruption in the public sector using a composite indicator. Countries are ranked from one to 174, with one as the least corrupt. CPI provided data for the variable *corruption*.

The World Bank offers high-quality statistical data for improving global development. For this study, The World Bank provided data for the variable *GDP*.

Mediational path models with steps consistent with the work of Baron and Kenny (1986) were used to examine the direct and indirect effects between the GI, FI, BHN, C, FE, and GDP variables.

1.9.3. Chapter IV

The purpose of chapter IV is to identify practice-specific applications and curriculum development in the food, agriculture, natural resources, and human (FANH)

sciences from this current research. This chapter addressed the research question: What are strategy implications from this research on postsecondary education in the FANH sciences? This study includes a design proposal of six modules pertaining to the variables used in chapter III (i.e. food insecurity, basic human needs, corruption, female education, and GDP). The modules will address food insecurity, female education, health and safety, corruption, economy, and holistic development. Each module will identify current international development strategies while also incorporating the effects of gender inequity.

1.9.4. Chapter V

Lastly, chapter V summarizes and synthesizes the findings from chapters II, III, and IV. The summary of chapters II, III, and IV inform the reader of the collective research findings and provides a bridge from this academic research to practical application.

1.10. Conclusion

Prior to this study, research on the relationship between gender inequity and food insecurity was limited. This research empirically analyzes the relationship between gender inequity and food insecurity revealing a statistically significant relationship.

This study began to fill a gap in the body of scholarly literature. Utilizing cross-national methods, new measures in the form of gaps in the proximity of gender inequity and development, these analyses make an important contribution by empirically evaluating the impacts of gender inequity on food insecurity.

This study is differentiated from previous research by three aspects. First, it builds on previous efforts to study current rates of gender inequity and food insecurity at an international level (i.e. on a country-wide, macro level). Second, it begins to address a gap in research-based literature by presenting food security as being dependent on gender equity. Third, it adds to research-based literature by linking gender inequity, food insecurity, basic human needs, corruption, female education, and GDP.

This study reveals that gender inequity can no longer be viewed as an unassociated factor regarding food insecurity, but as a prediction for creating sustainable development. The empirical evidence provided by this study can be utilized by professionals and institutions to implement interventions. To apply this research, recommendations were made to FANH sciences at the post-secondary level. These recommendations include recommendations for curriculum design and development within the FANH sciences, recognizing women's role in development and the effects of gender inequity on global food insecurity.

Further recommendations can be made to professional associations and government agencies such as the American Association for Agricultural Education (AAAE), the United States Department of Agriculture (USDA), and the United States Agency for International Development (USAID). With all recommendations concentrating on recognizing women as pertinent in agricultural development and establishing food security.

Impact Areas

Impact areas of this study include the following:

- Food, Agriculture, Nutrition, and Human (FANH) sciences
- Agricultural Development
- International Development
- Leadership Development
- Food Security
- Women's Status
- Education
- Academia (e.g. university classroom, curriculum development)

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2. THE EFFECTS OF GENDER INEQUITY ON GLOBAL FOOD INSECURITY: A SCOPING STUDY

Food security was first defined at the 1996 World Food Summit as existing "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'' (Deepak, 2014, p. 1). The World Bank, the Food and Agriculture Organization of the United Nations (FAO), and the United States Agency for International Development (USAID) define food security as, "access at all times to sufficient food to meet dietary needs for a productive and healthy life" (Bushamuka et al., 2005, p. 19). International organizations coordinate their development and relief efforts around the four pillars of food security: availability, access, utilization, and stability (Mengesha, 2016).

The first pillar, availability, is understood as the uninterrupted supply of food. It is measured at a global, national, or regional level, and refers to the ability to obtain sufficient quantities of food to meet dietary needs. Availability is accessed without regard from where the food originated (Sachs & Patel-Campillo, 2014). The 1945 UN Charter addressed the distribution of food availability due to two main concerns: natural disasters and conflict.

The second pillar of food security, accessibility, implies physical and economic access to food. Access highlights the ability of a household to have the sufficient resources to "produce food, buy food, or receive food aid" (Sachs & Patel-Campillo, 2014, p. 401). Food access is obtained at the household level by "opening markets to

foreign imports, increasing production, and in some cases, encouraging the disposal of global surpluses of agricultural commodities. This affects the ability for women in particular to ensure long-term food security at the household level" (Sachs & Patel-Campillo, 2014, p. 401).

The third pillar of food security, stability, emphasizes dependability of food supply across seasons or during food emergencies or crises. Stability also refers to food prices (Sachs & Patel-Campillo, 2014). High food price instability due to globalization or economic or political changes can put households in developing countries at high risk as a large portion of their income is spent on food; price increases can force families to take children out of school or starve. Price instability has been shown to result in "macroeconomic instability, social unrest, and overall reduction in economic growth" (Rashid, 2007, p. 96).

The fourth and final pillar of food security, utilization, relates to the ability of individuals to meet their nutritional and dietary needs, i.e., food quality, safety, and nutrition, plus adequate water and sanitation which are vital components of one's ability to maintain health and wellbeing. Women are the primary curator in providing nutritional security for their children and household from available food sources (Sachs & Patel-Campillo, 2014). Utilization also refers to food quality and includes whether or not an individual's health condition allows for appropriate absorption of consumed nutrients (Bushamuka et al., 2005).

"It is written that without the certainty of food there can be no sustainable peace, democracy, or development" (Zimet, 1997, p. 32). Food insecurity is the absence of one

or more of the four pillars and can be chronic when individuals are unable to meet their minimum food requirements over a sustained period of time. It can also be chronic during a transient time, when a sudden drop occurs in the ability to access or produce necessary quantities of food to maintain a healthy or nutritious status (Deepak, 2014). Measures of food insecurity are based on food expenditures, consumption, and the nutritional status of household members (Floro & Swain, 2013).

A focus on immediate provision of food to communities affected by hunger and malnutrition draws from the very definition and understanding of food security adopted in major international documents governing the issue. According to FAO (1996), food security is when all people have physical and economic access to sufficient, safe, and nutritious food to meet their daily dietary needs and preferences. This refers to the individual, household, national, regional, and global levels.

According to a previous study with women in Ethiopia, food insecurity has a more encompassing definition, "as meaning lack or shortage of sufficient quantity and quality of food, lack or shortage of money to buy consumables at the household level, lack of access to schools for their children and lack of access to health facilities" (Mengesha, 2016, p. 29). To these women, lack or shortage of food is simply one element of their definition and understanding of food insecurity. This highlights how food insecurity is also the inability to access resources and services that women are primarily responsible for providing (Mengesha, 2016). Gender discrimination and the unequal distribution of food within a household is a primary underlying cause of high rates of malnutrition in many countries (Hillenbrand, 2010).

In another study, women perceived food insecurity as not having a variety of food that was good and/or enough to feel full. To these women, high quality food included a selection of different tasting foods, side dishes, meat, and fresh vegetables. Most women implied they did not eat high quality food because they could not afford it (Piaseu, Belza, & Shell-Duncan, 2004).

"Social and cultural barriers often constrain the right to food for all, as some social norms are prohibitory in nature, some customary rules and practices are discriminatory and often uncritically taken as normal in society" (Ghale, Pyakuryal, Devkota, Pant, & Timsina, 2018, p. 19). In an analysis of data, researchers discovered four critical dimensions of gender in relation to food systems: legal, psychological, material, and socio-cultural. Gender roles in relation to rural agriculture systems should be addressed in decision-making, participation, and implementation processes in rural agricultural development (Ghale et al., 2018).

Worldwide, gender inequity is recognized as a basic underlying cause of food insecurity and constant malnutrition. Women's lack of power compared to men has far-reaching effects on every aspect of food insecurity (Hillenbrand, 2010). This inequity can range from low agricultural productivity, which reduces food availability on a national scale, to poor use and distribution of food within the household, and to limited knowledge of nutrition-promoting practices. Together, these disparities perpetuate epidemic levels of malnutrition, despite strong economic growth of various countries (Hillenbrand, 2010).

The role of men in food security tends to be minimal in comparison to women, yet their role in decision-making about what food should be produced, consumed, and what food should be sold is substantial in most developing countries. Women perform a majority of the work related to food security, yet their power to make independent decisions is limited. Most women have little authority to make decisions about food production, consumption, or sale, independently of their husbands (Hyder et al., 2005).

There has been a growing need to consider gender equity as a key element to development, especially in terms of women and men's status. It has also become crucial to recognize women's needs and contributions to society, especially in terms of agriculture and food security (Iruonagbe, 2011). Women invest approximately 10 times more of their earnings than men do on their family's well-being, including children's health, education, and nutrition (Duflo, 2012; Maertens & Verhofstadt, 2013; Quisumbing & Maluccio, 2000). Female power has a direct impact on agricultural productivity and household food security (Sraboni et al., 2014; Harper et al., 2013; Akter et al., 2017).

Food security is a complex problem entailing various aspects of a society. It is a global problem that does not have boundaries and affects people in both developing and developed countries. "Women could become vital players in solving world hunger if given the right tools and support from the government and the community. Women are not the cause of food insecurity, natural disasters, and conflict, although, they shoulder the burden of eradication" (Zimet, 1997, p. 33). Gender equity is considered a prerequisite to achieving global food security; however, gender systems are diverse and

complex. “The nature and extent of gender inequity and the conditions necessary to empower women vary across countries, communities and regions" (Akter et al., 2017, p. 270).

> Addressing women and women’s rights in the context of the right to adequate food must take into consideration their full set of human rights, not just the right to food. Mainstreaming women into strategies to improve food and nutrition security must recognize and plan for structural, cultural, and physical violence that impede women’s access to human rights as well as their capacity to engage publicly for themselves and others. Education and social networking are critical resources to expose and confront violence, providing more capacity for women to realize their potential for themselves and their communities. The right to adequate food embraces self-determination that strives to build local food systems that are not dependent on outside economic and political power (Bellows, Lemke, Jenderedjian, & Scherbaum, 2015, p. 1210-1211).

2.1. Theoretical Framework

Women’s role in agriculture largely went unacknowledged until the 1970s. Since that time, feminist researchers have revealed how female labor in the production of food is critical. Women not only grow, sell, buy, and prepare food, but also are involved in agricultural businesses. Women contribute to the agricultural economy of developing countries and to the global world of commercial agriculture (Ransom & Bain, 2011). Ransom and Bain (2011) found the following:

> In an effort to reduce poverty and improve food security, development organizations under pressure from feminists began in the 1970s to target women in their agricultural aid policies and programs and from the late 1980s to 'mainstream' gender. Yet, critics argue that mainstreaming has been turned into a public management strategy by development bureaucracies focused on processes rather than results. That is, bureaucracies are willing to implement mainstreaming at the rhetorical and procedural level but not at the practical level, which would have more radical implications for gender relations. (p. 49-50)

Women in Development Perspective

The foundation of the "women in development" (WID) perspective is traced back to the work of Ester Boserup (1970), with research building on this arriving at two general conclusions: "(i) Development processes have not been as kind to women in that they have not had the same opportunities as their male counterparts being relegated to secondary status and exploitation, and (ii) that women play a key role in development, contributing greatly to economic and social well-being though being unacknowledged and unappreciated" (Scanlan, 2004, p. 1808-1809). This research focuses on the second primary concern confronting the fact that women make vital contributions toward development (Benavot, 1989; Bhatti, 1998; Boserup, 1970; Dixon-Mueller, 1985; Kennedy & Peters, 1992; Smith & Haddad, 2000; World Bank, 2001; Scanlan, 2004).

Ester Boserup's seminal study focused attention on the invisibility of women. Boserup exposed the failure of national governments and international development agencies to incorporate women into development initiatives. She argued that foreign

assistance was biased toward men because "the prevailing wisdom was that women were not involved in productive economic activities such as agriculture but were instead confined to the production of subsistence crops and food preparation within the home" (Ransom & Bain, 2011, p. 51). The motivating cause of Boserup and other WID scholars was to reform development programs to include women so that poverty, well-being, and equity issues related to women could be addressed (Ransom & Bain, 2011).

The WID perspective has specific importance to food security (Scanlan, 2004; Akinyele, 1997; Kennedy & Peters, 1992; Patel, 1990; Smith & Haddad, 2000; United Nations Population Fund, 2002). International agencies such as FAO (1997), the International Food Policy Research Institute (Quisumbing, Brown, Sims Feldstein, Haddad, & Peña, 1995), and the World Food Program (2002) have stated that women are key to achieving food security. The World Bank (2001) called for increased attention on gender issues, affirming that gender inequity undermines the effectiveness of development policies in fundamental ways (Scanlan, 2004).

The influential work of Ester Boserup (1970) provided a foundation for the participation of women in decision-making and for mainstreaming gender into economic development. The WID approach treats women as a homogenous group and did not question the structural causes of oppression and sub-ordination (Boserup, 1970). It alerted the need of women's participation, with experiences, evidence, and lessons for developing the conceptual approach of "woman and development" (WAD) (Razavi & Miller, 1995). WAD enhanced thinking about women's empowerment beyond WID.

Gender and Development Theory

Razavi and Miller (1995) argue that the WAD approach provided the analytical and intellectual groundwork for the shift to "gender and development" (GAD). The theory of GAD was introduced in order to focus on empowerment and to challenge unequal gendered power relations, access to resources, and the value of women's roles and needs across different societies (Ghale, 2010). This development framework also explores masculinity and ways in which men and women interact in different socio-cultural and politico-economic contexts.

GAD has shaped various development areas including food security (Patel, 2012). It is essential to analyze food systems using a holistic approach that includes legal policies, customary practices, social norms, economic opportunities, and political environments. It is also important to consider the psychological health of women and their social function as defined by their local culture, values, norms, and practices (Ghale et al., 2018).

2.2. Conceptual Definitions

Conceptual definitions of gender inequity and food insecurity are presented.

Gender Inequity

Gender is a social category including roles, responsibilities, and ideas about what characteristics make a man or a woman. Gender inequity is the idea that men and women are not equal. This results in different treatment or perceptions of individuals due to their gender. It arises from differences in biology and cultural norms.

Gender relations and gender inequity are dynamic, multifaceted, and fluid. Gender inequity is context-specific and complex, and can include unequal rights to employment or income, discriminatory land ownership, lower education of a specific sex, gender-based violence, and unequal workloads and/or division of labor (Kerr et al., 2016). Gender inequity "damages the physical and mental health of millions of girls and women across the globe, and also of boys and men despite the many tangible benefits it gives men through resources, power, authority, and control" (WHO, 2018, para. 1).

In this research, the terms "gender equity" and "gender inequity" will be used rather than "gender equality" and "gender inequality" to avoid any confusion that may be associated with assuming that "equal" means "the same."

Food Insecurity

Food insecurity is the absence of one or more of the four pillars (i.e. availability, accessibility, stability, and utilization). Food insecurity indicates a high probability of randomly selecting an individual from a population who is consuming insufficient calories to cover their energy requirement for a healthy life (Social Progress Index, 2018).

2.3. Problem Statement

The problem is that gender inequity impacts every social institution, ranging from individual family households to international development organizations and, therefore, if not addressed becomes a "stumbling block on the road to a sustainable economy" (Jacobson, 1992, p. 1). The problem that this chapter addresses is a current gap in research-based literature on the effects of gender inequity on food insecurity. This

scoping study sought to answer the following research question: What research-based literature exists regarding the effects of gender inequity on food insecurity?

The widely accepted meaning of food security is when "all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs for an active and healthy life" (Iruonagbe, 2011, p. 3544). Food insecurity would be an absence of one or more of the four pillars. However, food insecurity is much more than merely a lack of food on the table; it is the total disempowerment of those affected, which happens to be primarily women (Mengesha, 2016). The food security framework (i.e. availability, access, utilization, and stability of food) does not address causes of food insecurity from a gender-sensitive perspective (Sachs & Patel-Campillo, 2014). This is a problem, because the leading cause of food insecurity is the inequitable distribution of land, food, and productive resources (e.g. water and seeds) (Sachs & Patel-Campillo, 2014).

Women play a crucial role in ensuring household food security, acting as food producers, income earners, food providers, as well as processing and preparing food to maintain the health and wellbeing of their families (Iruonagbe, 2011). Worldwide, women comprise approximately 43 percent of the agricultural labor force and produce over 50 percent of the world's food (FAO, 2011; WEF, 2013; Doss, 2014; Akter et al., 2017). In many parts of the world, women's identity and sense of self are based on their ability to provide for their families. The prevalence of food insecurity denies them this right (Mengesha, 2016). Women in developing countries play an essential role in meeting the food and nutritional needs of their families through food production and

economic access to food. Women represent a majority of smallholder farmers and serve as producers, laborers, processors, and traders within markets. They are responsible for 60 to 80 percent of food production in most developing countries (WEF, 2013).

Despite women's contributions to achieving food security, they are often constrained by poverty, illiteracy, and discrimination receiving credit and extension services, as well as cultural norms perpetuating gender inequities (Okoli & Umeh, 2001). Cultural constraints and attitudes undervalue women's work and responsibilities. Women endure disproportionate work burdens, discrimination, and lack of personal autonomy and are not involved in household decision-making or in policy-making (Iruonagbe, 2011).

Women equate to 70 percent of the world's hungry and are disproportionately impacted by malnutrition, poverty, and food insecurity. Female farmers lack access to agricultural extension training, agricultural resources and technology, land ownership rights, and credit (WEF, 2013; Patel, 2012; Fook, 2011; Deepak, 2014). Gender equity should be the starting point for creating successful and sustainable food security (Kushnir, 2011).

2.4. Method

The method for this research, i.e., chapter II, is a scoping review of the literature. The purpose of this review is to provide thorough insight to the topics of *gender inequity* and *food insecurity*. Similar to a systematic review, a scoping review uses a methodical process to review literature. Arksey and O'Malley (2007) state that a scoping review may be developed "to examine the extent, range and nature of research activity" and also

to “identify research gaps in the existing literature” (p. 22). This method allows the researcher to identify available literature across multiple disciplines (Arksey & O’Malley, 2007) and may be a preliminary assessment of potential size and scope of available literature and research (Grant & Booth, 2009). This method was selected through consultation with the Center for Systematic Reviews at Texas A&M University because of the multidisciplinary, global aspect of the research and the intent of identifying gaps in research-based literature.

The purpose of chapter II is to identify research-based literature related to gender inequity and food insecurity. More specifically, the purpose of Article I is to provide an overview of the research related to the relationship between gender inequity and food insecurity and identify existing gaps across multiple disciplines. Compared to a systematic review, the research question for a scoping review should reveal a broad range of references and facilitate the identification of all research, regardless of study method (Arksey & O’Malley, 2007).

2.4.1. Data Collection

This scoping study used the five-stage scoping review framework by Arksey and O’Malley (2007). The stages were (1) define the research question, (2) identify relevant studies, (3) study selection, (4) chart the data, and (5) collate, summarize, and report the results (see Figure 2-1).

The scoping study was conducted using the EBSCOhost search database. EBSCOhost is a database vendor and was suggested to use for this study by the Center for Systematic Reviews at Texas A&M University. Due to the multidisciplinary nature

of this study, Ebscohost allowed the researcher to search across multiple disciplines for research-based literature pertinent to this research. The disciplines of gender studies, sociology, health, and agriculture were selected for this study. Search terms included: *gender equity, gender inequity, gender equality, gender inequality, woman, women, female, mothers, food security, food insecurity,* and *food sovereignty.* A list of selection criteria and search databases are provided in Figure 2-1.

1. Define the research question:
What research-based literature exists regarding the effects of gender inequity on food insecurity?

2. Identify relevant studies:
Using Ebscohost search engine, the following databases were reviewed: Gender Studies, Sociology Source Ultimate, Medline, and Agricola.
Search terms included: (food n2 (secur* or insecur*) AND (women or female or woman or females or mothers) AND (equity or disparit* or inqualit* or discriminat*).

3. Study selection:
Selection criteria for publications included the following:

- The publications must have included two variables in the research question: gender inequity and food insecurity.
- Publications must have been published in 1990 or later.
- Only peer review and refereed journal articles were eligible.
- The publication must have been written or translated into English.

4. Chart the data:

- Article title, journal name, year of publication & countries included in the study
- Method of study & notes on what was done
- Theoretical framework used, if any
- Factors associated with food insecurity & methods being implemented to improve food insecurity
- Lineage practiced
- What variables were used to measure gender inequity & any efforts to try and improve gender equity
- How are gender inequity and/or food insecurity defined

5. Collate, summarize, and report the findings:
Total publications included in this scoping review: 59

Figure 2-1. Scoping review framework. (Adapted from Arksey & O'Malley, 2007)

2.4.2. Define the Research Question

This chapter sought to answer the research question: What research-based literature exists regarding the effects of gender inequity on food insecurity? Furthermore, five additional research questions guided this research:

1. How does gender inequity relate to food insecurity?
2. Where are gender inequity and food insecurity addressed in the literature?
3. Where are gender inequity and food insecurity not addressed in the literature (where are the gaps)?
4. How often is gender inequity a predictor of food insecurity?
5. What variables are most commonly addressed for improving food insecurity?

2.4.3. Identify Relevant Studies

Inclusion/exclusion criteria. Selection criteria for publications was influenced by the WID and GAD theoretical frameworks, and included the following:

1. The publications must have included two variables in the research question: gender inequity and food insecurity.
2. Publications must have been published in 1990 or later.
3. Only peer reviewed and refereed journal articles were eligible.
4. The publication must have been written or translated into English.

2.4.4. Study Selection

The scoping study conducted a search for (food n2 (secur* or insecur*) AND (women or female or woman or females or mothers) AND (equity or disparit* or inqualit*) or discriminat*) within the Gender Studies, Sociology Source Ultimate,

Medline, and AGRICOLA databases available through the Texas A&M University library system using EBSCOhost. A total of 607 references were located and reviewed. In these 607 references, a significant portion was derived from Gender Studies which included 434. Medline included the second highest results with 106 references. Sociology included 34 references, and AGRICOLA included 33 references.

References failing to meet required search criteria, being published before 1990, or not being a peer-reviewed or refereed journal article were omitted from the study. Ultimately, 265 references were selected for full text review from the initial electronic search. All references were exported to RefWorks for organization and documentation.

2.4.5. Chart the Data

Each full-text reference was coded using a Google Form. The Google Form included the following criteria, which was completed through the coding process:

- Article title
- Journal name
- Year of publication
- Country or countries included in the study
- Method of study and notes on what was done
- Theoretical framework
- Factors highly associated with food insecurity
- Methods being implemented to improve food insecurity
- Lineage practiced
- Variables used to measure gender inequity

- Methods being implemented or recommended to improve gender equity
- Reference's definition of food security and/or gender inequity

2.4.6. Collate, Summarize, and Report the Findings

Ultimately, 59 references were considered eligible for this scoping study. The elimination process and final selection is shown in Figure 2-2. After selecting the 59 eligible publications, data was extracted. This was done by documenting elements of the publications in a Google Form. Therefore, the initial research question was answered: What research-based literature exists regarding the effects of gender inequity on food insecurity.

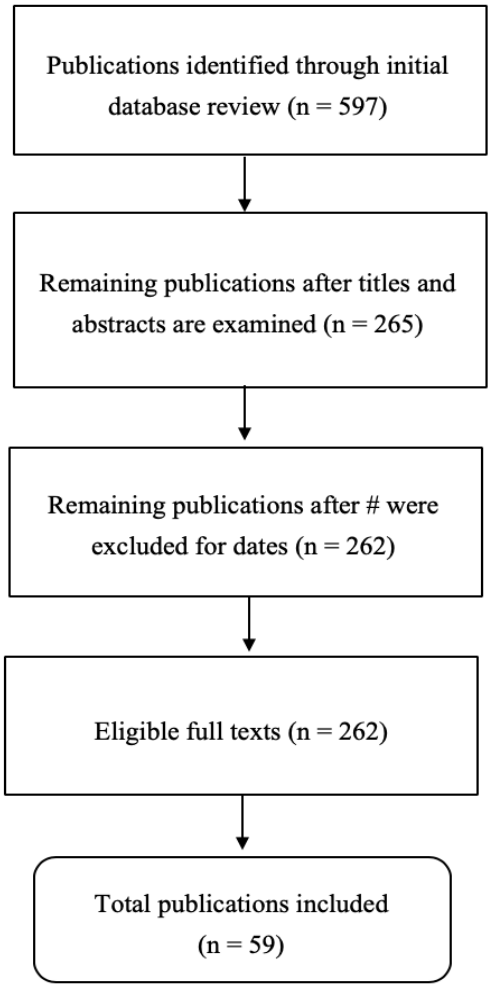


Figure 2-2. The publication selection process.

Each reference's discipline was recorded. This revealed a gap in research-based literature in the disciplines of agriculture, sociology, and medicine. Studies on the relationship of gender inequity and food insecurity are limited to the field of gender studies, see Table 2-1.

Table 2-1

Journal Disciplines

Discipline	Number of Articles
Gender Studies	54
Medical	2
Sociology	1
Agriculture	2
Total	59

The references used for this study ranged in publication from the year 1990 to 2019. Figure 2-3 shows a graph with year of publication in the x axis and number of references from that year in the y axis.

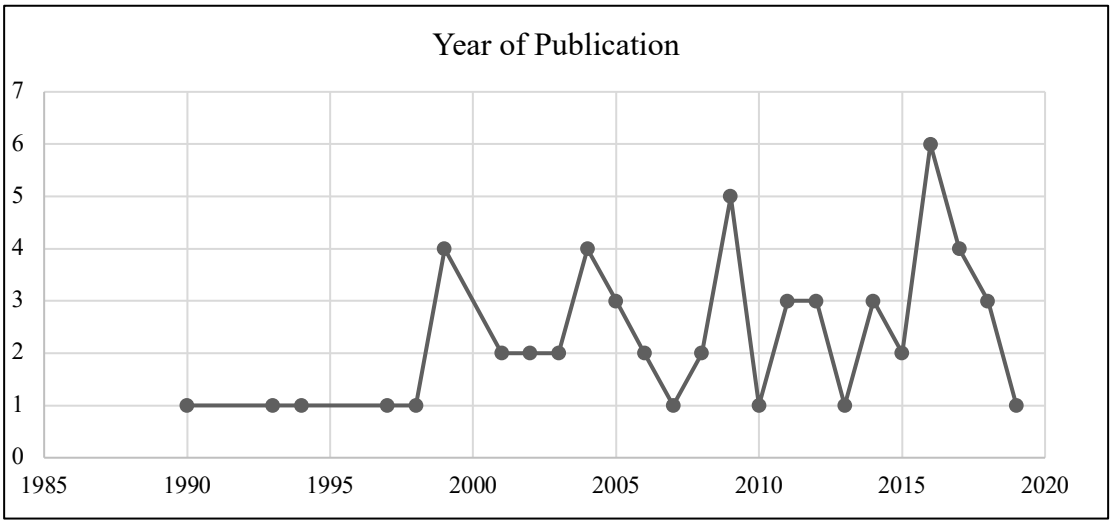


Figure 2-3. Year of publication.

Journal titles and the number of times references came from each individual journal is listed in Table 2-2. A detailed list of references used in the scoping review can be found in Appendix A. A majority of studies (42) included in the 59 references were limited to fewer than three countries. This scoping review identified 32 references studying only one country. Ten references studied two countries, seven studied three countries, six studied four countries, and four studied more than four countries, see Table 2-3.

Table 2-2

Journal Titles	
African Crop Science Conference Proceedings	1
African Health Sciences	1
African Urban Quarterly	1
Agenda: Empowering Women for Gender Equity	4
Ahfad Journal	1
Asian Development Perspectives	1
BMC Public Health	1
Community and Global Nutrition	1
Development	2
Feminist Studies	1
Food and Nutrition Bulletin	1
Food Policy	1
Gender & Behavior	2
Gender & Society	1
Gender and Development	2
Gender and Food: From Production to Consumption and After	1
Gender Issues	1
Gender, Place & Culture	2

Table 2-2 Continued

Journal Titles	
Gender, Technology & Development	1
Health and Human Rights	1
Health Care for Women International	1
Impact	1
INSTRAW news: women and development (United Nations International Research and Training Institute for the Advancement of Women - INSTRAW)	1
International Journal of Environmental Research and Public Health	1
Journal of Global Health	1
Journal of Hunger & Environmental Nutrition	1
Journal of International Women's Studies	2
Journal of Nursing Scholarship	1
Journal of Southern African Studies	1
Journal of Sustainable Agriculture	1
Journal of Women and Social Work	1
Kurukshetra	1
Mainstream	1
Maternal & Child Nutrition	1
NJAS - Wageningen Journal of Life Sciences	1
One on One: Women in Action	1
Productivity	1
Public Health Nutrition	1
Social Welfare	1
Studies of Tribes and Tribals	1
The Socialist	1
The Ahfad Journal	1
Violence Against Women	1
WIDER Research Paper, The United Nations University World Institute for Development Economics Research (UNU-WIDER)	1
Woman and food security: role of panchayats	1
Women & Environments	1

Table 2-2 Continued

Journal Titles	
Women in Action	1
World Development	3
Yojana	1
Total	59

Table 2-3

Number of Countries Studied	
One country	32
Two countries	10
Three countries	7
Four countries	6
More than four countries	4
Total	59

Eighty-nine countries were included in the scoping study, a complete list of countries can be found in Appendix B. Figure 2-4 illustrates a map of signifying the countries that were included in this research.

Figure 2-4. All countries included in the scoping study.

Lineage discussed in each reference is shown in Figure 2-5. An overwhelming majority of food-insecure countries practice patrilineality. Findings determined that in 27 references, the society studied practiced patrilineality, four references studied societies practicing both patrilineal and matrilineal lineage, and zero practiced solely matrilineal lineage.

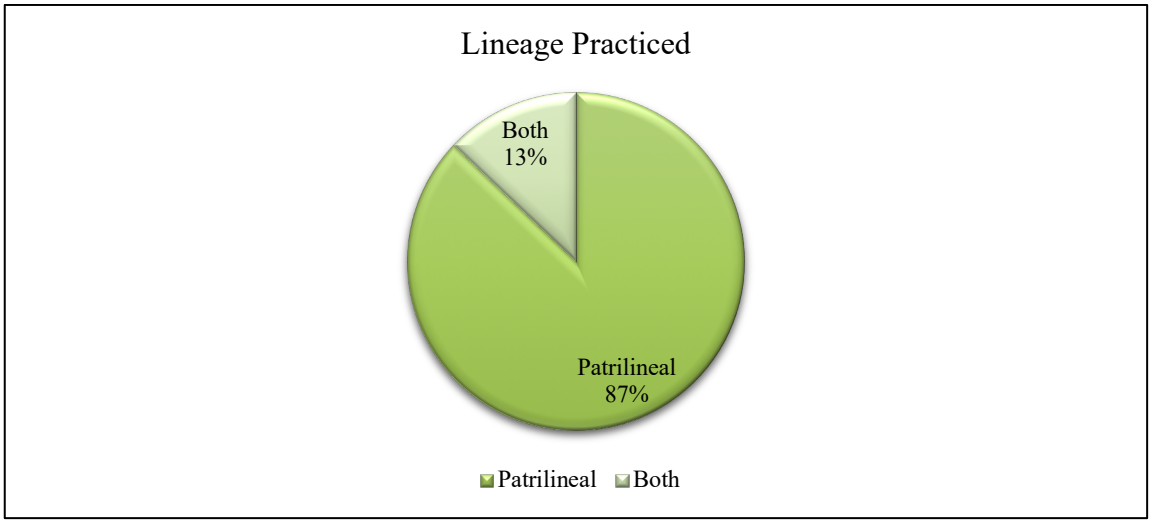


Figure 2-5. Lineage practiced.

Table 2-4 identifies the factors that were most highly associated with *food insecurity* as defined by the literature. From most frequently mentioned to least are as follows: (1) social factors, (2) gender inequity, (3) environment/climate, (4) severe poverty, (5) economic factors, (6) political factors, (7) health, and (8) HIV/AIDS. Other notable factors that were only discussed in only one or two references were war and conflict, domestic violence, and gender-based violence. Table 2-5 reveals the factors most highly associated with *gender inequity* as defined by the literature. From most frequently mentioned to least are as follows, all pertaining to the treatment of women: (1) fewer resources, (2) gendered division of labor, (3) limited influence over decision-making, (4) time poverty, (5) unequal access to land rights, (6) unequal access to income, (7) work and responsibilities are undervalued, (8) limited access to technology, (9) lineage, (10) limited access to information, (11) low social status, (12)

discrimination, (13) poor education, (14) discrimination receiving credit, (15) restricted access to markets due to customs or cultural norms, (16) lack of personal autonomy, (17) unable to buy seeds, fertilizer, or hire labor, and (18) illiteracy.

Table 2-4

Factors Highly Associated with Food Insecurity

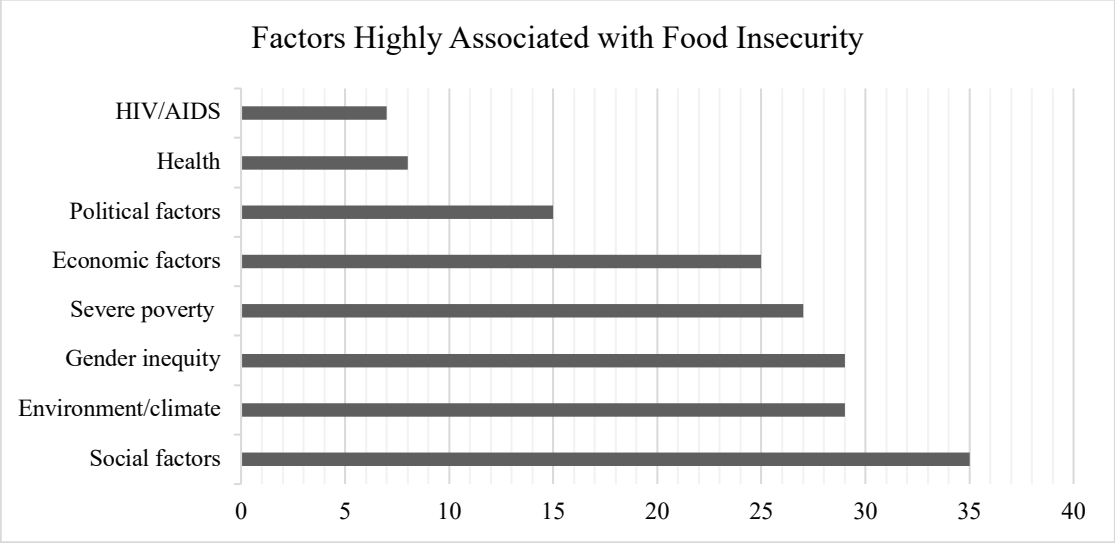
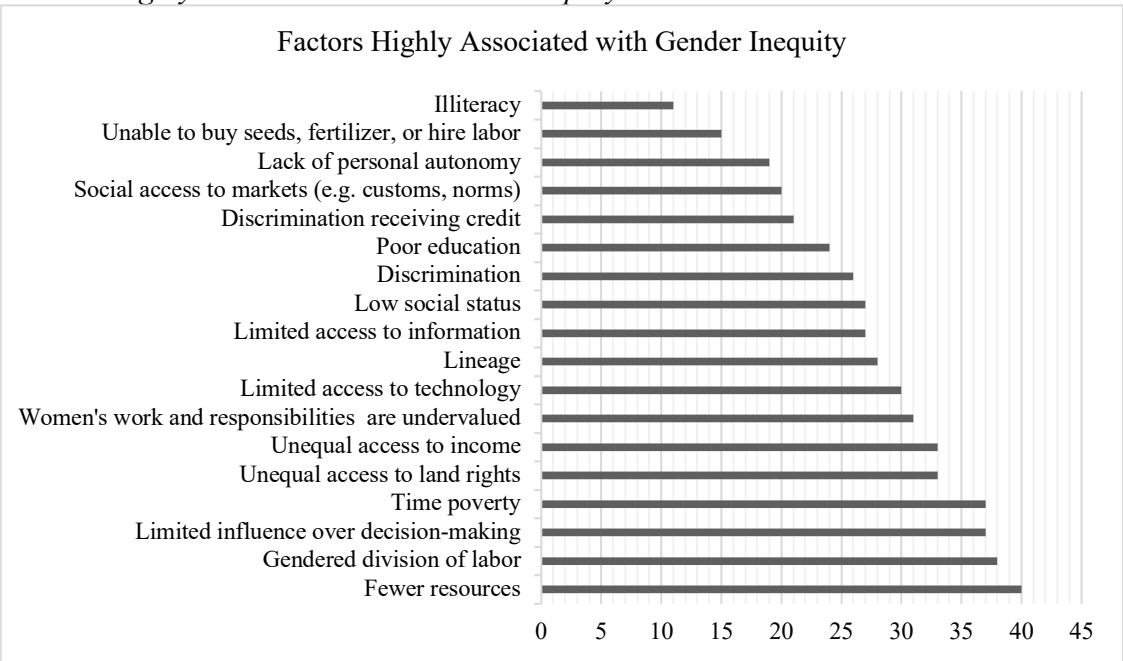


Table 2-5

Factors Highly Associated with Gender Inequity



This scoping study included references ranging from 1990 to 2019. This research was guided by the theoretical frameworks of WID and GAD. WID originates from the seminal work of Ester Boserup in the 1970s. Throughout the decades, gender inequity and its foundational role in development have remained steadfast.

A country that discriminates against half of its population is not utilizing its full development potential (United Nations Fourth World Conference on Women, 1995). “In no society today do women enjoy the same opportunities as men. This unequal status leaves considerable disparities between how much women contribute to human development and how little they share in its benefits” (UNDP, 1995, p. 29).

Women work more hours than men, yet most of their labors remains unpaid, unrecognized, and undervalued as they contribute trillions of ‘‘invisible’’ dollars to the global economy (UNDP, 1995; United Nations Population Fund, 2002). A society with greater gender equity is more likely to value the well-being and just treatment of all citizens, and by extension view concerns regarding hunger, health, education, and individual lives as higher priorities (Scanlan, 2004).

2.5. Results

Five research questions guided this scoping study. Following is a discussion about each question.

1. How does gender inequity relate to food insecurity?

Upon reviewing the research-based literature, gender inequity cannot be separated from food insecurity. Across the 89 countries studied in the references, women were essential in maintaining and striving for household food security. In every country studied, women serve critical roles in securing food for their families. Supporting the WID framework, women play a clear critical role in development, however, their agricultural labor is not recognized. Analogous to Boserup’s findings in the 1970’s women remain second-class citizens in many parts of the world and have undervalued work and contributions in society. International agencies remain biased toward men.

Despite major constraints, women are expected to meet basic survival needs. Among poor women of the world, rural female farmers in Africa have one of the lowest social status, however, they are expected to support themselves and their families. While men cultivate cash crops, women’s agricultural work is in subsistence crops" (Hyder et

al., 2005). Women are responsible for planting, growing, harvesting, and storing food to sustain their families, as well as managing other tasks such as food preparation, fetching water and firewood, hygiene, and health care for their children. “Women’ s work begins early in the morning and usually lasts until late in the evening, with few opportunities for rest during the day" (Hyder et al., 2005, p. 329). Supporting the GAD framework, unequal power dynamics among men and women contributes largely to women’s limited access to resources. Various studies included in the scoping review also identified various forms of masculinity and gender expectations. These social norms can have negative psychological impacts on both men and women.

2. Where are gender inequity and food insecurity addressed in the literature?

As shown in Table 2-1, gender inequity and food insecurity are primarily addressed in gender studies with very limited exposure in the agriculture, sociology, and health disciplines.

3. Where are gender inequity and food insecurity not addressed in the literature (where are the gaps)?

This scoping review identified a gap in research-based literature within the disciplines of agriculture, sociology, and health (see Table 2-1).

4. How often is gender inequity a predictor of food insecurity?

In the 59 references included in the scoping review, 34 answered “yes” that gender equity is necessary in order to improve food security. This question was not applicable to three articles, and the other 22 did not make a clear statement or implication. Figure 2-6 depicts the 37 responses.

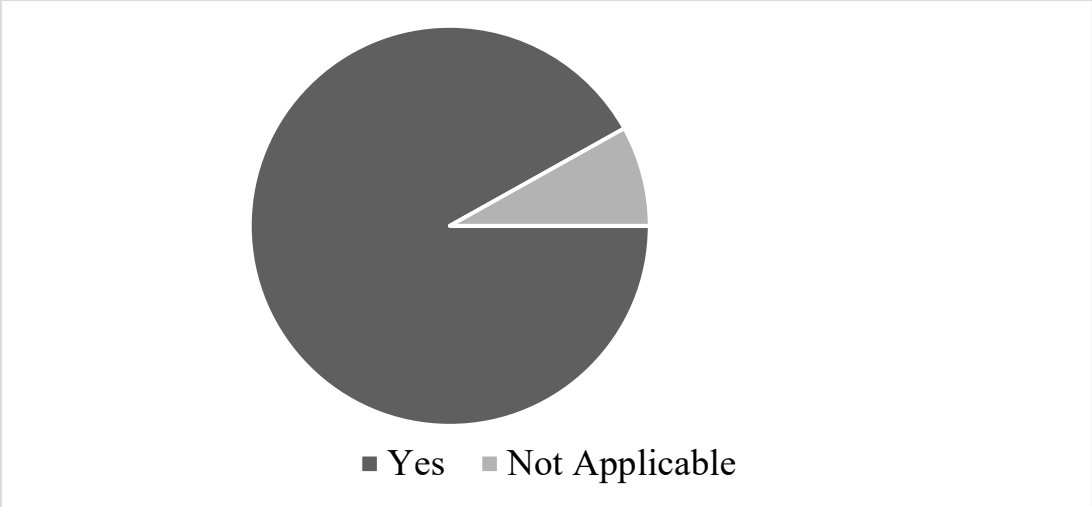


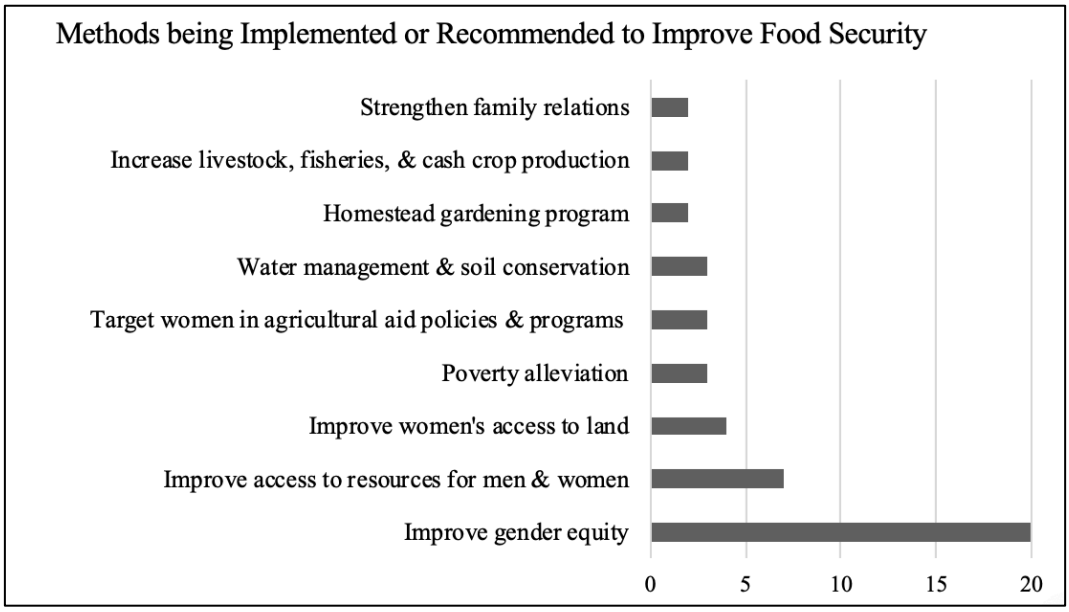
Figure 2-6. Is gender equity necessary to improve food security?

5. What variables are most commonly addressed for improving food insecurity?

The variables most commonly addressed for improving food security from most frequently mentioned to least: (1) improving gender equity, (2) improving access to resources for both men and women, (3) improving women's access to land, (4) poverty alleviation, (5) target women in agricultural programs and policies, (6) water management and soil conservation, (7) homestead gardening programs, (8) increase livestock, fishery, and cash crop production, and (9) strengthen family relations; see Table 2-6.

Table 2-6

Methods being Implemented or Recommended to Improve Food Insecurity



2.6. Conclusion

A disturbing amount of the same social ills continue to plague countries on every continent, from India to South Africa to the United States. This research set out to specifically focus on the plague of food insecurity, looking at it in relation to gender inequity. Despite arguments originating in the 1970s to include women in the decision-making process, policy design, and development implementation, many of the same arguments can be found in today's literature. The WID framework stated the importance of recognizing women's contributions to economic and agricultural development, yet 30 years later research-based literature continues to make the same statements regarding

women's contribution, and it would appear that little has improved. In fact, in some countries hunger and food insecurity have worsened!

Women's rights movements have made noble strides toward female empowerment and much good has resulted in these endeavors. In development, it is important to consider both males and females, as reinforced by the GAD framework. In the references used for this study, often men and women share common interests but vary in what they prioritize and what they actually do. In every reference studied, women had some sort of internal drive to care for and provide the best nutrition for their families. Men appear to have a drive to provide. However, in the poor communities studied, where job security does not exist and finding a steady income is extremely difficult, men become depressed and discouraged leading to negative and harmful behaviors (i.e. abandoning their families, spending income on alcohol and prostitutes). Another barrier for men (and women) is that in some societies it is considered shameful for men to perform any caretaking or household tasks and in doing so humiliation is brought onto the man as well as the woman. These aspects of society are often not considered when development policies or programs are developed and implemented.

The same developmental aspects of a society suffer when higher gender inequity is being practiced. These areas include poor healthcare and limited access to healthcare, low education, education is viewed as a low priority, poor economic development, and harmful, violent, and/or discriminatory social norms. There is immense potential for when men and women work together and share in the decision-making process to greatly

benefit their household, community, and country. In countries where gender equity is greater, the society as a whole reaps benefits.

Food insecurity is highly associated with the holistic health of a society. The leading factors identified with food insecurity include social factors, environment/climate, gender inequity, severe poverty, economic factors, political factors, and health. Each of these is closely tied to gender inequity and the treatment of women. The most common factors associated with gender inequity include women having fewer resources, gendered division of labor including women being charged with household chores, caretaking, and subsistence farming, women having limited influence over decision-making, women receiving unequal access to land rights and income, discrimination, low social-status, and lineage.

A majority of references used for this study observed patrilineal societies. The patrilineal structure supports many of the factors highly associated with gender inequity and food insecurity (i.e. social factors, gendered division of labor, women's lack of land tenure, women's work and responsibilities being undervalued, low female education, women left out of decision-making, women's restricted access to markets, technology, and information). These are undermining factors leading to poorer social development and greater barriers for women which in turn produce negative effects on children in a society as well. Patrilineal societies are known for practicing lineage through the male line and bride-price. Both of these practices automatically lower women's social status and promote high rates of domestic violence. Findings from this research revealed that violence, war, and gender-based violence are not commonly addressed issues impacting

food insecurity. Although they were mentioned in a few references, they appear to have limited exposure in research-based literature in the disciplines that were covered.

One key aspect that was repeated over and over throughout this study was the inherent drive that mothers appear to have to provide and prepare for their families; that urge is pervasive. Starting at the conception of every human life, a woman is the foundation of that being's health and nutrition. This study indicates that a woman's inherent role in providing food and nutrition to her children does not end at 38 weeks. More often than not, women tend to prioritize the quality of food, health, and education of their children across the 89 countries referenced in this research. This is a cross-cultural phenomenon, the selfless and sacrificial love.

The purpose of this study was to find gaps in the research-based literature in the FANH sciences on the effects of gender inequity on food insecurity, and answer the research question: what research-based literature exists regarding the effects of gender inequity on food insecurity? In the academic setting, gender studies seem to adequately recognize the relationship between gender inequity and food insecurity. However, other areas of study (i.e. agriculture, sociology, and health) are lacking in awareness. If change agents in the field of agriculture and policy-making are not being educated about women's vital roles in development, how can change occur? And, if this topic is not being addressed, why is that?

Guided by the research questions, this study accomplished two objectives. First, it confirmed a gap in scholarly literature within the fields of agriculture, sociology, and health on the effects of gender inequity on food insecurity. Second, this research

confirmed the importance of gender equity on food insecurity resulting in a total of 59 summarized publications. This study differentiated from previous studies through four aspects. First, it will add to research-based literature by linking gender inequity and food insecurity. Second, it begins to address a gap in the agricultural literature by looking at sustainable development on the basis of gender equity. Third, it builds on previous efforts to study current food insecurity rates and gender inequity at an international level. Fourth, and most important, it examines food security as being dependent on gender equity, hypothesizing that food security cannot be established and maintained without first securing the equitable treatment of women.

This study reinforced many feminist theories including gender and development and women in development. This study also reinforced the importance of knowing and understanding specific community cultures before taking on any actions or implementations. This scoping review served as a conceptual starting point for the bigger discussion: What are the effects of gender inequity on global food insecurity?

2.7. References

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3. THE EFFECTS OF GENDER INEQUITY ON GLOBAL FOOD INSECURITY USING STRUCTURAL EQUATION MODELING

Gender inequity and food insecurity are multi-dimensional, cross-national occurrences plaguing nearly every country. Food security was first defined at the 1996 World Food Summit as existing "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'' (Deepak, 2014, p. 1). The World Bank, Food and Agriculture Organization of the United Nations (FAO), and the United States Agency for International Development (USAID) define food security as, "access at all times to sufficient food to meet dietary needs for a productive and healthy life" (Bushamuka et al., 2005, p. 19).

International organizations coordinate their development and relief efforts around the four pillars of food security: availability, access, utilization, and stability (Mengesha, 2016). Food insecurity is the absence of the conditions defined by the food security framework. Notably, the food security framework does not address causes of food insecurity from a gendered perspective or approach (Sachs & Patel-Campillo, 2014); therefore, food insecurity is primarily addressed through market-based solutions involving increased global agricultural production, international trade, and market integration (Sachs & Patel-Campillo, 2014).

According to women in Ethiopia, food insecurity has a more encompassing definition, "as meaning lack or shortage of sufficient quantity and quality of food, lack or shortage of money to buy consumables at the household level, lack of access to

schools for their children and lack of access to health facilities" (Mengesha, 2016, p. 29). To these women, lack or shortage of food is simply one element of their definition and understanding of food insecurity. "This underscores how food insecurity is also the inability to access resources and services which women have primary responsibility to provide for" (Mengesha, 2016, p. 29).

"[Women's] interests are not being heard by policy makers, whose responses are not based on a thorough understanding of the realities these women face" (Gawaya, 2008, p. 157). Food security cannot be taken as a single isolated issue; it is part of a complex social and economic relationship (Mathew, 1998). Food security is found to be better in countries where women have greater education, employment, and political representation, also where women have greater control over reproduction, and longer life expectancy. Higher levels of personal autonomy allow women to improve their household nutrition through increased income, knowledge, and bargaining power. Decision-making power and control over resources help to strengthen and support new gender norms and expectations regarding women's behavior (Koenig, Ahmed, Hossain, & Mozumder, 2003).

In the summer of 1975, the United Nations (UN) hosted the first International Women's Year Conference; this "intergovernmental conference offered an unprecedented opportunity to put women at the center of international policymaking" (Olcott, 2010, p. 735-736) for the first time in history. Women in influential positions can transform social institutions. They can promote growth among public services and mobilize resources that can help satiate women's needs. These can both result in a

"'positive 'dispersion' effect' of expanded female autonomy on food security" (Parashar, 2005, p. 991).

3.1. Background

Food insecurity is multi-layered issue, impacted by physical, environmental, economic, and social areas of a society. Food insecurity involves not just "production, but access; not just output but process; not just technology but policy; not just global balance but also national conditions; not just national figures but household realities; not just rural but urban consumption; and not just quantity of food but also quality" (Sinha, 2004, p. 5-6). The food insecurity approach must be holistic. Every individual should have physical and economic access to a healthy diet that includes necessary macro and micro nutrients. Individuals should also have access to safe drinking water, sanitation, hygiene, health care, and education in order to live a healthy and productive life (Sinha, 2004).

Basic human needs. Gender inequity has a direct impact on meeting basic human needs (e.g. education, health, safety, and income) (Akinyele,1997; Bhatti,1998; Kennedy & Peters,1992; Patel,1990; Smith & Haddad, 2000). Gender equity is "especially important for the lives of the most vulnerable segment of the population—children" (Scanlan, 2004, p. 1810). Gender-based violence is rarely acknowledged or anticipated by policy makers when attempting to address women's vulnerability to food insecurity (Bellows, Lemke, Jenderedjian, & Scherbaum, 2015).

Violence is an unrecognized aspect of hunger, malnutrition, and the exclusion of groups such as women and children from food security. The threat of violence impedes

women from engaging in their own right to adequate food and from acting on behalf of their families and communities to the full extent of their capabilities. This helps explain why so little progress has been made to improve gender equity in the area of food security (Bellows et al., 2015).

Corruption. Corruption is a pervasive problem impacting the world's most vulnerable populations (Transparency International, 2014). Corruption has been identified as one of the most critical obstacles to development as it interferes with development efforts (Danon, 2011; Collier, 2008). In 2007 at the end of a two-year grant project, two Liberian nationals were blamed for stealing food from "the most vulnerable of the vulnerable" (Cole, 2013, p. 25). The nationals stole 90 percent of donated food pledged to rural Liberian women and children. The food was sold in local markets for the personal gain rather than being delivered (Cole, 2013).

Countries with greater perceived levels of corruption have longer-term economic challenges. Gyimah-Brempong (2002) found that corruption has statistically significant negative impacts on income growth rates in African countries. Cole et al. (2017) connected corruption and gender equity—finding that on average, countries with a higher number of women in government are associated with lower perceived corruption. Lower corruption was also associated with increased national expenditures on healthcare and increased expenses on healthcare were associated with higher levels of foreign direct investment (Cole, Dooley, Sandlin, & Murano, 2017).

Female education. Everyone, even the uneducated, benefit from the higher educational level of a community (Kravdal, 2004; Burroway, 2016). Women's

educational expansion may have a protective effect on child malnutrition. Female farmers with higher levels of education are more likely to "take advantage of the importance of family planning, child care, balanced diet, good sanitation, as well as adopt new technology and have access to extension services" (Okoli & Umeh, 2001, p. 48). Educated females may begin to transform social institutions, promote the growth of public services, and mobilize resources that could help satisfy their own and other women's needs, resulting in a dispersion effect of expanded female education on food security (Parashar, 2005).

Gross domestic product. Scholars and policymakers often assume that economic growth is the key to increasing the food supply and alleviating food insecurity (Jenkins & Scanlan, 2001). This belief is evident in several cross-national studies in developing countries suggesting that fostering economic development is the best way to reduce malnutrition (Moradi, 2010; Stevens et al., 2012). This relationship, however, is neither automatic nor guaranteed (Burroway, 2016). The homogenous effects of gender inequity on child malnutrition and food insecurity are comparable to, and at times larger than, those of GDP per capita.

"Women's work in the agricultural sector often remains invisible because the products of their labor are for the largest part intended for household consumption and do not reach the market economy" (Ibnouf, 2009, p. 145). Economic development does not benefit all segments of a population equally; national income levels should be evaluated alongside other factors to fully understand the overall well-being (Blumberg, 1995; Parpart, Connelly, & Barriteau, 2000).

Some countries attain lower rates of malnutrition than national income would suggest, while other countries experience high rates of malnutrition relative to their GDP per capita. Economic development alone does not necessarily provide for other basic human needs (Hagey, 2012; Nussbaum, 2004; Burroway, 2016).

Across research and policy, economic development has been regarded as key to increasing food supply and alleviating food insecurity. However, economic development does not promise fairly distributed income, nor does it guarantee that other human needs will be fulfilled (Burroway, 2016).

3.2. Problem Statement

The problem is that gender inequity impacts every social institution, ranging from individual family households to international development organizations and, therefore, if not addressed becomes a "stumbling block on the road to a sustainable economy" (Jacobson, 1992, p. 1). Gender inequity at the macro-level has been relatively understudied in recent cross-national research (Burroway, 2016).

Hundreds of millions of people are chronically hungry and food insecure, meaning they are unable to secure enough nutritious food on a regular basis. The leading causes of food insecurity is the inequitable distribution of land, food, and productive resources (i.e. water, seeds, and fertilizer) (Sachs & Patel-Campillo, 2014). "The complex and often interrelated causes of this acute social malady include poverty, political and economic exclusion, conflict, gender and ethnic discrimination, geographic isolation, displacement of people from their native lands, adverse or unreliable weather conditions, and disease" (Dreistadt, 2006, p. 5).

Gender equity should be the starting point for creating successful and sustainable food security (Kushnir, 2011). Deputy Director-General of the Rome-based Food and Agriculture Organization (FAO) Ann Tutwiler stated that the gap in agricultural production and productivity exists not because of rural women's incapability, but due to existing social constraints. "Conventional agriculture development has actually shifted resources *away* from female farmers" (Jacobson, 1992, p. 7). Female farmers lack access to seeds and credit which greatly impedes their ability to achieve food security (Deen, 2012; O'Brien, Gunaratna, & Gebreselassie, 2016).

The causes of food insecurity cannot simply be attributed to an imbalance between supply and demand. Lack or shortage of food is a symptom of a major structural problem that continually disempowers major sections of the population. "According to the UN Special Rapporteur to the Right to Food, the causes of hunger are not only technical but are also about 'discrimination, lack of accountability. The structural imbalances are evident from household to community, national and global levels" (Mengesha, 2016, p. 27).

3.3. Purpose of Study and Research Question

The purpose of this cross-sectional, non-experimental study was to fill a gap in the scholarly literature regarding the effects of gender inequity on global food insecurity. Variables for this study were carefully selected from a previous scoping review of literature examining existing research-based literature studying *gender inequity* and *food insecurity*. The scoping review revealed leading factors contributing to food insecurity as defined by the literature as well as leading factors associated with gender inequity as

defined by the literature. These commonalities overlaying across multiple studies led to the use of four mediating, control variables in various sectors of international societies. The four mediating variables are significant that they represent the areas of *health and safety*, *education*, *economic development,* and *ethics*. For this study, the names of these variables are basic human needs (BHN) representing health and safety, corruption (C) representing ethics, female education (FE) representing education, and gross domestic product (GDP) representing economic development. The research question was: What are the effects of gender inequity on food insecurity?

3.4. Significance of Research

Currently, a geographical bias exists in gender research which leads to incomplete knowledge of region-specific gender gaps in agriculture. Women's empowerment in agriculture has received attention in the literature in recent decades; however, empirical research has focused primarily on sub-Saharan Africa. In 2014, the Food and Agricultural Organization (FAO) and the International Food Policy Research Institute (IFPRI) gathered current gender research in agriculture in a book titled *Gender in Agriculture: Closing the Knowledge Gap* (Quisumbing et al., 2014). A majority of studies were conducted in sub-Saharan Africa (59%) followed by South Asia (22%) and Southeast Asia (6%) (Akter et al., 2017). In midst of this knowledge gap, many region-specific gender gaps, needs, and constraints remain unknown and unaccounted for; therefore, frequently applied gender intervention frameworks designed from existing knowledge and established narratives are unsuited and potentially damaging in less studied regions. In order to ensure that development strategies are properly concentrated

and implemented, research focus needs to shift to regions that have been less explored (Akter et al., 2017).

Several features of this chapter differentiated it from previous studies. First, it adds to scholarly literature by linking gender inequity, food insecurity, basic human needs, corruption, female education, and gross domestic product. This study also adds to the body of literature due to the wide scope of data from 112 countries being analyzed. This research begins to address a gap in the literature by looking at food security through a gendered lens. In addition, this research builds on previous efforts to study the far-reaching effects of gender inequity on the world. More broadly, this research provides empirical results on which experts can base practice and policy decisions. Most importantly, this study treats gender equity as a vital resource to achieving food security.

3.5. Theoretical Framework

Women's role in agriculture largely went unacknowledged until the 1970s. Since that time, feminist researchers have revealed how female labor in the production of food is critical. Women not only grow, sell, buy, and prepare food, but are also involved in agricultural business. Women contribute to the agricultural economy of developing countries and to the global world of commercial agriculture (Ransom & Bain, 2011).

> In an effort to reduce poverty and improve food security, development organizations—under pressure from feminists—began in the 1970s to target women within their agricultural aid policies and programs and from the late 1980s to 'mainstream' gender. Yet, critics argue that mainstreaming has been turned into a public management strategy by development bureaucracies focused

> on processes rather than results. That is, bureaucracies are willing to implement mainstreaming at the rhetorical and procedural level but not at the practical level, which would have more radical implications for gender relations (Ransom & Bain, 2011, p. 49-50).

Women in Development Perspective

The foundation of the "women in development" (WID) perspective is traced back to the work of Ester Boserup (1970), with research building on this arriving at two general conclusions as reported by Scanlan (2004):

> (i) Development processes have not been as kind to women in that they have not had the same opportunities as their male counterparts being relegated to secondary status and exploitation, and (ii) that women play a key role in development, contributing greatly to economic and social well-being though being unacknowledged and unappreciated. (p. 1808-1809)

This study focuses on the second primary concern confronting the fact that women make vital contributions toward development (Benavot, 989; Bhatti, 1998; Boserup, 1970; Dixon-Mueller, 1985; Kennedy & Peters,1992; Smith & Haddad, 2000; World Bank, 2001; Scanlan, 2004).

Ester Boserup's classic study focused attention onto the invisibility of women. Boserup exposed the failure of national governments and international development agencies to incorporate women into development initiatives. She argued that foreign assistance was biased toward men because "the prevailing wisdom was that women were not involved in productive economic activities such as agriculture but were instead

confined to the production of subsistence crops and food preparation within the home" (Ransom & Bain, 2011, p. 51). The motivating cause of Boserup and other WID scholars was to reform development programs to include women so that poverty, well-being, and equity issues related to women could be addressed (Ransom & Bain, 2011).

The WID perspective has specific importance to food security (Scanlan, 2004; Akinyele, 1997; Kennedy & Peters,1992; Patel, 1990; Smith & Haddad, 2000; United Nations Population Fund, 2002). International agencies such as, FAO (1997), the International Food Policy Research Institute (Quisumbing, Brown, Sims Feldstein, Haddad, & Peña, 1995), and the World Food Program (2002) have stated that women are key to achieving food security. The World Bank (2001) called for increased attention on gender issues, stating that gender inequity undermines the effectiveness of development policies in fundamental ways (Scanlan, 2004, p.1809; Brown, Feldstein, Haddad, Peña, & Quisumbing, 1995; Riker, 2000; Save the Children, 2002; United Nations Population Fund, 2002).

The seminal work of Ester Boserup (1970) provided a foundational basis for the participation of women in decision-making and for mainstreaming gender into economic development. The WID approach treats women as a homogenous group and did not question on the structural causes of oppression and subordination (Boserup, 1970). It alerted the need of women's participation, with experiences, evidence, and lessons for developing the conceptual approach of "woman and development" (WAD) (Razavi & Miller, 1995). WAD, enhanced thinking about women's empowerment beyond WID.

Gender and Development Theory

Razavi and Miller (1995) argue that the WAD approach provided the analytical and intellectual groundwork for the shift to "gender and development" (GAD). The theory of GAD was introduced in order to focus on empowerment, challenge unequal gendered power relations, access to resources, and the value of women's roles and needs across different societies (Ghale, 2010). This development framework also explores masculinity and ways in which men and women interact in different socio-cultural and politico-economic contexts.

GAD has shaped various development areas including food security (Patel, 2012). It is essential to analyze food systems using a holistic approach that includes legal policies, customary practices, social norms, economic opportunities, and political environments. It is also important to consider the psychological health of women, and their social function as defined by their local culture, values, norms, and practices. (Ghale, Pyakuryal, Devkota, Pant, & Timsina, 2018).

3.6. Method

Driven by the research question What are the effects of gender inequity on food insecurity? a cross-sectional, nonexperimental, multinational quantitative analysis was used to examine the effects of gender inequity on food insecurity. The 112 countries in this study can be viewed in Figure 3-1.

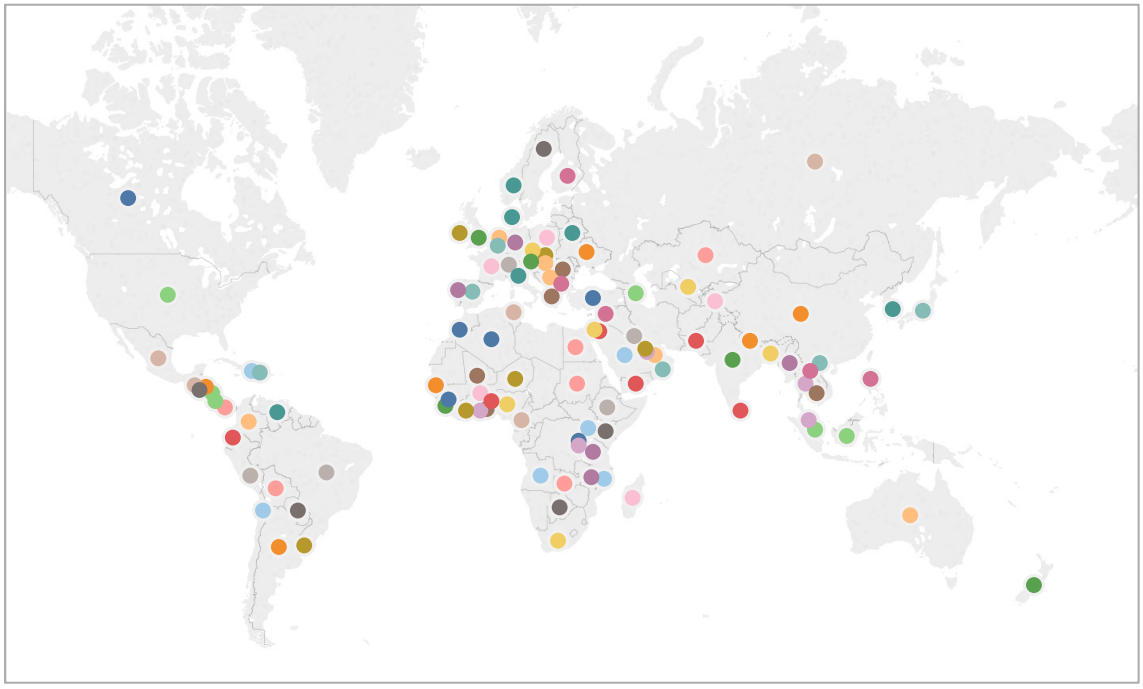

Figure 3-1. Countries in this study.

The effects of gender inequity on food insecurity were examined using a simple linear regression with the variables gender inequity (GI) and food insecurity (FI), followed by hierarchical structural equation modeling (SEM) using GI, FI, basic human needs (BHN), corruption (C), female education (FE) and gross domestic product (GDP) as mediating variables to the effects of GI on food insecurity. Each variable was examined one at a time to examine its mediating effect. These were followed by a path

analysis using SEM to incorporate all six variables. Six research questions guided this study:

1. What is the effect of gender inequity on food insecurity?
2. How does gender inequity relate to basic human needs and food insecurity?
3. How does gender inequity relate to corruption and food insecurity?
4. How does gender inequity relate to GDP and food insecurity?
5. How does gender inequity relate to female education and food insecurity?
6. Finally, how does gender inequity related to food insecurity with the four mediating variables also considered?

I used a simple linear regression, four SEM analyses, and one path analysis to examine the research questions. Informed by WID and GAD, I operationalized this design in six steps.

1. Model 1

    a. Model 1 is a simple linear regression between gender inequity as the independent variable and food insecurity as the dependent variable in order to answer guiding research question one.

    b. Model 1 results were presented.

2. Model 2

    a. Based on the second guiding research question and the conceptual framework, empirical findings were developed and presented.

    b. This model uses gender inequity as the independent variable, basic human needs as the mediating variable, and food insecurity as the dependent variable.

c. Direct and indirect effects between variables were tested using SEM.

d. Model 2 results were presented.

3. Model 3

a. Based on the third guiding research question, the conceptual framework, and empirical findings were developed and presented. This model uses gender inequity as the independent variable, corruption as the mediating variable, and food insecurity as the dependent variable.

b. Direct and indirect effects between variables were tested using SEM.

c. Model 3 results were presented.

4. Model 4

a. Based on the fourth guiding research question, the conceptual framework, and empirical findings were developed and presented. This model uses gender inequity as the independent variable, female education as the mediating variable, and food insecurity as the dependent variable.

b. Direct and indirect effects between variables were tested using SEM.

c. Model 4 results were presented.

5. Model 5

a. Based on the fifth guiding research question, the conceptual framework, and empirical findings were developed and presented. This model uses gender inequity as the independent variable, gross domestic product as the mediating variable, and food insecurity as the dependent variable.

b. Direct and indirect effects between variables were tested using SEM.

c. Model 5 results were presented.

6. Model 6

a. A conceptual framework was developed based on scholarly literature and the theoretical frameworks used in this study. The framework was constructed with directional relationships between and among the variables gender inequity (GI), basic human needs (BHN), corruption (C), female education (FE), gross domestic product (GDP), and food insecurity (FI).

b. Direct and indirect effects between variables were tested using SEM.

c. Model 6 results were presented.

3.6.1. Overview

Data. The variables analyzed were taken from five different databases: WomanStats Project, Social Progress Index, Transparency International, World Bank, and the Global Food Security Index. The final analytic method was a path analysis using the variables: GI from WomanStats Project; BHN from Social Progress Index; C from Transparency International; FE from Social Progress Index; GDP from World Bank; and FI from Global Food Security Index. The variables for this study were selected based on research-based findings from an initial exploratory scoping study.

1. Gender Inequity (GI) - WomanStats Project

The WomanStats Project aims to investigate "the link between the security and behavior of states and the situation and security of the women within them" (WomanStats Project, 2018, para. 1). WomanStats research has been published in leading journals, such as *International Security* and the *Journal of Peace Research*, and

has also been vetted at the United Nations, the Central Intelligence Agency (CIA), the US Department of Defense, and the Senate Foreign Relations Committee (WomanStats Project, 2018).

When examining women's association with social, economic, or agricultural development, Multivariate-Scale #6 (Patrilineality/Fraternity Syndrome Scale) was selected from the WomanStats database as it pertains to women's household-level disempowerment. This multivariate scale determines "to what degree a country relies on the patrilineal/fraternal security provision mechanism within its society" (WomanStats Codebook, 2019). Scores range from zero, indicating lower patrilineality/fraternity syndrome or low gender inequity, to 16, indicating high reliance on patrilineality/fraternity or high gender inequity. The scoring process used by WomanStats can be found in the Appendix. Figure 3-2 is a map created by WomanStats, revealing multivariate-scale-6 scores. For the purpose of this study, multivariate-scale-6 operationalized the variable GI.

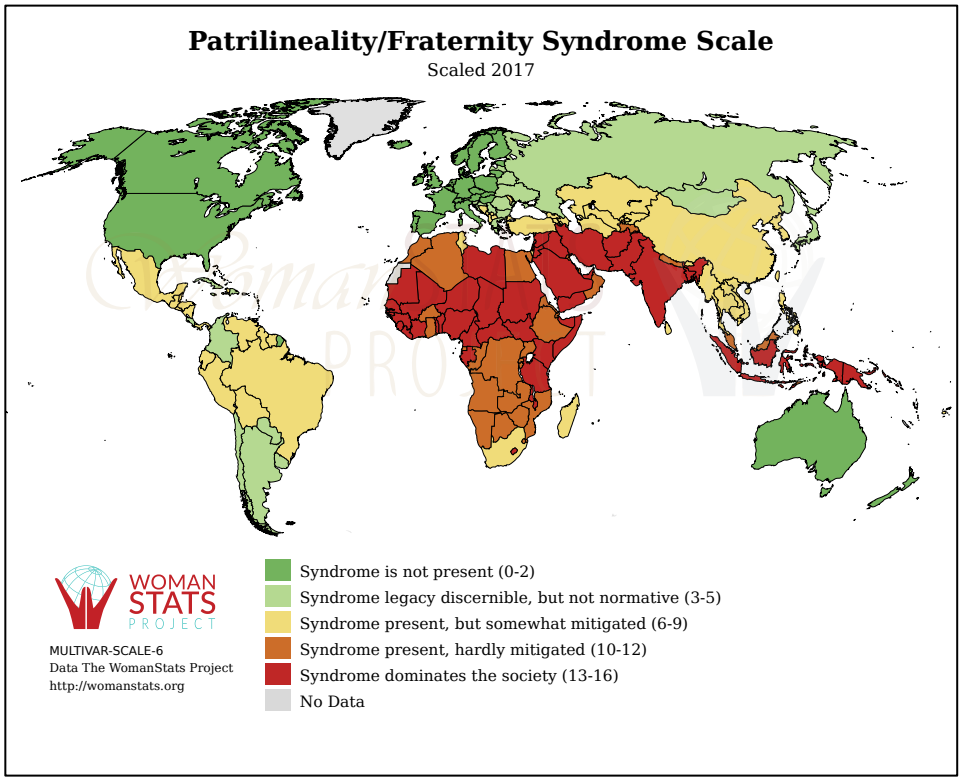

Figure 3-2. Gender inequity (reprinted from the WomanStats Project Multivariate-Scale-6).

2. Basic Human Needs (BHN) - Social Progress Index

The Social Progress Imperative is a global nonprofit based in Washington, DC. The organization launched the Social Progress Index (SPI) in 2014 with efforts to face social challenges and drive efforts to create equitable, inclusive, and prosperous societies (Social Progress Imperative, 2018). The index is a comprehensive measure of a country's quality of life, measuring three major areas: basic human needs, foundations of wellbeing, and opportunity.

BHN represents the health and safety variable for this study. BHN is a composite score comprising 16 individual indicators; however, due to the nature of this study

analyzing food insecurity, five indicators were not included in the BHN variable in order to not cause any error measurements against food insecurity. The 11 indicators included in the BHN variable for this study are as follows: 1) access to basic drinking water; 2) access to piped water; 3) access to basic sanitation facilities; 4) rural open defecation; 5) access to electricity; 6) quality of electricity supply; 7) household air pollution attributable deaths; 8) homicide rate; 9) political killings and torture; 10) perceived criminality; and 11) traffic deaths. Country scores range from 0 to 100, with higher scores indicating greater fulfillment of basic human needs. These variables can be viewed in Figure 3-3. More detail on each variable can be found in the Appendix. For the purpose of this study, SPI provided data for the variable BHN.

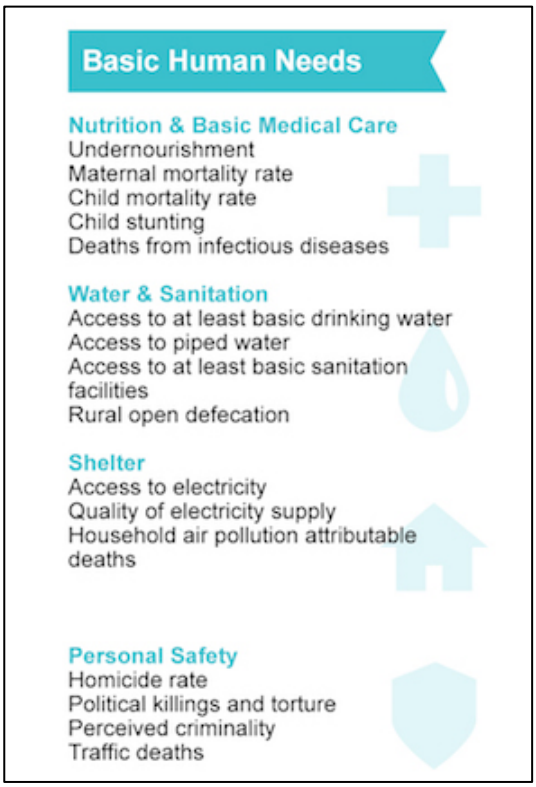

Figure 3-3. Basic human needs (reprinted from the Social Progress Index).

3. Corruption (C) - Corruption Perceptions Index

The Corruption Perceptions Index (CPI) is the leading global indicator of public sector corruption. The index is developed and maintained by Transparency International (Saisana & Saltelli, 2012). Transparency International compares 180 country scores from year to year. The 2018 CPI uses data from 13 surveys (see Appendix E for full list) and expert assessments to measure public sector corruption. CPI uses a scale ranging from 0 to 100, where 0 is highly corrupt and 100 is very clean. CPI provided data for the variable C in this study. Figure 3-4 shows a map created by CPI with the 2018 global corruption levels.

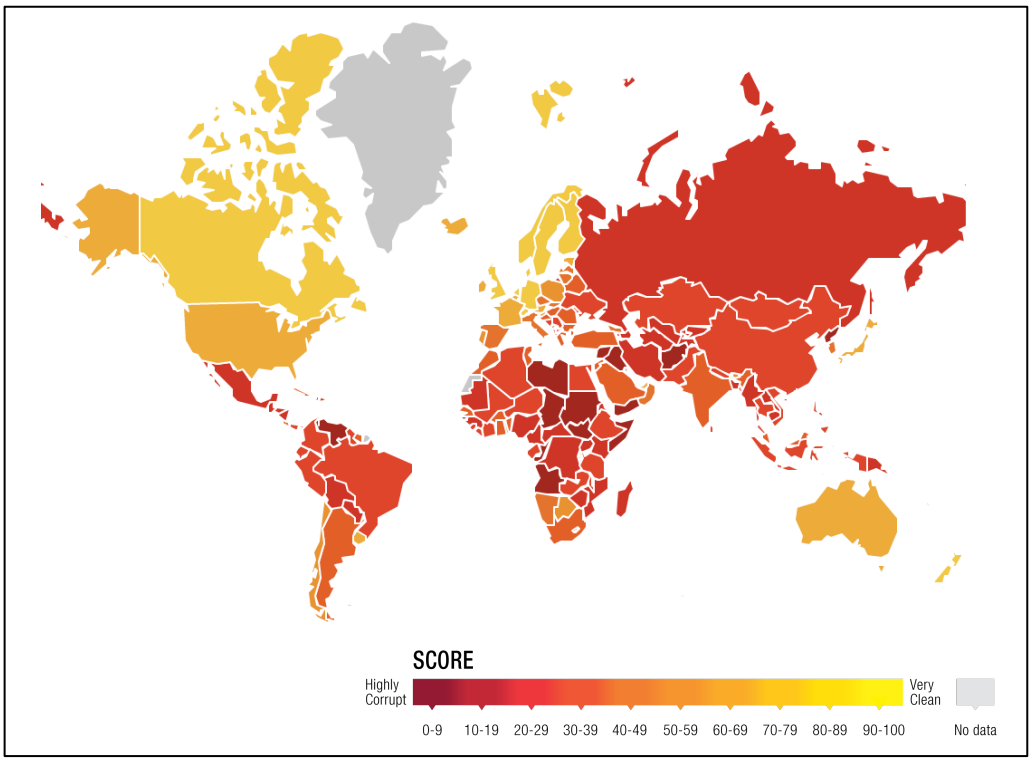

Figure 3-4. Corruption (reprinted from the Corruption Perceptions Index).

4. Gross Domestic Product (GDP) - World Bank

The World Bank offers high-quality statistical data for improving global development. Gross domestic product was selected for this study as GDP is often an indicator of the overall well-being of a nation and is tackled by development agencies as a means to improve food security and child malnutrition. However, the homogenous effects of gender inequity on child malnutrition and food insecurity are comparable to, and at times larger than, those of GDP per capita. Often times, scholars and policymakers assume that increased economic development will improve food security. This relationship, however, is neither automatic nor guaranteed (Burroway, 2016). For

this study, The World Bank provided data for the variable GDP. GDP is offered in current (US$) per capita and is a single score in real dollars.

5. Female Education (FE) - Social Progress Index

SPI is a global nonprofit based in Washington, DC. The organization launched SPI in 2014 with efforts to face social challenges and drive efforts to create equitable, inclusive, and prosperous societies (Social Progress Imperative, 2018). The index is a comprehensive measure of a country's quality of life. A component of the opportunity category on SPI is women's average years in school. This variable is a single score indicator of the average school year attendance by women ages 25 to 34, including primary, secondary, and postsecondary education. SPI provided data for the variable FE.

6. Food Insecurity (FI) - Global Food Security Index

The Global Food Security Index (GFSI) considers the affordability, availability, quality, and safety of food across 112 countries. The index is developed and maintained by The Economist Intelligence Unit. GFSI is a quantitative benchmarking model constructed from 28 indicators measuring the drivers of food insecurity across both developing and developed countries. GFSI also assesses a countries' exposure to the impacts of a climate change, susceptibility to natural resource risks, and how countries are adapting to these risks (GFSI, 2018). The index scores countries from 0 (very food insecure) to 100 (highly food secure). GFSI defines operationally the variable FI. A visual representation of the index created by GFSI is presented in Figure 3-5. The outer circle represents country population, while the inner colored circle represents the index score as percent of population.

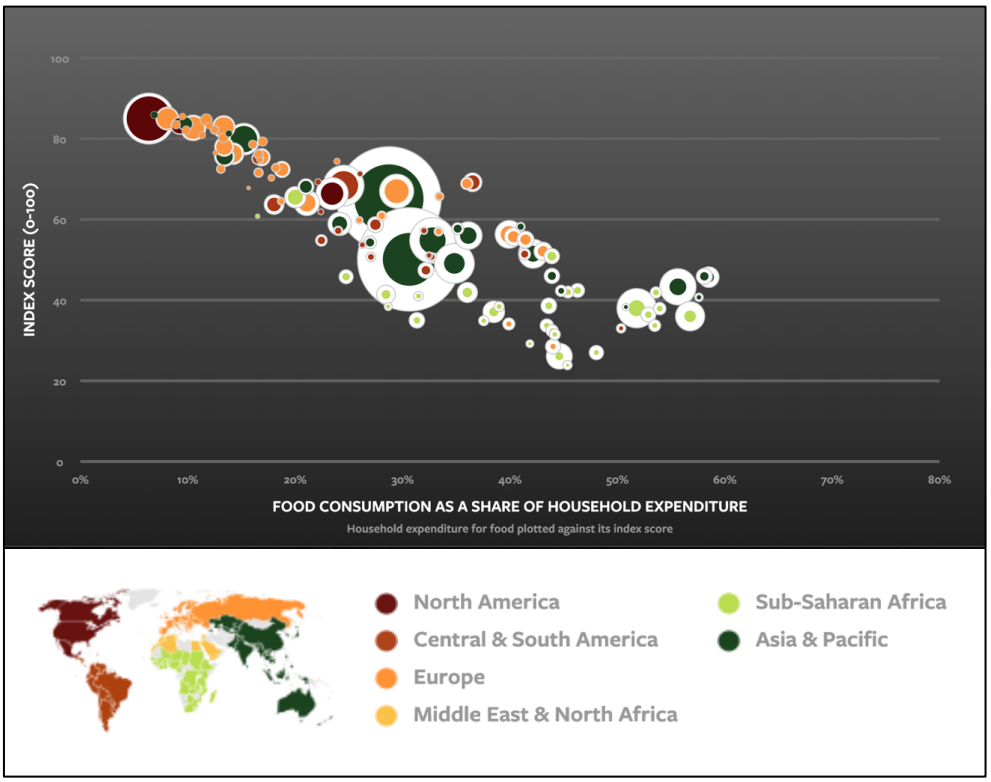

Figure 3-5. Food insecurity variable (GFSI scores reprinted from the Global Food Security Index).

See Table 3-1 to review all of the variables and their individual score range and meaning.

Table 3-1

Variable Score Meanings

Variable	Score Range	Meaning
Gender Inequity (GI)	0-16	0= Lower GI; 16= Higher GI
Basic Human Needs (BHN)	0-100	0= BHN unmet; 100= BHN met
Corruption (C)	0-100	0=Highly corrupt; 100=Very clean
Female Education (FE)	Single Score	Number equal to female average years in school
Gross Domestic Product (GDP)	Single Score	Number equal to country's GDP per capita
Food Insecurity (FI)	0-100	0=high food insecurity; 100=food secure

Assumptions. Accepting secondary data on GI, BHN, C, FE, GDP, and FI, it is assumed that the sources (i.e. WomanStats Project, Social Progress Index, Transparency International, World Bank, and the Global Food Security Index) are all valid and reliable sources.

3.6.2. Conceptual Definitions

Conceptual definitions of gender inequity, food insecurity, structural equation modeling, observable variable, mediating variable, Sobel testing and bootstrapping are presented.

Gender Inequity

Gender is a social category including roles, responsibilities, and ideas about what characteristics make a man or a woman. Gender inequity is the idea that men and women are not equal. This results in different treatment or perceptions of individuals due to their gender. It arises from differences in biology and cultural norms.

Gender inequity is dynamic, multifaceted, and fluid. It is context-specific and complex, and can include unequal rights to employment or income, discriminatory land ownership, lower education of a specific sex, gender-based violence, and unequal workloads and/or division of labor (Kerr et al., 2016). Gender inequity "damages the physical and mental health of millions of girls and women across the globe, and also of boys and men despite the many tangible benefits it gives men through resources, power, authority, and control" (WHO, 2018, para. 1). Men are more likely to have access to resources and earn cash wages; however, they are less likely to spend it on family needs (i.e. food, clothes, health care, and education). Such patterns are disturbingly prevalent across countries and cultures (Jacobson, 1992; O'Brien et al., 2016).

Food Insecurity

Food insecurity is the absence of one or more of the four pillars (i.e. availability, accessibility, stability, and utilization). Food insecurity indicates a high probability of randomly selecting an individual from a population who is consuming insufficient calories to cover their energy requirement for a healthy life (Social Progress Index Methodology, 2018).

Structural Equation Modeling (SEM)

For the purpose of this study, SEM software was selected to test the observed variables. This is a type of path analysis. Path analysis is highly flexible and effective at examining relationships between and among variables. Bowen and Guo (2012) define SEM as an "umbrella' encompassing a set of multivariate statistical approaches to

empirical data" (p. 5). SEM models are based on theoretical or empirical frameworks (Bowen & Guo, 2012).

Observable variable. Also referred to as a manifest variable, an observed variable can be directly seen and represents the data. Observable variables can be categorical, ordinal, or continuous (Kline, 2015). In this study, all variables used are observable and continuous.

Mediation analysis. Mediation analysis allows researchers to predict behavior under a wide array of conditions and policy interventions (Baron & Kennedy 1986). A mediator variable explains how nature works; it helps explain the mechanism through which the causal variable affects the outcome. A mediator is an observable variable that is called the indirect effect. The mediator variable is affected by one variable and in turn affects another variable (Kline, 2015).

Sobel test and bootstrapping. The Sobel test and Bootstrapping are two variations of testing the significance of the indirect effect (Baron & Kennedy 1986).

3.6.2.1. Descriptive Statistics

Using STATA, number of observations, mean, standard deviation (SD), minimum, and maximum were calculated for GI, BHN, C, FE, GDP, and FI. The following are composite scores: GI, BHN, C, and FI. FE and GDP are single scores, with female education (FE) reported in years of schooling received by women ages 25-34 in a country and GDP being reported in real dollars. Table 3-2 contains descriptive statistics for the six variables examined in the study. Table 3-3 provides zero-order correlation coefficients of all pairs of variables used in the models.

Table 3-2

Descriptive Statistics for All Variables Used in Models

Variable	n	M	SD	Min	Max
Gender Inequity (GI)	112	7.67	4.59	0 (low GI)(good)	15 (high GI)(poor)
Basic Human Needs (BHN)	110	72.41	18.45	38.08 (unmet)	98.32 (met)
Corruption (C)	111	44.49	20.17	13 (corrupt)	90 (clean)
Female Education (FE)	111	10.00	4.10	1.41 (low)	15.68 (good)
Gross Domestic Product per capita (GDP)	109	$14,548.12	$18,673.53	$285.73 (low)	$78,812.65 (high)
Food Insecurity (FI)	112	58.62	17.41	24 (poor)	86 (good)

Table 3-3

Zero Order Correlation for All Variables Used in Models

	GI	BHN	C	FE	GDP	FI
GI	1.00					
BHN	-0.75	1.00				
C	-0.68	0.74	1.00			
FE	-0.81	0.86	0.65	1.00		
GDP	-0.66	0.67	0.86	0.65	1.00	
FI	-0.76	0.91	0.83	0.84	0.80	1.00

Statistical procedure. The hypothesized, directional relationships were tested using STATA/IC 15.1.

3.6.3. Conceptual Framework

Observations, $N = 112$, were tested using one independent variable (GI) and one dependent variable (FI). Model 1 is a simple linear regression based on literature and

constructed using GI as an independent variable and FI as a dependent variable. Models 2-5 are structural equation models keeping GI as an exogenous or independent variable and FI as an endogenous dependent variable, and using either BHN, C, FE, or GDP as mediating variables. Finally, in Model 6 all six of the variables are arranged based on the literature and conceptual framework of this study.

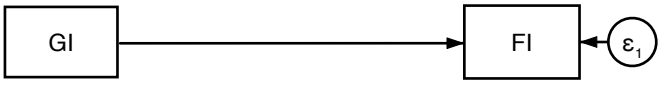

Figure 3-6. Model 1 is a simple linear regression of GI and FI.

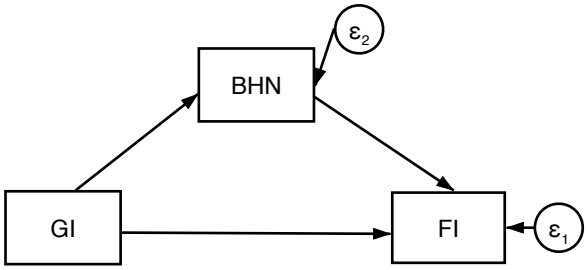

Figure 3-7. Model 2 is an SEM using GI, FI, and BHN.

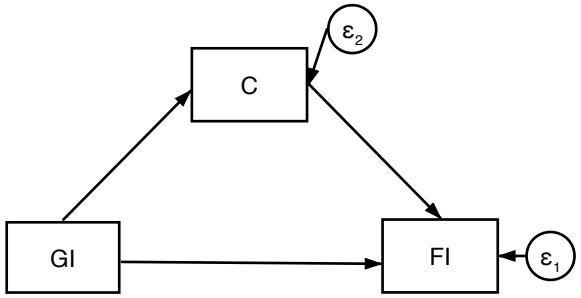

Figure 3-8. Model 3 is an SEM using GI, FI, and C.

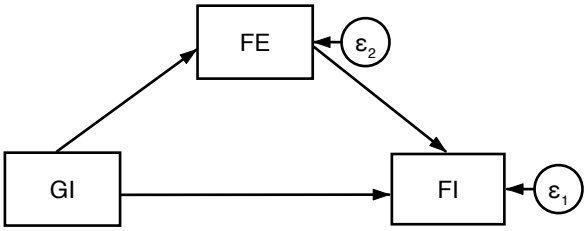

Figure 3-9. Model 4 is an SEM using GI, FI, and FE.

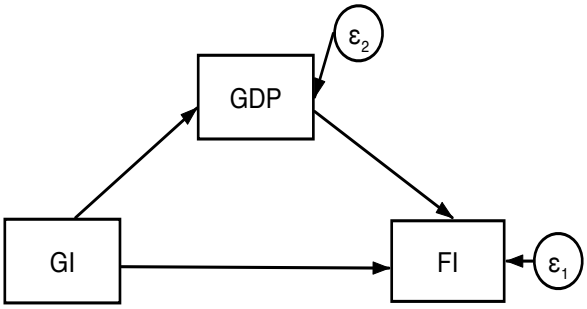

Figure 3-10. Model 5 is an SEM using GI, FI, and GDP.

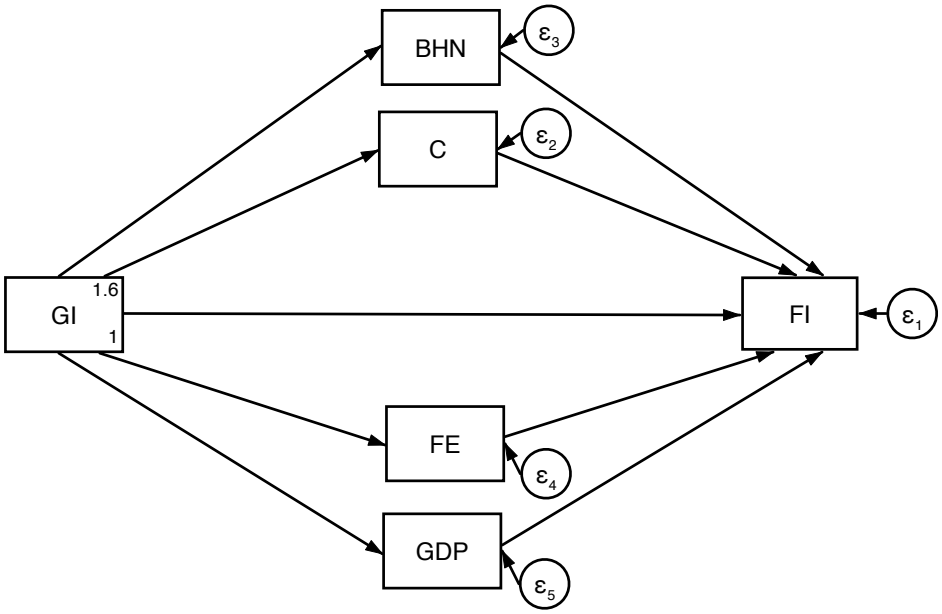

Figure 3-11. Model 6 used all six variables: GI, BHN, C, FE, GDP, and FI.

3.7. Results

Model 1

Model 1 results are depicted in Figure 3-12.

Testing. Model 1 examined the effect of GI on FI through a simple linear regression.

Results. In Model 1, a path was drawn from GI to FI.

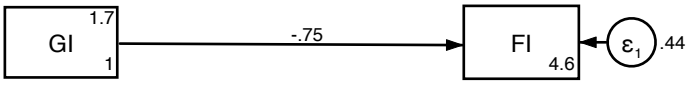

Figure 3-12. The standardized results include the estimates for Model 1.

*The relationship between GI and FI was statistically significant, revealing that GI explains 56% of the variation in FI. In the top right of GI, 1.7 represents the standard

mean and 1 in the bottom right represents the standard variance. In FI, 4.6 represents the standard intercept and .44 represents the standard unexplained variance.

Model 2

Next, the classic approach to mediation analysis was utilized (See Appendix G). Initially, the effect of GI on FI was -2.83 (X –› Y(c); $p < 0.001$*). That is, as gender inequity worsened by one unit, (+1) food insecurity worsened by -2.83 units. Adding BHN as a mediator with each unit change in GI, BHN changes by -2.97 on average, that is, basic human needs are unmet (X –› M(a); $p < 0.001$*). The direct effect of BHN on FI is 0.74 (M –› Y (b); ($p < 0.001$*). That is, as basic human needs are increasingly met, food security increases. Controlling for GI, the decrease in FI scores per change in BHN is -2.97, which in turn leads to an average -2.19 change in FI scores. [Indirect effect=ab= (-2.97) (0.74) = -2.19]. 83% of the variance in the FI score is explained by the mediation model [$F (1,108) = 130.97$, $p <0.001$].

Next, indirect effects of the mediation model were tested using the Sobel test of indirect effects and Bootstrapping CI of indirect effect. The results indicated the indirect effects of the mediational model were statistically significant [(Sobel test of indirect effects = -2.19, $p < 0.005$); Bootstrapping CI of indirect effect = 95% CI (-2.62, -1.76)].

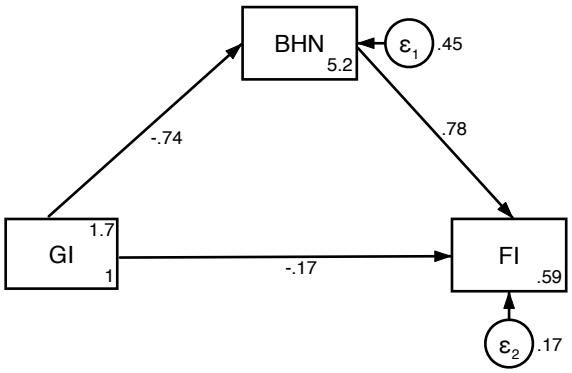

Figure 3-13. The standardized results including the estimates for Model 2.

*The relationship between GI and BHN was statistically significant. *The relationship between BHN and FI was statistically significant. In the top right of GI, 1.7 represents the standard mean and 1 in the bottom right represents the standard variance. In FI, 0.59 represents the standard intercept and 0.17 represents the standard unexplained variance. In BHN, 5.2 represents the standard intercept and 0.45 represents the standard unexplained variance.

Model 3

The classic approach to mediation analysis was utilized (See Appendix). The total effect of GI on FI was -2.825 (X −›Y(c); $p < 0.001$*). With higher levels of GI, C changes by -2.96 on average (X −› M(a); $p < 0.001$*). The direct effect of C on FI is 0.523 (M −›Y (b); ($p < 0.001$*). That is, as corruption increases, food insecurity increases. Controlling for GI, the change in FI scores per change in C is -2.96, which in turn leads to an average -1.55 change in FI scores [Indirect effect=ab= (-2.96) (0.523) = -

1.55]. 75% of the variance in the FI score is explained by the mediation model [F (2,108) = 165.88, p <0.001].

Next, indirect effects of the mediation model were tested using the Sobel test of indirect effects and Bootstrapping CI of indirect effect. The results indicated the indirect effects of the mediational model were statistically significant [(Sobel test of indirect effects = -1.55, p < 0.001); Bootstrapping CI of indirect effect = 95% CI (-1.95, -1.15)].

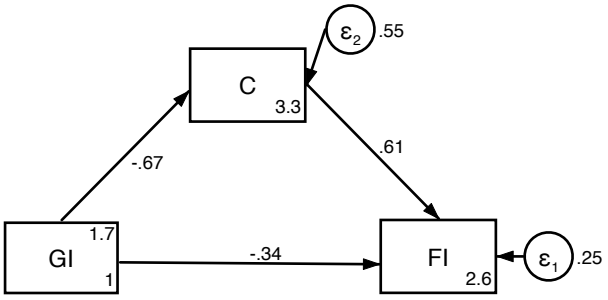

Figure 3-14. The standardized results including the estimates for Model 3.

*The relationship between GI and C was statistically significant. *The relationship between C and FI was statistically significant. *The relationship between GI and FI was statistically significant. In the top right of GI, 1.7 represents the standard mean and 1 in the bottom right represents the standard variance. In FI, 2.6 represents the standard intercept and 0.25 represents the standard unexplained variance. In C, 3.3 represents the standard intercept and 0.55 represents the standard unexplained variance.

Model 4

A classic approach to mediation analysis was utilized (See Appendix). The total effect of GI on FI was -2.825 (X –› Y(c); p < 0.001*). With higher levels of GI, FE

changes by -0.72 on average (X –› M(a); p < 0.001*). The direct effect of FE on FI is 2.83 (M –› Y (b); (p < 0.001*). That is, as female education increases, food security increases. Controlling for GI, the increase in FI scores per increase in FE is -0.72, which in turn leads to an average -2.04 change in FI scores [Indirect effect=ab= (-0.72) (2.83) = -2.04]. 73% of the variance in the FI score is explained by the mediation model [F (2,100) = 131.71, p <0.001].

Next, indirect effects of the mediation model were tested using the Sobel test of indirect effects and Bootstrapping CI of indirect effect. The results indicated the indirect effects of the mediational model were statistically significant [(Sobel test of indirect effects = -2.03, p < 0.001); Bootstrapping CI of indirect effect = 95% CI (-2.63, -1.43)].

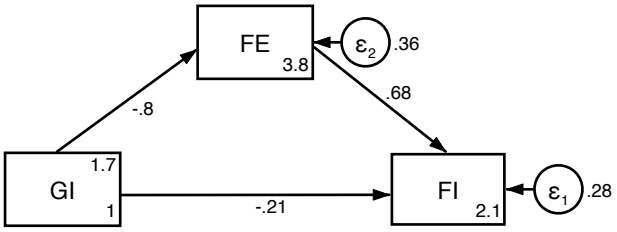

Figure 3-15. The standardized results including the estimates for Model 4.

*The relationship between GI and FE was statistically significant. *The relationship between FE and FI was statistically significant. *The relationship between GI and FI was statistically significant. In the top right of GI, 1.7 represents the standard mean and 1 in the bottom right represents the standard variance. In FI, 2.1 represents the standard intercept and 0.28 represents the standard unexplained variance. In FE, 3.8 represents the standard intercept and 0.36 represents the standard unexplained variance.

Model 5

The classic approach to mediation analysis was utilized (See Appendix). The total effect of GI on FI was -2.825 (X –› Y(c); $p < 0.001$*). With higher levels of GI, GDP changes by -$2,590.77 on average (X –› M(a); $p < 0.001$*). The direct effect of GDP on FI is 0.0005 (M –› Y (b); ($p < 0.001$*). That is, as gross domestic product increases, food security increases. Controlling for GI, the change in FI scores per change in GDP changes by -$2,590.77, which in turn leads to an average -1.3 change in FI scores [Indirect effect=ab= (-$2590.77) (0.0005) = -1.3]. 74% of the variance in the FI score is explained by the mediation model [$F (2,106) = 147.96$, $p<0.001$].

Next, indirect effects of the mediation model were tested using the Sobel test of indirect effects and Bootstrapping CI of indirect effect. The results indicated the indirect effects of the mediational model were statistically significant [(Sobel test of indirect effects = -1.34, $p < 0.001$); Bootstrapping CI of indirect effect = 95% CI (-1.66, -1.02)].

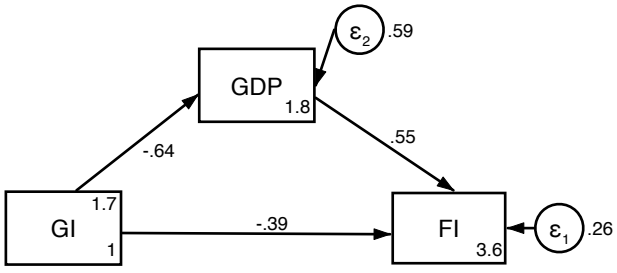

Figure 3-16. The standardized results including the estimates for Model 5.

*The relationship between GI and GDP was statistically significant. *The relationship between GDP and FI was statistically significant. *The relationship between GI and FI was statistically significant. In the top right of GI, 1.7 represents the standard mean and

1 in the bottom right represents the standard variance. In FI, 3.6 represents the standard intercept and 0.26 represents the standard unexplained variance. In GDP, 1.8 represents the standard intercept and 0.59 represents the standard unexplained variance.

Model 6

Model 6 depicts all six variables, using BHN, C, FE, and GDP as mediating variables simultaneously.

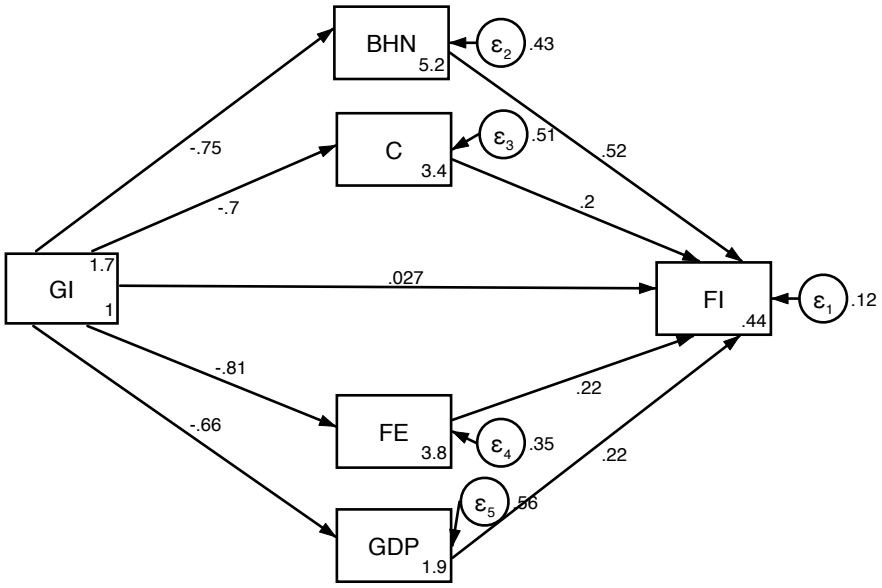

Figure 3-17. The standardized estimates for Model 6.

Once all mediators were found to be significant in univariate analyses were entered together into a final logistic model. *The relationship between GI and BHN was statistically significant. *The relationship between GI and C was statistically significant. *The relationship between GI and FE was statistically significant. *The relationship between GI and GDP was statistically significant. *The relationship between BHN and

FI was statistically significant. *The relationship between C and FI was statistically significant.

3.8. Discussion

The results of the mediation analyses revealed the importance of placing significant value on the role of gender inequity in development policies and programs. The food security of a nation is dependent on gender equity. But beyond food security, the overall well-being a nation is dependent on gender equity. As shown by the mediation analyses, gender equity is a pivotal measurement to determine other development areas. While many development and female empowerment agencies tackle female education to improve gender equity, the results from this study revealed that female education alone is not a highly explanatory factor contributing to food security. This may be due to the fact that in many countries, even if a girl is educated, she may not increase her freedoms or social status at all. While education is important and should be encouraged, education alone does not necessarily change or benefit the lives of females around the world.

Supported by previous literature, findings indicated that gender equity is a precondition for the advancement of development areas such as, food security, health and personal safety, corruption, education, and economic development. Countries with higher levels of gender inequity suffer from more severe levels of food insecurity. Ending all forms of discrimination against women and girls not only has positive effects on global food security but has "a multiplier effect across all other development areas" (Lalaguna & Dorodnykh, 2018, p. 1).

Analysis of how gender inequity shapes women's ability to effectively establish and maintain food security has been missing from cross-national research (Burroway, 2016). This investigation revealed statistically significant relationships between gender inequity, food insecurity, basic human needs, corruption, female education, and gross domestic product.

These findings are significant, revealing that any program solely addressing gender may be an incomplete or less effective approach than incorporating one or more development goals with a gender component woven in. Gender inequity reveals much more about the social norms than just attitudes toward men or women. The inequitable treatment toward one people group based on something such as sex reveals the mental attitudes and abilities of a people to separate, objectify, and dehumanize select individuals. Development programs targeting one area of food insecurity are severely lacking. Oftentimes, gender is viewed as separate from other development goals, while food insecurity is commonly addressed by striving to achieve the four food security pillars. However, the best approach to any and all of these development goals includes gender equity.

The simple linear regression between gender inequity and food insecurity revealed that gender inequity explains 56% of the variation of food insecurity (see Model 1). The simple mediation models (Model 2-5) revealed statistically significant relationships between gender inequity, basic human needs, corruption, female education, gross domestic product, and food insecurity. Among the four mediating variables, basic human needs demonstrated the strongest explanatory ability. The predictive ability of

Model 2 using basic human needs was R^2=0.83 and showed significant indirect effects ($p<0.005$). This indicates that addressing basic human needs while also addressing gender inequity is a strong pathway to help improve food insecurity.

Model 3 was a mediation analysis using corruption as a mediating variable. Findings revealed a significant indirect effect ($p<0.001$) and a predictive ability of R^2=0.75, indicating that corruption and gender inequity are strongly related to food insecurity. Programs and policies addressing corruption should also incorporate gender inequity for best results. Model 4 was a mediation analysis using female education as a mediating variable. This analysis showed significant indirect effects ($p=<0.001$) and revealed a predictive ability of R^2=0.73. These findings indicate that female education and gender inequity are strongly related to food insecurity and programs that address both of these variables can help improve food insecurity. Model 5 was a mediation analysis using gross domestic product as a mediating variable. This analysis showed significant indirect effects ($p=<0.001$) and a predictive ability of R^2=0.74, indicating that corruption and gender inequity are strongly related to food insecurity. Programs addressing corruption and gender inequity can help improve food insecurity.

The total indirect of Model 6, which included all six variables, was statistically significant ($p<0.001$). Upon the interaction of all four mediating variables, basic human needs remained the most significant with the strongest mediating effects between gender inequity and food insecurity. The multiple mediation model showed no direct effect of gender inequity on food insecurity when the mediating variables of basic human needs, corruption, female education, and GDP are included in an explanatory model. This may

be a result of the high zero order correlation between all pairs of exogenous variables. A reduced model using only basic human needs as a mediating variable on the relationship between gender inequity and food insecurity could be most helpful.

These results highlight the importance of understanding food insecurity using a gender-sensitive perspective approach. In instances where women do not receive equitable treatment despite high levels of human development, one could question just how "developed" that society actually is (Sharma, 1997; Scanlan, 2004). Gender inequity should be encompassed in all research, policy initiatives, and teaching methods.

Promoting gender equity is crucial in order to create and maintain a healthy society. Gender-based biases and constraints have a high cost on any society in terms of untapped potential in achieving development goals (FAO, 2014; Lalaguna & Dorodnykh, 2018). "At the most basic level improving the decision-making capacity and opportunity of women improves the life chances of the world's children who are the foundation of a country's overall development well-being" (Scanlan, 2004, p. 1822).

3.9. Implications

Women must be acknowledged as vital contributors to national food security. A result of this study is that gender inequity can no longer be seen as a disassociated factor when examining international development. FAO (2011) estimated that when women control income, they spend more of it on food, health, clothing, and education for their children than men do. This has positive effects on overall well-being and economic growth through improved health, nutrition, and education. Actions are needed in order to improve gender equity and ensure that women and girls have equal opportunities to

benefit from development. Barriers must be removed which prevent women from being full participants in all sections of society (Lalaguna & Dorodnykh, 2018).

Whether creating policy or training development agents, gender equity must be established as a priority at the forefront. Improving gender equity in any society has been proven to not only enhance the lives of women, but also of children and men and in turn benefit the entire country. Using findings from this study, suggestions can be made for policy and training strategies to incorporate gender roles, cultural expectations, and work towards improving gender equity while remaining culturally sensitive. In order to improve a specific area of development, such as female education, a community's values, beliefs, and traditions must be taken into account. Understanding food security and development can only be best fully understood with a WID and GAD. These should be incorporated in all research, policy, and teaching approaches. According to Dreistadt (2006):

> Sustainable food security implies strengthening the livelihood security of all members within a household by ensuring both physical and economic access to balanced diet, safe drinking water, environmental sanitation, basic healthcare and primary education. Directly or indirectly, women do play a greater role [than do men] in all these aspects. (p. 3)

3.10. Limitations, Delimitations, and Recommendations for Further Research

Limitations

In this chapter, analyses are limited by the social and demographic variables used. This study is limited by the time period in which it takes place. The study provides

a benchmark for future longitudinal studies that examine the changing status of women globally.

Delimitations

Secondary international open-access data were selected for use in this study. All variables were treated as observable variables. Variables were delimited within simple path models testing observable variables.

Recommendations for Further Research

While this research begins to address a gap in scholarly literature, further research opportunities are unlimited. While this study focused on four mediating variables between gender inequity and food insecurity, many other variables could also be observed as the relationships of societal function and normality are endless. Future research exploring variables such as war and violence, HIV/AIDS, female reproductive rights, alcohol consumption and domestic violence may help identify other influences on food insecurity.

3.11. Conclusion

As concluded in this chapter, gender inequity has significant effects on global food insecurity. This research has revealed the higher levels of gender inequity are associated with higher levels of food insecurity, lower levels of basic human needs being met, more corruption, reduced female education, and lower GDP. The four mediating variables were selected for this study based on research-based literature used in an exploratory scoping study.

This chapter began to fill a gap in the body of research-based literature. Utilizing cross-national methods, new measures in the form of gaps in the proximity of gender inequity and development, these analyses make an important contribution by empirically evaluating the effects of gender inequity on food insecurity. An important contribution of these analyses is the utilization multi-national data across 112 countries to present results regarding the important role of gender equity on food security.

Findings from this study confirmed that women are a vital human resource who can help national governments, development agencies, and policy planning strategies in achieving global food security. Figures 3-18 through 3-23 visually illustrate global color coding with the results from this study for each individual variable. However, one area of development cannot be appropriately addressed without understanding and gaining perspective on the culture. This study further established the idea of a need for holistic community development and the need to understand gender equity at its roots.

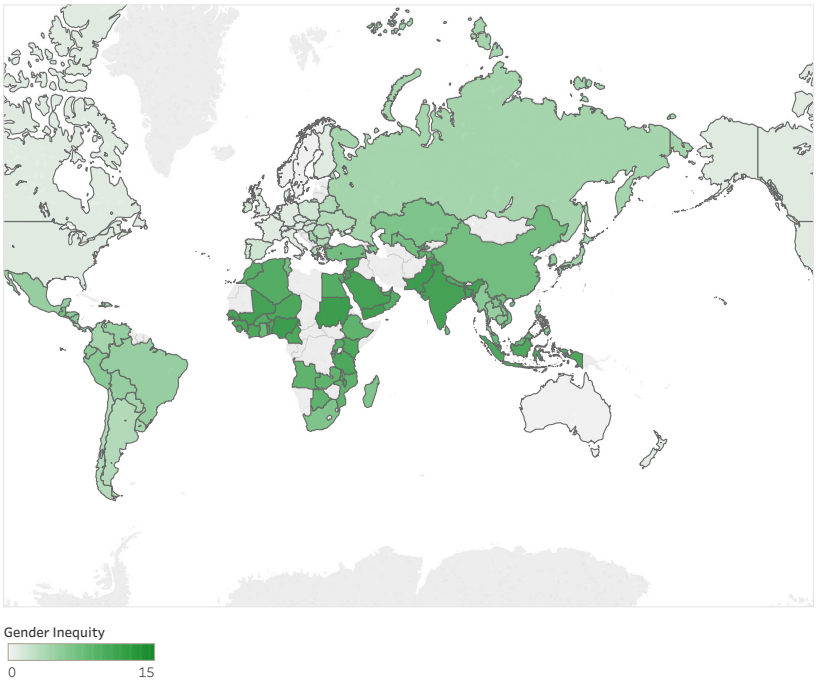

Figure 3-18. Gender inequity results (darker green indicates higher GI).

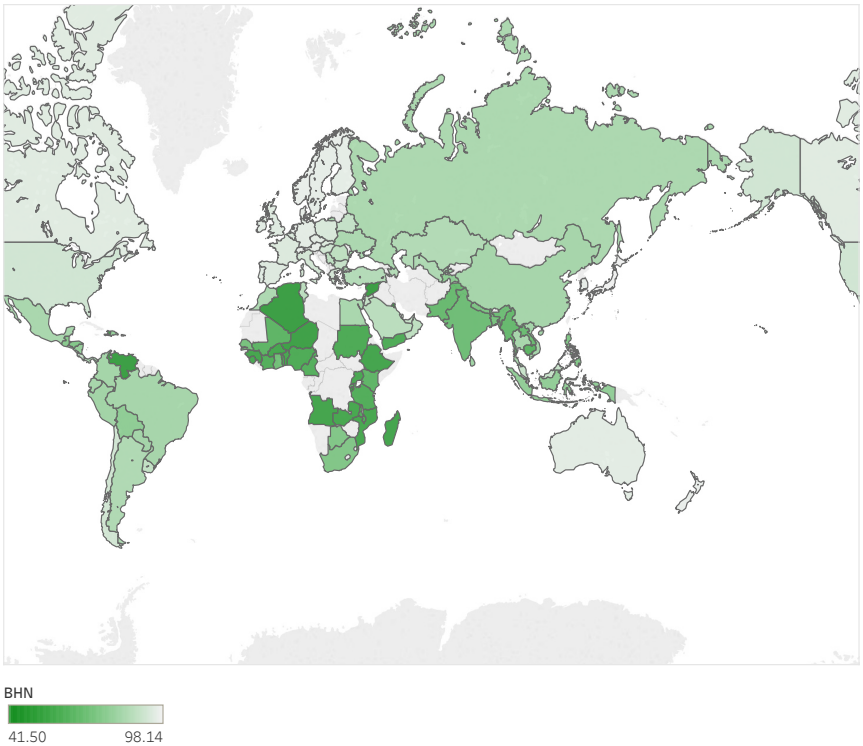

Figure 3-19. Basic human needs results (darker green indicates fewer BHN).

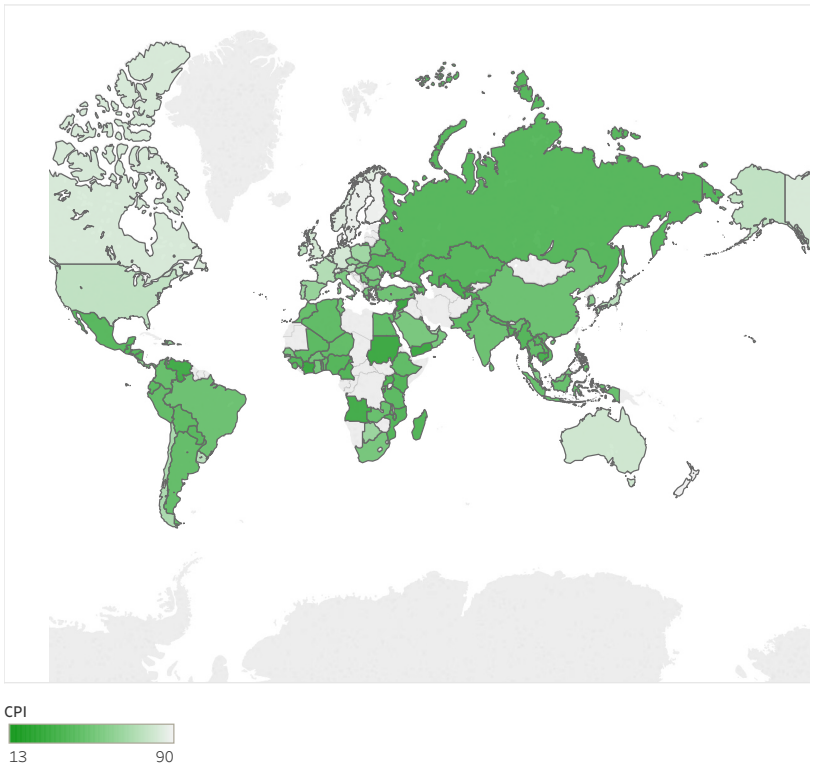

Figure 3-20. Corruption results (darker green indicates higher C).

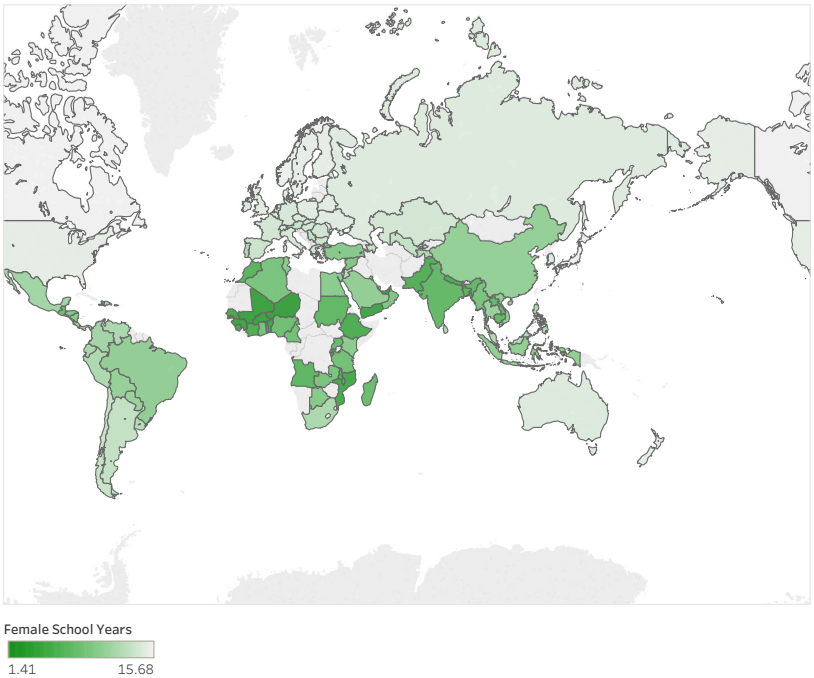

Figure 3-21. Female education results (darker green indicates lower FE).

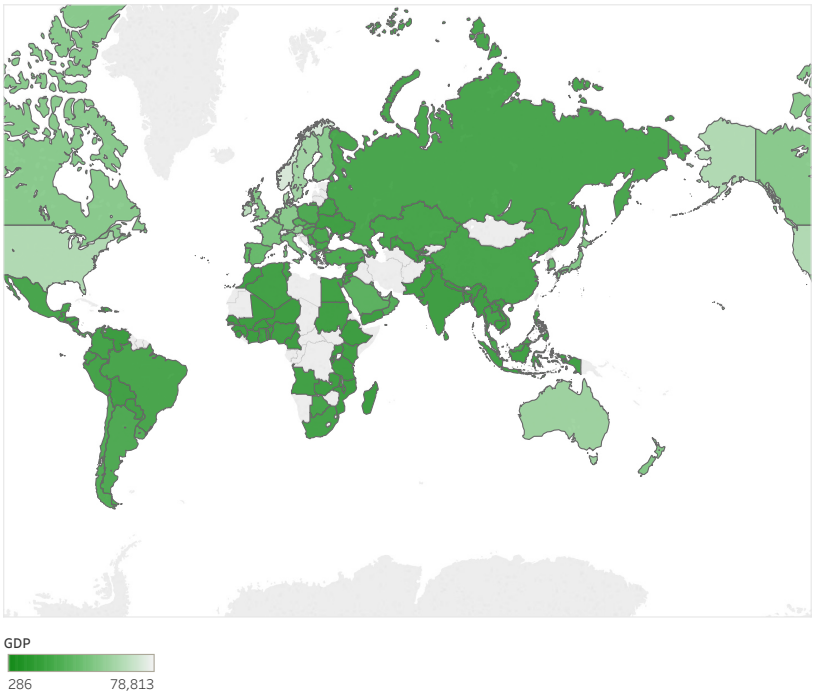

Figure 3-22. Gross domestic product results (darker green indicates lower GDP).

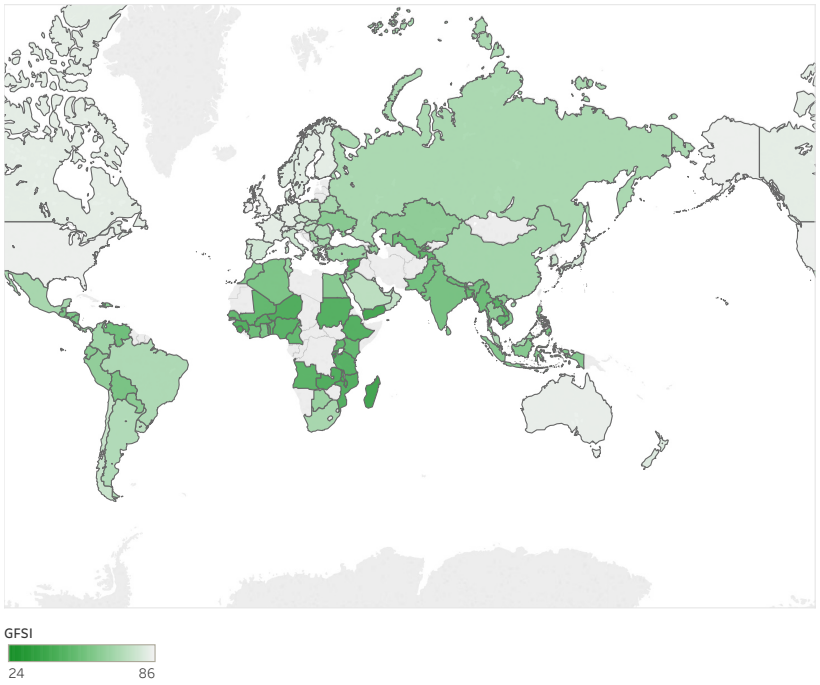

Figure 3-23. Global food insecurity results (darker green indicates severe FI).

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4. WOMEN AS A VITAL RESOURCE TO ACHIEVING FOOD SECURITY

One out of every nine people in the world is undernourished (FAO, 2018; Senauer & Sur, 2001; Pinstrup-Andersen & Cheng, 2007). According to the Food and Agriculture Organization of the United Nations (FAO) and others, evidence indicates a rise in world hunger that has been increasing over the past three years. Food insecurity is an ever-growing issue with the total number of people suffering from undernourishment or chronic food deprivation increasing from "804 million in 2016 to nearly 821 million in 2017" (FAO, IFAD, UNICEF, WFP & WHO, p. xiii, 2018).

According to UN Women (2012), gender inequity is a major cause and effect of hunger and poverty (Karl, 2009). According to the Rural Women and the Millennium Development Goals developed by the United Nations Inter-Agency Task Force on Rural Women, if women had equal access to the same resources as men, yields would increase by 20-30 percent. This yield increase would raise agricultural output by 2.5-4.0 percent in developing countries, decreasing the total number of hungry people by 12-17 percent worldwide (UN Women, 2012; O'Brien, Gunaratna, & Gebreselassie, 2016).

"In many parts of the world, women are the primary growers of food, especially subsistence crops; according to FAO women produce about 80 percent of Africa's food and about 50 percent of food worldwide" (Hudson, Ballif-Spanvill, Caprioli, & Emmett, 2012, p. 14). Ironically, an estimated 60 percent of the world's chronically hungry people are women and girls (Karl, 2009).

4.1. Issue

Gender inequity negatively impacts every social institution, ranging from individual households to international development organizations. It is a stumbling block on the road to sustainable development (Jacobson, 1992; O'Brien et al., 2016). Gender equity is essential to food security as well as global peace and security (Verveer, 2012; Assan, 2014). Analysis of how gender inequity shapes women's ability to effectively establish and maintain food security has been missing from cross-national research. The effects of gender inequity are comparable to or greater than the effects of economic development (Burroway, 2016).

Policies and programs that address women's needs, interests, and barriers are key for ensuring food security (UN Women, 2012; Assan, 2014; Karl, 2009). However, assisting in the aid of women has been viewed as separate from what are considered more strategic issues (i.e. war, peace, and economic stability). However, "promoting the status of women is not just a moral imperative but a strategic one" (Verveer, 2012, para. 2).

Women are rarely involved in designing or implementing development programs. Consequently, these programs do not address women's real needs (Jacobson, 1992; Assan, 2014). According to the United Nations (UN), the international community contributed an estimated 7.5 billion dollars to rural development assistance from 2008 to 2009. However, only three percent was allocated to gender equity programs where gender equity was the primary objective (Deen, 2012; O'Brien et al., 2016). The equal celebration of both sexes must be promoted to create an optimal society to "celebrate"

both sexes equally. A healthy society requires that both males and females be valued for their contributions (MacLeod, 1996). Misconceptions and assumptions about household function can have detrimental effects on food security. Development planners often assume that an increase in household income through the employment of men in cash crop production will benefit everyone in the household and enable food purchasing power. In many cases, however, incomes are not shared even though women are solely responsible for supplying household food (Karl, 2009).

The gender division of responsibilities tends to be overlooked or unrecognized by development planners. Barber Conable of the World Bank speculated 40 years ago that women do two-thirds of the world's work, an opinion still supported by evidence today (Hudson et al., 2012). In addition to women doing a majority of the world's work, "feminist economists have rightly pointed out that capitalism could not even exist if women did not perform these labors with little or no remuneration. Apparently, in the thinking of most economists, women are like air and water, to be used for free" (Hudson et al., 2012, p. 15). Women are responsible for the care of children and the elderly; these roles in the households and communities are not recognized by policymakers.

"Inequality is maintained through cultural acceptance" (Hudson et al., 2012, p. 15). While female agriculturists account for 60 percent of the workforce in sub-Saharan Africa and nearly 70 percent in South Asia, fewer than five percent of females in Northern and Western Asia and 15 percent in sub-Saharan Africa are landholders (UN Women, 2012). "More resources should be allocated to women so that they can better practice their multiple roles and equally benefit from the economic growth and

community development" (Yiping, 2009, p. 79). The goal of gender advocacy is to transform economic policymaking so that the human rights dimensions are considered at the design stage of programs (Sadasivam, 1997; O'Brien et al., 2016; Assan, 2014).

4.2. Significance of the Research

The purpose of chapter IV is to identify practice-specific applications and curriculum development in the food, agriculture, natural resources, and human (FANH) sciences from this current research. This chapter addresses the research question: What are strategy implications from this research on postsecondary education in the FANH sciences?

Written as a strategy piece, this chapter identifies practical strategies and recommendations to enhance postsecondary education. The recommendations concentrate on recognizing women as pertinent in agricultural development and establishing food security. More specific, this chapter addresses the research question: What are strategy implications for FANH sciences at the university level as it relates to the current research results? (i.e. the research results from chapter II and III). Chapter II revealed a gap in scholarly literature in the agriculture, sociology, and health disciplines. Chapter III revealed a statistically significant relationship between gender inequity and food insecurity with gender inequity explaining 56% of food insecurity.

This dissertation contributes to the FANH sciences by recognizing women's role in development. It includes a design proposal of six modules pertaining to the variables used in chapter III (i.e. food insecurity, basic human needs, corruption, female education, and GDP). Five modules will address food insecurity, female education,

health and safety, corruption, economy. A sixth module will be a holistic development course. Each module will identify current international development strategies while also incorporating the effects of gender inequity.

To develop recommendations for postsecondary curricula and modules following is a background, current research, and findings for the six modules. This is the underlying foundation for answering the question: What are strategy implications from this research on postsecondary education in the FANH sciences?

4.2.1. Background

Food Insecurity

Food insecurity is defined as being the absence of one or more pillar(s) in the food security framework (i.e. availability, access, utilization, and stability). International agencies coordinate their development and relief efforts around ensuring these four pillars are met (Mengesha, 2016). Methods implemented to achieve food security often include increasing economic production (e.g. cash crop production and international trade) in order to increase gross domestic product (GDP).

Due to a lack of gender perspective in research and training, individuals entering into international development work have little to no awareness of gender roles in foreign countries. This lack of education leads to the persisting gender blind approach or a continuation of Western views on gender roles and stereotypes (Cornwall, 2003). Students must be educated on the relationship between women and development. This would allow them to become leaders capable of making decisions impacting sustainable transformation.

Agricultural extension has long suffered from gender biases (Kahamba, Massawe, & Kira, 2017; Barodia, 2015). A majority of extension officers are male and they are trained to deal solely with male farmers (Jacobson, 1992; O'Brien et al., 2016; Assan, 2014). However, "providing women with fair access to resources, and establishing policies that encourage domestic food production, would go a long way toward closing the gap in food security" (Jacobson, 1992, p. 34).

Gender Inequity

Gender is a social category including roles, responsibilities, and ideas about what characteristics make a man or a woman. Gender inequity is dynamic, multifaceted, and fluid. It is context-specific and complex and can include unequal rights to employment or income, discriminatory land ownership, lower education of a specific sex, gender-based violence, and unequal workloads and/or division of labor (Kerr, Chilanga, Nyantaki-Frimpong, Luginaah, & Lupafya, 2016). Gender inequity "damages the physical and mental health of millions of girls and women across the globe, and also of boys and men despite the many tangible benefits it gives men through resources, power, authority, and control" (WHO, 2018, para. 1). Men are more likely to have access to resources and earn cash wages; however, they are less likely to spend it on family needs (i.e., food, clothes, health care, and education). Such patterns are disturbingly prevalent across countries and cultures (Jacobson, 1992; O'Brien et al., 2016).

Gender equity seeks to provide equal value and recognition to the diverse natures, roles, and needs of both women and men. Respective needs vary accordingly in most societies; women may desire to fulfill roles as mothers, homemakers and providers

of basic needs. This often results in a weaker position related to job and training access, equal pay, rights to land and other capital assets, and freedom of movement. To generate progress towards gender equity, these imbalances need to be addressed in the design of policies, programs and projects (ILO, 2007; Assan, 2014; Karl, 2009).

Postsecondary Education

Postsecondary education refers to the education following secondary school or after graduating from high school. Students can pursue two- or four-year postsecondary degrees after finishing high school or completing a GED (USDA, 2018). This study is pertinent to the FANH sciences in postsecondary education. Future leaders are obtaining their education and must gain the highest education about methods to create sustainable change and improve the inequities ailing every society (Me-Nsope, 2015). If gender equity is a predictor to a country's food security, then gender equity and methods to achieve gender equity must be addressed in research-based literature and education within the FANH sciences.

4.2.2. Current Research

This dissertation contributes to research-based literature by analyzing the multidimensional effects of gender inequity on food insecurity with findings from a scoping study and a multi-national analysis using structural equation modeling (SEM). Findings from a multi-disciplinary scoping study on the topics of gender inequity and food insecurity revealed a gap in research-based literature in the disciplines of sociology, health, and agriculture. The SEM study examined the direct and indirect effects of gender inequity on food insecurity (FI), basic human needs (BHN), corruption (C),

female education (FE), and GDP. Findings revealed that gender inequity is a strong predictor of food insecurity, with gender inequity explaining 56% of a country's food insecurity. Additionally, gender inequity is a strong predictor of a country's basic human needs being unmet, higher corruption scores, lower female education, and lower GDP. The variables tested included observable variables taken from the following databases: WomanStats Database, Global Food Security Index (GFSI), Corruption Perceptions Index (CPI), Social Progress Index (SPI), and World Bank.

WomanStats aims to investigate "the link between the security and behavior of states and the situation and security of the women within them" (WomanStats Project, 2018, para. 1). WomanStats research has been published in leading journals, such as International Security and the Journal of Peace Research, and has also been vetted at the UN, the Central Intelligence Agency (CIA), the U.S. Department of Defense, and the Senate Foreign Relations Committee (WomanStats Project, 2018).

GFSI considers the issues of affordability, availability and quality, and safety of food across 112 countries. "The index is a quantitative benchmarking model constructed from 28 unique indicators that measure the drivers of food security across both developing and developed countries. The GFSI also includes a category that assesses countries' exposure to the impacts of climate change, their susceptibility to natural resource risks, and how countries are adapting to these risks" (GFSI, 2018, para. 1).

CPI is an index developed and maintained by Transparency International (Saisana & Saltelli, 2012). The index measures perceptions of corruption in the public sector using a composite indicator. The CPI aggregates data from respected institutions

including the African Development Bank, the Economist Intelligence Unit, World Bank, and World Justice Project (Saisana & Saltelli, 2012).

Social Progress Imperative is a global nonprofit based in Washington, DC. The organization launched the SPI in 2014 with efforts to face social challenges and drive efforts to create equitable, inclusive, and prosperous societies (Social Progress Imperative, 2018). The index is a comprehensive measure of a country's quality of life. Finally, the World Bank offers high-quality statistical data for improving global development. They provide analysis and advice to developing countries, with a mission to "end extreme poverty and promote shared prosperity in a sustainable way" (World Bank, 2019, para. 1).

4.2.2.1. Findings

Women are a vital human resource that has the potential to help national governments, development agencies, and policy planning strategies. Ending all forms of discrimination against women and girls not only has positive effects on global food security but also is "a multiplier effect across all other development areas" (Lalaguna & Dorodnykh, 2018, p. 1). Gender equity is a precondition for the advancement of development areas such as: health and personal safety, corruption, education, and economic development. Gender-based biases and constraints have a high cost on any society in terms of untapped potential in achieving these and other development goals (FAO, 2014; Lalaguna & Dorodnykh, 2018).

This dissertation has revealed that higher levels of gender inequity are associated with higher levels of food insecurity, lower levels of basic human needs, reduced female

education, and lower GDP. Using these findings, suggestions can be made for policy and training strategies to incorporate gender roles and cultural considerations and work towards improving gender equity while remaining culturally sensitive. In order to improve a specific area of development, such as female education, a community's values, beliefs, and traditions must be taken into account. Understanding food security and development can only be best fully understood with a gender-sensitive perspective. These should be incorporated in all research, policy, and teaching approaches.

Therefore, gender inequity can no longer be seen as a disassociated factor when examining international development. Whether creating policy or training development agents, gender equity must be established as a priority. Improving gender equity in any society has been proven to not only enhance the lives of women, but also of children and men and in turn benefit an entire country. FAO (2011) estimated that when women control income, they spend more of it on food, health, clothing, and education for their children than men do. This has positive effects on overall well-being and economic growth through improved health, nutrition, and education.

Using findings from chapter II and III, suggestions can be made for policy and training strategies to incorporate gender roles and cultural considerations, and work towards improving gender equity while remaining culturally sensitive in the FANH sciences. Actions are needed in order to improve gender equity and ensure that women and girls have equal opportunities to benefit from development, which unless addressed, prevent women from being full participants in all sections of society (Lalaguna & Dorodnykh, 2018).

4.3. Strategy Recommendations

Based on current and previous research studies, specific strategy recommendations to bring awareness to the effects of gender inequity on global food insecurity are offered. Six modules are proposed as a result of this chapter. The modules address gender inequity throughout areas of international development. Each module addresses key elements in international development and social progress. An innovative aspect to this approach is the importance of recognizing gender inequity when approaching international development and teaching strategies. Based on information gathered and analyzed, the following modules are proposed:

Module 1: Food Insecurity (FI)

Module 2: Female Education (FE)

Module 3: Health and Safety (BHN)

Module 4: Corruption (C)

Module 5: Economy (GDP)

Module 6: Holistic Development

Each of the six modules are intended to stand alone in one-hour, in person classes or the modules could form a separate course or various lectures in a FANH science course. Each future module would include information about the six modules, broad introduction of the importance of women in development; importance of the topic of the module; student learning measurable objectives; a guide for lecturers to use for conducting the class, including a PowerPoint presentation and open-ended questions for discussion; required and recommended readings; and evaluation options (i.e. a

preflection and reflection exercise, pre- and post-test, or end-of-class test). Each module will be the foundation for possible future delivery via cyber-based technology that will permit reaching a broader array of students in the U.S. and abroad. Appendices P and Q are prototype frameworks for two modules, food security and female education.

Following is background information that substantiates the importance of each module within the context of a strategy for incorporation into postsecondary education in the FANH sciences.

1. Food Insecurity

Women work to achieve household food security through food production, planting and harvesting, herding, cleaning, food processing and preparation, cooking, going to market, and collecting water and fuel (Becker, 2000; Dixon-Mueller, 1985; International Labor Organization Office for Women, 1981; Save the Children, 2002). Despite these vital contributions toward global food security, women farmers are frequently underestimated and overlooked in development strategies (Makki & Gebreel, 2009). Food policies rarely address gender specificities related to all aspects of the food security framework (i.e. availability, accessibility, stability, and utilization). Furthermore, discriminatory socio-cultural norms, behaviors, and traditions hinder women's access to food (Ghale, Pyakuryal, Devkota, Pant, & Timsina, 2018).

Many challenges face women working in smallholder agriculture. Gendered norms regarding asset control and an assumption that women in agriculture are concerned with subsistence only reinforce biases in policies and institutions. These biases worsen gender-based discrimination and perpetuates the lack of recognition

surrounding women's role in agriculture. Female food producers remain largely excluded from land ownership, technology training, tools, and extension services (Kelkar, 2009; Hillenbrand, 2010).

Subsistence gardening and small family plots are important means of addressing household food security but these efforts go unrecognized in official food availability records, despite being vital sources of nutrition and income (Becker, 2000; Levin et al., 1999; United Nations Population Fund, 2002; Tinker, 1997). Previous research has shown key links between female power in the family, household food security, and well-being (Besteman, 1995; Brown, Webb, & Haddad, 1994; Handa, 1996; Kennedy & Peters, 1992; Quisumbing et al., 1995; Rogers, 1996).

Women's work in agriculture often remains "invisible" because the products of their labor are primarily intended for household consumption and do not reach the market economy (Ibnouf, 2009). This prevents women from being regarded by policy-makers and extension agents. Few of the world's extension agents are women and most extension services focus on commercial crops rather than subsistence farming (Sinha, 2004). It is essential to pursue policies recognizing women's rights and acknowledging their contributions to societal well-being (Pritchett & Summers, 1996; Scanlan, 2004).

2. Female Education

"If you educate a man you educate an individual, but if you educate a woman you educate a nation," according to the UN Commission on the Status of Women, Sierra Leone's Parliamentary Committee on Agriculture and Food Security Member, Bernadette Lahai (Jackson, 2009, p. 1). When women are educated, they have fewer

children, they become empowered, and they are able to contribute more to their families and their community (O'Brien et al., 2016). Female education provides more opportunities to work outside the home and earn higher income, giving women more economic power, greater authority, and bargaining power within the household (Nussbaum, 2004; Sen, 1999). When women earn wages, their families have better health, nutrition, and education. Mothers have shown, through household financial decisions, to prioritize the well-being of their children. So, when mothers are financially better off, children are less susceptible to many severe social ills (i.e. hunger, malnutrition, stunting, and wasting) (Cho, 2015; O'Brien et al., 2016).

Female education has been shown to improve child nutrition through access to information and greater health knowledge (Glewwe, 1999; Thomas, Strauss, & Henriques, 1991). The educational level of a mother is directly correlated with the survival and developmental prospects of her children. Studies across various developing countries have found a strong positive correlation between literacy and varying education levels of mothers with children's nutrition levels. Even a slight increase in female education has a meaningful impact on the health of her children. A study in the Philippines found that a mother's education was more of a contributing factor to her children's health status than household income (Hudson et al., 2012). "Educated women are more likely to interact effectively with healthcare providers, comply with treatment regimens, and break from tradition in adopting newer innovations in nutrition" (Burroway, 2016, p. 121). "A cross-national study of 63 nations determined that women's education was the single most important factor in levels of malnutrition over a

twenty-five-year period" (Hudson et al., 2012, p. 45). Women's educational expansion may have a protective effect on child malnutrition (Burroway, 2016).

Providing girls with equal access to education and training is a long-term strategy that can sustain changes in the status of women (Ibnouf, 2009). Women's empowerment within their households increases the likelihood that their children will attend school, which is particularly crucial for daughters (UNICEF, 2006). "An estimated two-thirds of the 300 million children without access to education are girls, and two-thirds of the 880 million illiterate adults are women" (Crossette, 2000, para. 8). If girls are unable to access education, it has detrimental effects on their economic abilities, health, and political participation (Wolfe, 2014).

Education enhances access to the political process, allowing women to request specific resources for their children (Nussbaum, 2004). Educated females can transform social institutions, promote growth in public services, and mobilize resources that could help satisfy their own and other women's needs. All of this can result in a diffusion effect of expanded female education on food security (Parashar, 2005). Gender-based socio-cultural values in low income countries have contributed to unequal female enrollment rates in higher education. These inequalities call for gender sensitive action to correct gender bias and, thus, to ensure gender equity (Barodia, 2015; Mlama et al., 2005; Kahamba et al., 2017; O'Brien et al., 2016; Karl, 2009). Everyone, even the uneducated, benefit from the higher educational level of a community (Kravdal, 2004; Burroway, 2016).

3. Health and Safety

The Thomson Reuters Foundation conducted a survey to determine the most dangerous countries in which to be born female. In response to the foundation's findings, CEO Monique Villa stated, "this survey shows that 'hidden dangers' like a lack of education or terrible access to healthcare are as deadly, if not more so, than physical dangers like rape and murder. In Afghanistan, for instance, women have a one in 11 chance of dying in childbirth. In the top five countries, basic human rights are systematically denied to women" (Casserly, 2011, para. 3).

Researchers have long pointed to damaging effects of malnutrition, stress, illiteracy, and toxic environments in children's lives. Neural systems of underprivileged children develop less, which impacts language development, their ability to plan, remember details, and pay attention in school (Toppo, 2011). Children are the most innocent victims. Child mortality reveals more than just the well-being of children but more broadly represents the state of human development in a society (Scanlan, 2004). Hunger, child mortality, and gender equity are three key priorities in development, "with the lattermost being a primary engine for addressing poverty and achieving widespread human development" (Scanlan, 2004, p. 1808).

"Violence against women and girls is a cross-cutting issue that affects their ability to access the full range of human rights" (Wolfe, 2014, para. 17). "Gender-based violence is rarely acknowledged or anticipated by policy makers when attempting to address women's particular vulnerability to food and nutrition insecurity and to mainstream them into right to adequate food work" (Bellows, Lemke, Jenderedjian, &

Scherbaum, 2015, p. 1200). Violence is an under-theorized aspect of hunger, malnutrition, and the exclusion of groups such as women, children, and the indigenous from food and nutrition security. The threat of diverse forms of violence impedes women from engaging in their own right to adequate food and from acting on behalf of their families and communities to the full extent of their capabilities. This helps to explain why so little progress has been made in improving gender mainstreaming with respect to food and nutrition security.

4. Economy

Scholars and policymakers often assume that economic growth is the key to increasing food supply and alleviating food insecurity (Jenkins & Scanlan, 2001). This belief is evident among several cross-national studies in developing countries suggesting that fostering economic development is the best way to reduce malnutrition (Moradi, 2010; Stevens et al., 2012). However, "economic development alone does not promise that income is distributed fairly, nor does it guarantee that other human needs will be fulfilled" (Burroway, 2016, p. 119). What has been missing from cross-national research is an analysis of how gender inequity shapes women's ability to effectively establish and maintain food security. The effects of gender inequity are comparable to or greater than the effects of economic development (Burroway, 2016).

The homogenous effects of gender inequity on child malnutrition and food insecurity are comparable to, and at times larger than, those of GDP per capita. The relationship between economic development and food security is neither automatic nor guaranteed (Burroway, 2016). Economic development does not benefit all segments of a

population equally (Blumberg, 1995; Parpart, Connelly, & Barriteau, 2000). Some countries have revealed lower rates of malnutrition than national income would suggest, while other countries experience drastically high rates of malnutrition in contrast to their GDP per capita (Hagey, 2012; Nussbaum, 2004). "This suggests that fostering economic development alone does not necessarily provide for other central human needs" (Burroway, 2016, p. 119). National income levels should be evaluated alongside other factors to fully understand the overall well-being of a society.

5. Corruption

Corruption is a pervasive problem impacting the world's most vulnerable populations (Transparency International, 2014). Corruption has been identified as one of the most critical obstacles to development (Danon, 2011; Collier, 2008). In 2007, at the end of a two-year grant project, two Liberian nationals were blamed for stealing food from "the most vulnerable of the vulnerable" (Cole, 2013, p. 25). The nationals stole 90 percent of donated food pledged to rural Liberian women and children. The food was sold in local markets for personal gain rather than being delivered (Cole, 2013).

Countries with greater perceived levels of corruption have longer-term economic challenges. Gyimah-Brempong (2002) found that corruption has negative impacts on income growth rates in African countries. Cole et al. (2017) connected corruption and gender equity, finding that on average, countries with a higher number of women in government are associated with lower perceived corruption. Lower corruption was also associated with increased national expenditures on healthcare and increased expenses on

healthcare were associated with higher levels of foreign direct investment (Cole, Dooley, Sandlin, & Murano, 2017).

6. Holistic Development

The 2030 Agenda for Sustainable Development was born following the Millennium Development Goals (MDGs), which expired in 2015. The adoption of Sustainable Development Goals (SDGs) was one of the primary outcomes of the UN Conference on Sustainable Development. Global leaders recognized gender equity and female empowerment and opportunity as fundamental human rights. They also recognized gender equity as being essential for sustainable development (United Nations General Assembly Resolution, 2012). Improving gender equity, rooted in human rights, is recognized as both a key development goal on its own and as a "vital means to helping accelerate sustainable development" (Lalaguna & Dorodnykh, 2018, p. 2).

Gender inequity is a multi-dimensional issue rooted in economic, social, and cultural structures of a society, requiring a comprehensive approach. An analysis of a specific country's cultural context is needed in order to effectively improve its gender equity. Gender equity "requires a wide range of solutions and partners to work in a collective manner to address gender in a broad and holistic manner, thereby contributing to sustainable development" (Lalaguna & Dorodnykh, 2018, p. 10).

Currently, a geographical bias exists in gender research which leads to incomplete knowledge of region-specific gender gaps in agriculture. Women's empowerment in agriculture has received extensive attention in the literature in recent decades, however empirical research has focused primarily on sub-Saharan Africa. In

2014, the FAO and the International Food Policy Research Institute (IFPRI) gathered current gender research in agriculture in the book titled “Gender in Agriculture: Closing the Knowledge Gap” (Quisumbing et al., 2014). A majority of studies were conducted in sub-Saharan Africa (59%) followed by South Asia (22%) and Southeast Asia (6%) (Akter et al., 2017). In midst of this knowledge gap, many region-specific gender gaps, needs, and constraints remain unknown and unaccounted. Hence, frequently applied gender intervention frameworks, designed from existing knowledge and established narratives are unsuited and potentially damaging in less studied regions. In order to ensure that “development efforts are channeled in the right direction and in the right form, research focus needs to shift to regions that have been insufficiently explored in the past" (Akter et al., 2017, p. 271).

Gender equity and gender relations play a foundational role in the general wellbeing of a household. Therefore, moving beyond just women, the question is, if and how can we better incorporate men and their role. Many societies and certain development programs fail in include men’s position and influence (Lemke, 2003). Motivating fathers to work hand-in hand with mothers in productive and reproductive tasks (e.g. taking care of children or elderly) has been shown to have a positive impact on the nutritional status and general wellbeing of children. Fathers can prepare food and feed children while mothers are doing other productive work.

Previous studies have examined hegemonic (i.e. ruling or dominant) masculinities. Hegemonic masculinities “are conceptualized as historically specific, normative patterns of practice that reinforce the subjugation of women to men” (Kerr et

al., 2016, p. 3). Hegemonic masculinity includes an expectation where men are not supposed to care for children. Reproductive tasks act as threats to men's masculinity and can bring feelings of shame and discomfort (Kerr et al., 2016). Gender equity is the process of being fair to both women and men (UNFPO, 2005) and has positive effects for both men and women.

4.4. Conclusion

Gender inequity is a multidimensional issue (Alkire et al., 2013). The various dimensions of inequity (e.g. decision-making over production and income) may vary across and within communities (Mason & Smith, 2003). In some communities, women may enjoy higher decision-making power over production and input while they are disempowered in regard to asset ownership, control over income, or community leadership (Alkire et al., 2013). In order to design effective gender intervention frameworks, it is essential to acknowledge the context and domain-specific heterogeneity in empowerment. Customs, traditions, and social constraints often prevent women from receiving any anticipated benefits from development efforts. Due to the multidimensional nature of inequity and the diversity and complexity of gender systems around the world, it is essential to capture the cross-cultural variations in gender specific needs and constraints (Akter et al., 2017). It has been recognized that unless women's full potential is properly developed, "no transformation and economic development is possible" (Sinha, 2004, p. 10). If policymakers want to ensure food security in developing countries, they should not neglect the potential of policies that promote gender equity (Burroway, 2016).

Gender equity “should be the starting point for successfully bringing about food security" (Kushnir, 2011, p. 34). This chapter emphasizes the importance of analyzing social systems in regard to the decision-making process, division of labor, and gender relations, rather than merely relying on generalizations in research-based literature when planning for food security strategies and development application (Muneer & Mohamed, 2003; Ibnouf, 2009).

Within the agricultural, formal, or informal sector of a society, social and cultural constraints vary between regions and countries. Enhancing women’s role and power without an appropriate understanding of the cultural activities performed by women will result in inappropriate policy implementation. Impactful development strategies require an appropriate planning approach, which should be gender-sensitive and include knowledge of the local community and household structure. Gender-sensitive learning must first acknowledge that innovative development must meet the educational needs of today’s and tomorrow’s learners (Barodia, 2015; Lan, 2010; Kahamba et al., 2017; Assan, 2014).

Further recommendations can be made to professional associations and government agencies such as the American Association for Agricultural Education (AAAE), the Association for International Agricultural and Extension Education (AIAEE), the United States Department of Agriculture (USDA), and the United States Agency for International Development (USAID). All recommendations would concentrate on recognizing women as pertinent in agricultural development and establishing food security.

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5. THE IMPACT OF GENDER INEQUITY ON GLOBAL FOOD INSECURITY: A CONCLUSION

One out of every nine people in the world is undernourished (FAO, 2018; Senauer & Sur, 2001; Pinstrup-Andersen & Cheng, 2007). According to the Food and Agriculture Organization of the United Nations (FAO) and others, evidence indicates a rise in world hunger that has been increasing over the past three years. Food insecurity is an ever-growing issue with the total number of people suffering from undernourishment or chronic food deprivation increasing from "804 million in 2016 to nearly 821 million in 2017" (FAO, IFAD, UNICEF, WFP & WHO, p. xiii, 2018). This dissertation examined a potential cause for this food insecurity increase.

"In many parts of the world, women are the primary growers of food, especially subsistence crops; according to the FAO, women produce about 80 percent of Africa's food and about 50 percent of food worldwide" (Hudson, Ballif-Spanvill, Caprioli, & Emmett, 2012, p. 14). According to the Rural Women and the Millennium Development Goals developed by the United Nations Inter-Agency Task Force on Rural Women, if women had equal access to the same resources as men, yields would increase by 20-30 percent. The yield increase would raise agricultural output by 2.5-4.0 percent in developing countries, decreasing the total number of hungry people by 12-17 percent worldwide (UN Women, 2012; O'Brien et. al., 2016).

5.1. Dissertation Synthesis

This dissertation was driven by the pervasive problems of gender inequity and food insecurity. The scoping study in chapter II found a gap in research-based literature

addressing the relationship between gender inequity and food insecurity in the disciplines of sociology, health, and agriculture. The cross-sectional, nonexperimental study in chapter III examined the effects of gender inequity on global food insecurity. Structural equation modeling through five mediated models were used to test relationships between observable variables. Results included a statistically significant relationship between gender inequity and food insecurity, with gender inequity explaining for 56% of a country's food insecurity. This research revealed that higher levels of gender inequity are associated with higher levels of food insecurity, lower levels of basic human needs being met, increased corruption, reduced female education, and lower GDP. This research was foundational in that it treated gender inequity as the independent variable and food insecurity as the dependent variable.

Gender equity is an essential component to achieving food security, as well as other development goals. This study provided empirical results on which professionals and institutions can base interventions and teaching methods. To apply this research, recommendations were made for curriculum development in the food, agriculture, natural resources, and human (FANH) sciences at the postsecondary level. These recommendations include bringing gender awareness into teaching strategies so that the effects of gender inequity on global food insecurity and other development goals are appropriately addressed.

5.2. Significance of Research

This study is differentiated from previous research by three aspects. First, it builds on previous efforts to study current rates of gender inequity and food insecurity at

an international level (i.e. on a country-wide, macro level). Second, it begins to address a gap in research-based literature by presenting food security as being dependent on gender equity. Third, it adds to research-based literature by linking gender inequity, food insecurity, basic human needs, corruption, female education, and GDP.

This study reveals that gender inequity can no longer be viewed as an unassociated factor in regard to food insecurity, but a prediction for creating sustainable development. The empirical evidence provided by this study can be utilized by professionals and institutions to implement interventions. To apply this research, recommendations were made to FANH sciences at the post-secondary level. These recommendations include curriculum design and development within the FANH sciences, recognizing women's role in development and the effects of gender inequity on global food insecurity.

5.3. Research Questions Answered

Because this dissertation was a journal-ready design, chapters II, III, and IV were written as journal articles and are self-contained studies. Research questions guiding this dissertation served these three individual studies: (a) a scoping review of the literature to identify publications related to gender inequity and food insecurity; (b) a statistical examination on the effects of gender inequity on food insecurity; and (c) a practical, evidence-based recommendation for curriculum development in the FANH sciences. Within these studies the following, research questions were answered, respectively

1. What research-based literature exists regarding the effects of gender inequity on food insecurity?

2. What were the effects of gender inequity on food insecurity?
3. What are strategy implications from this research on postsecondary education in the FANH sciences?

Answers to dissertation research questions are answered per chapter.

Chapter II: What research-based literature exists regarding the effects of gender inequity on food insecurity?

A scoping review method was selected through consultation with the Center for Systematic Reviews at Texas A&M University for this study due to the multidisciplinary, global aspect and the intent of identifying gaps in research-based literature. Arksey and O'Malley (2007) state that a scoping review may be developed "to examine the extent, range and nature of research activity" and also to "identify research gaps in the existing literature" (p. 22). This method allowed the researcher to identify available literature across multiple disciplines (Arksey & O'Malley, 2007) and offered a preliminary assessment of potential size and scope of available research-based literature (Grant & Booth, 2009).

The five-stage framework by Arksey and O'Malley (2005) was used to conduct this scoping study (i.e. (1) define the research question, (2) identify relevant studies, (3) study selection, (4) chart the data, and (5) collate, summarize, and report the results). Ultimately, 59 research-based references were reviewed and considered eligible for this scoping review. These included references are summarized in Table 5-1.

Table 5-1

Included References in the Scoping Study

Author(s)	Year	Title	Journal name	Discipline
Anyangwe, Mtonga, & Chirwa	2006	Health inequities, environmental insecurity and the attainment of the millennium development goals in sub-Saharan Africa: The case study of Zambia	International Journal of Environmental Research and Public Health	Gender Studies
Akter et al.	2017	Women's empowerment and gender equity in agriculture: A different perspective from Southeast Asia	Food Policy	AGRICOLA
Balakrishnan	2002	Rural Women & Food Security	Productivity	Gender Studies
Bellows, Lemke, Jenderedjian, & Scherbaum	2015	Violence as an under-recognized barrier to women's realization of their right to adequate food and nutrition: Case studies from Georgia and South Africa	Violence Against Women	Medline
Burroway	2016	Empowering women, strengthening children: A multi-level analysis of gender inequality and child malnutrition in developing countries	Gender & Food: From Production to Consumption and After	Gender Studies
Bushamuka et al.	2005	Impact of a homestead gardening program on household food security and empowerment of women in Bangladesh	Food and Nutrition Bulletin	Gender Studies
Chilton, Rabinowich, Council, & Breaux	2009	Witnesses to hunger: Participation through photovoice to ensure the right to food	Health & Human Rights	Medline
Cramer, Förch, Mutie, & Thornton	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	Gender Studies
Deepak	2014	A postcolonial feminist social work perspective on global food insecurity	Journal of Women and Social Work	Gender Studies
Diamond-Smith et al.	2019	Food insecurity and intimate partner violence among married women in Nepal	Journal of Global Health	Gender Studies
Dreistadt	2006	Women, hunger, and food insecurity	The Socialist	Gender Studies

Table 5-2 Continued

Included References in the Scoping Study

Author(s)	Year	Title	Journal name	Discipline
Floro & Swain	2013	Food security, gender, and occupational choice among urban low-income households	World Development	Gender Studies
Galiè et al.	2017	Women's empowerment through seed improvement and seed governance: Evidence from participatory barley breeding in pre-war Syria	NJAS - Wageningen Journal of Life Sciences	AGRICOLA
Gawaya	2008	Investing in women farmers to eliminate food insecurity in Southern Africa: Policy-related research from Mozambique	Gender and Development	Gender Studies
Geisler	1993	Silences speak louder than claims: Gender, household, and agricultural development in Southern Africa	World Development	Gender Studies
Ghale et al.	2018	Gender dimensions of food security, the right to food and food sovereignty in Nepal	Journal of International Women's Studies	Gender Studies
Hart	2008	The ignorance of gender in agrarian livelihoods in rural South Africa	Agenda: Empowering Women for Gender Equity	Gender Studies
Hedge	1999	Empowerment: Women and food security	Yojana	Gender Studies
Hillenbrand	2010	Transforming gender in homestead food production	Gender and Development	Sociology
Hyder et al.	2005	The pervasive triad of food security, gender inequity and women's health: Exploratory research from sub-Saharan Africa	African Health Sciences	Gender Studies
Ibnouf	2009	The role of women in providing and improving household food security in Sudan: Implications for reducing hunger and malnutrition	Journal of International Women's Studies	Gender Studies
Iruonagbe	2011	Gender equity and food security: Lessons from Ozalla community, Edo State, Nigeria	Gender and Behavior	Gender Studies
Karl	2009	Inseparable: The crucial role of women in food security revisited	Women in Action	Gender Studies

Table 5-3 Continued

Included References in the Scoping Study

Author(s)	Year	Title	Journal name	Discipline
Kerr	2005	Food security in northern Malawi: Gender, kinship relations and entitlements in historical context	Journal of Southern African Studies	Gender Studies
Kerr et al.	2016	Integrated agriculture programs to address malnutrition in northern Malawi	BMC Public Health	Gender Studies
Kuhnlein	2017	Gender roles, food system biodiversity, and food security in indigenous peoples' communities	Maternal & Child Nutrition	Gender Studies
Kushnir	2012	Understanding the gendered fields of the Gambia for food security programming	Women and Environments	Gender Studies
Lalaguna & Dorodnykh	2018	Gender equality and sustainable development	Asian Development Perspectives	Gender Studies
Lemke	2003	Empowered women and the need to empower men: Gender relations and food security in black South African households	Studies of Tribes and Tribals	Gender Studies
Lemke et al.	2003	Empowered women, social networks and the contribution of qualitative research: Broadening our understanding of underlying causes for food and nutrition insecurity	Public Health Nutrition	Gender Studies
Makki & Gebreel	2009	The role of women in jubraka farming and household food security in Kadogli	The Ahfad Journal	Gender Studies
Mathew	1998	Panchayati raj, food security and women's participation	Mainstream	Gender Studies
Meludu, Ifie, Akinbile, & Adekoya	1999	The role of women in sustainable food security in Nigeria: A case of udu local government area of Delta State	Journal of Sustainable Agriculture	Gender Studies
Mengesha	2016	Food security: What does gender have to do with it?	Agenda: Empowering women for gender equity	Gender Studies
Mpagi	1999	The role of women in food security and implementation of the national gender policy: A case study in Uganda	Impact	Gender Studies
Nichols	2016	Time ni hota hai: Time poverty and food security in the kumaon hills, India	Gender, Place and Culture	Gender Studies

Table 5-4 Continued

Included References in the Scoping Study continued

Author(s)	Year	Title	Journal name	Discipline
Okoli & Umeh	2001	Food security and women in developing countries	Ahfad Journal	Gender Studies
Page-Reeves et al.	2014	"Is always that sense of wanting... never really being satisfied": Women's quotidian struggles with food insecurity in a Hispanic community in New Mexico	Journal of Hunger and Environmental Nutrition	Gender Studies
Pala-Okeyo	1994	Community based food security through women: A gender advocacy strategy for linking local food needs, capacities and policy for sustainable development in Africa	African Crop Science Conference Proceedings	Gender Studies
Patel	1990	Women: The providers of food security in Lesotho	African Urban Quarterly	Gender Studies
Piaseu, Belza, & Shell-Duncan	2004	Less money less food: Voices from women in urban poor families in Thailand	Health Care for Women International	Gender Studies
Piaseu & Mitchell	2004	Household food insecurity among urban poor in Thailand	Journal of Nursing Scholarship	Gender Studies
Ransom & Bain	2011	Gendering agricultural aid: An analysis of whether international development assistance targets women and gender	Gender and Society	Gender Studies
Razzaque & Toufique	2007	Does women's status matter for food security? Evidence from Bangladesh	WIDER	Gender Studies
Riley & Dodson	2016	'Gender hates men': Untangling gender and development discourses in food security fieldwork in urban Malawi	Gender, Place and Culture	Gender Studies
Sachs & Patel-Campillo	2014	Feminist food justice: Crafting a new vision	Feminist Studies	Gender Studies
Scanlan	2004	Women, food security, and development in less-industrialized societies: Contributions and challenges for the new century	World Development	Gender Studies
Sharma	2002	Empowering women for household food security	Woman and food security: role of panchayats	Gender Studies

Table 5-5 Continued

Included References in the Scoping Study continued

Author(s)	Year	Title	Journal name	Discipline
Sinha	2004	Rural women in dynamics of agriculture and food security	Kurukshetra	Gender Studies
Sinha	1999	Empowering women for food security	Social Welfare	Gender Studies
Smith	2012	Gender and food security in a fair, green economy?	Development	Gender Studies
Thamaga-Chitja	2012	How has the rural farming woman progressed since the setting up of the millennium development goals for eradication of poverty and hunger?	Agenda: Empowering women for gender equity	Gender Studies
Tshishonga	2017	Women growing livelihoods through food security: Inanda's inqolobane yobumbano secondary co-operative	Agenda: Empowering women for gender equity	Gender Studies
Viswanath	2001	Women's micro-enterprises for food security in India	Development	Gender Studies
Wambogo, Ghattas, Leonard, & Sahyoun	2018	Validity of the food insecurity experience scale for use in sub-Saharan Africa and characteristics of food-insecure individuals	Community and Global Nutrition	Gender Studies
Yengoh, Armah, & Steen	2015	Women's bigger burden: Disparities in outcomes of large-scale land acquisition in Sierra Leone	Gender Issues	Gender Studies
Yiping	2009	The secrets in feeding China	One on One: Women in Action	Gender Studies
Zimet	1997	Food insecurity and women's role in the African region	INSTRAW news: women & development	Gender Studies

A gap in research-based literature was confirmed regarding the effects of gender inequity on food insecurity. This gap existed in the disciplines of sociology, health, and agriculture. Research-based literature recognizing the relationship between gender inequity and food insecurity was limited to the field of gender studies.

Publication Summary

Ultimately, 59 publications were reviewed and considered eligible for this scoping review. The references used for this study ranged in publication from the year 1990 to 2019. This scoping review identified 32 references studying only one country. Ten references studied two countries, seven studied three countries, six that studied four countries, and four studied more than four countries. Overall, 89 countries were included in the scoping study.

Factors most highly associated with food insecurity in the studies, from most mentioned to least are as follows: (1) social factors, (2) gender inequity, (3) environment/climate, (4) severe poverty, (5) economic factors, (6) political factors, (7) health, and (8) HIV/AIDS. Other notable factors which were only discussed in one or two references, included war and conflict, domestic violence, and gender-based violence. The factors most highly associated with gender inequity, all pertaining to the treatment of women, from most mentioned to least are as follows: (1) fewer resources; (2) gendered division of labor; (3) limited influence over decision-making; (4) time poverty (i.e. severe time constraints); (5) unequal access to land rights; (6) unequal access to income; (7) undervalued work and responsibilities; (8) limited access to technology; (9) lineage; (10) limited access to information; (11) low social status; (12) discrimination; (13) poor education; (14) discrimination receiving credit; (15) restricted access to markets due to customs or cultural norms; (16) lack of personal autonomy; (17) unable to buy seeds, fertilizer, or hire labor; and (18) illiteracy.

An overwhelming majority of food-insecure countries practice patrilineality. Findings determined that in 27 references, the society studied practiced patrilineality, four references studied societies practicing both patrilineal and matrilineal lineage, and zero practiced solely matrilineal lineage. This study was guided by three theoretical frameworks, as follows: women in development and gender and development. Originating from the work of Ester Boserup in the 1970s, gender inequity and its significant effects on development have remained important. “In no society today do women enjoy the same opportunities as men. This unequal status leaves considerable disparities between how much women contribute to human development and how little they share in its benefits” (UNDP, 1995, p. 29).

A country that discriminates against half of its population is not utilizing its full development potential (United Nations Fourth World Conference on Women, 1995). Women work more hours than men, yet most of their labors remains unpaid, unrecognized, and undervalued as they contribute trillions of ‘‘invisible’’ dollars to the global economy (UNDP, 1995; United Nations Population Fund, 2002).

A society with greater gender equity is more likely to value the well-being and just treatment of all citizens and, by extension, view concerns regarding hunger, health, education, and individual lives as higher priorities (Scanlan, 2004). By conducting a scoping review of research-based literature, a gap in the literature was identified regarding gender inequity and food insecurity. Overall, 59 references were identified with 54 coming from gender studies. Identifying and summarizing these publications

answered the research question: What research-based literature existed regarding the effects of gender inequity on food insecurity?

Chapter III: What are the effects of gender inequity on food insecurity?

The purpose of this quantitative study was to fill a gap in the scholarly literature regarding the effects of gender inequity on global food insecurity. A cross-sectional, nonexperimental, multinational analysis was used to examine the effects of gender inequity on food insecurity across 112 countries. This study also examined the effects of gender inequity on basic human needs (BHN), corruption (C), female education (FE), and gross domestic product (GDP). These four mediating variables were selected for this study based on research-based literature. The steps for completing this study consisted of a simple linear regression, four structural equation models (SEM), and one path analysis using SEM.

Results included a statistically significant relationship between gender inequity and food insecurity, with gender inequity explaining 56% of a country's food insecurity. This research revealed that higher levels of gender inequity are associated with higher levels of food insecurity, lower levels of basic human needs being met, increased corruption, reduced female education, and lower GDP (see Figure 5-1).

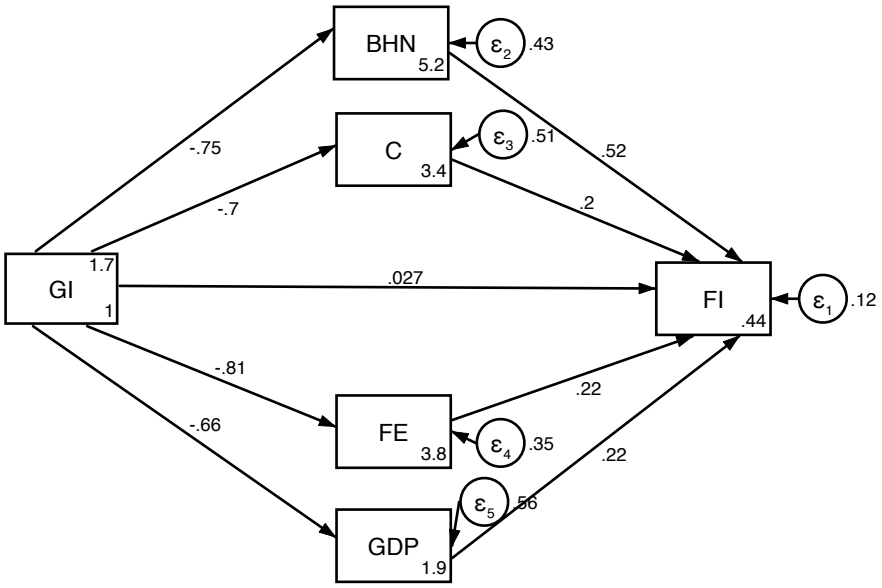

Figure 5-1. The results of a fully mediated path model.

The relationship between GI and BHN was statistically significant. The relationship between GI and C was statistically significant. The relationship between GI and FE was statistically significant. The relationship between GI and GDP was statistically significant. The relationship between BHN and FI was statistically significant. The relationship between C and FI was statistically significant.

This study began to fill a gap in the body of scholarly literature. Utilizing cross-national methods, new measures in the form of gaps in the proximity of gender inequity and development, these analyses make an important contribution by empirically evaluating the impacts of gender inequity on food insecurity. An important contribution of these analyses is the utilization of multi-national data across 112 countries, both developed and developing to present results regarding the important role of gender

equity on food security. Findings from this study confirmed women's essential role in achieving food security, answering the research question: What are the effects of gender inequity on food insecurity?

Chapter IV: What are the strategy implications from this research on postsecondary education in the FANH sciences?

The purpose of chapter IV was to identify practical applications and curriculum development strategies at the postsecondary level within the FANH sciences. This dissertation acknowledged a relationship between gender inequity and food insecurity as well as women's role in development. Written as a strategy piece, this chapter identified practical recommendations to enhance postsecondary education. These recommendations concentrate on recognizing women as pertinent in agricultural development and establishing food security.

In order to design an effective gender intervention framework, it is essential to acknowledge the context and domain-specific heterogeneity of empowerment. Due to the multidimensional nature of equity and the diversity and complexity of gender systems around the world, it is essential to capture the cross-cultural variations in gender specific needs and constraints (Akter et al., 2017). "If policymakers want to facilitate food security in poor countries, they should not disregard the potential of policies that will promote more equitable rights for women" (Burroway, 2016, p. 137).

Six modules were proposed as a result of this study. The modules address gender inequity throughout topics of international development. Each module addresses key elements in international development and social progress. The modules extended from

the four mediating variables used in the SEM study. Each module brings to light the effects of gender inequity on development. While each topic is approached, an innovative aspect to this design is the significance of gender inequity within each social sphere. Based on information gathered and analyzed, the following module outline was proposed:

Module 1: Food Insecurity (FI)

Module 2: Female Education (FE)

Module 3: Health and Safety (BHN)

Module 4: Economy (GDP)

Module 5: Corruption (C)

Module 6: Holistic Development

Gender inequity is a multi-dimensional issue rooted in economic, social, and cultural structures of a society which requires a comprehensive approach. An analysis of a country's cultural context is needed in order to effectively improve gender equity. Gender equity "requires a wide range of solutions and partners to work in a collective manner to address gender in a broad and holistic manner, thereby contributing to sustainable development" (Lalaguna & Dorodnykh, 2018, p. 10). Chapter IV addressed the research question: What are the strategy implications from this research on postsecondary education in the FANH sciences?

5.3.1. Study Limitations

In chapter II, the scoping review was limited by research studies currently available. Future research can extend this review and include future studies. In chapter

III, analyses were limited by the social and demographic variables used. This study was limited by the time period in which it takes place. The study provided a benchmark for future longitudinal studies that examine the changing status of women globally. Secondary international open-access data were selected for use in this study. All variables were treated as observable variables. Variables were limited within simple path models testing. Chapter IV was limited to the author's interpretations, perceptions, and views. Chapter IV was impacted by the way social issues are perceived, including perspectives on who merits treatment and best practices for instilling change.

Additionally, the databases used in this study did not report the same number of countries. This limits the amount of data available. Lastly, this data is macro in nature, including all countries and regions around the world. Interpretations and harsh assumptions should be made with caution.

5.4. Recommendations for Further Research

While this research begins to address a gap in research-based literature, further research opportunities are endless.

Chapter II

Chapter II was a scoping review of research-based literature. The review provided deep insight on the topics of gender inequity and food insecurity and revealed a gap in research-based literature in the disciplines of sociology, health, and agriculture. Further research would be to publish more studies pertaining to gender inequity in these disciplines.

An additional finding from the scoping study was the lack of research-based literature discussing gender-based violence. A future study could explore how we know violence is a problem and explore best approaches for research and policy change. The majority of food insecurity studies focus on sub-Saharan Africa, however other countries both developed and developing suffer from food insecurity. More studies could focus on less researched regions. Future research can also extend this scoping study and include future studies beyond 2019 and/or include studies prior to 1990.

Chapter III

Chapter III was a cross-sectional, non-experimental, multinational quantitative analysis examining the effects of gender inequity on food insecurity. While this study focused on four mediating variables between gender inequity and food insecurity, many other variables could also be observed as the relationships of societal function and normality are endless.

Areas worthy of further exploration include (but are not limited to): war and violence, HIV/AIDS, female reproductive rights, religiosity, alcohol consumption and domestic violence. "The patrilineal and virilocal inheritance system gives more power to husbands in decision-making processes. Alcohol use and domestic violence are rarely discussed in the literature on regional food security" (Kerr, 2005, p. 74). These may all help identify other influences on food insecurity.

Chapter IV

The purpose of chapter IV was to identify practice-specific applications and curriculum development in the FANH sciences from this dissertation research. Further

recommendations could be made to professional associations and government agencies such as the American Association for Agricultural Education (AAAE), the United States Department of Agriculture (USDA), and the United States Agency for International Development (USAID).

Findings from this study confirmed that women are a vital human resource who can help national governments, development agencies, and policy planning strategies in achieving global food security. Future studies could focus more on policy and government rather than postsecondary education.

5.5. Conclusion

This dissertation study accomplished three overarching goals. It identified a gap in the literature regarding gender inequity and food insecurity. Structural equation modeling included statistically significant relationships between the level of gender inequity and food insecurity, basic human needs, corruption, female education, and GDP. Lastly, the scholarly research was applied to practice through presenting six modules for postsecondary education within the FANH sciences.

This research can serve as empirical evidence on which development agents, educators, and policy-makers can base practice decisions. An important contribution of these analyses was the utilization of multi-national data across 112 countries, presenting results regarding to the important role of gender equity on food security. Findings from this study confirmed women's essential role in achieving food security. Countries desiring to improve food security, basic human needs, corruption, female education, and GDP may consider implementing strategic national gender equity improvement efforts.

This study is differentiated from previous research by three aspects. First, it builds on previous efforts to study current rates of gender inequity and food insecurity at an international level (i.e. on a country-wide, macro level). Second, it begins to address a gap in research-based literature by presenting food security as being dependent on gender equity. Third, it adds to research-based literature by linking gender inequity, food insecurity, basic human needs, corruption, female education, and GDP.

Results confirmed previous research-based literature and can help fill knowledge gaps. This study revealed the higher levels of gender inequity are associated with higher levels of food insecurity, lower levels of basic human needs being met, higher rates of corruption, inferior female education, and lower GDP. This study began to fill a gap in the body of scholarly literature. Utilizing cross-national methods, new measures in the form of gaps in the proximity of gender inequity and development, these analyses make an important contribution by empirically evaluating the impacts of gender inequity on food insecurity. An important contribution of these analyses is the utilization of multi-national data across 112 countries, both developed and developing to present results regarding the important role of gender equity on food security. Findings from this study confirmed women's essential role in achieving food security.

Additionally, higher levels of gender inequity are associated with higher levels of food insecurity, lower levels of basic human needs being met, more corruption, reduced female education, and lower GDP. As concluded in this study, women play a vital role in the development of any society regarding food security, as well as achieving basic human needs, decreasing corruption, increasing female education, and increasing gross

domestic product. Findings from this study confirmed women's essential role in achieving food security.

5.6. References

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APPENDIX A

Author(s)	Year	Title	Journal name	Discipline
Gawaya	2008	Investing in Women Farmers to Eliminate Food Insecurity in Southern Africa: Policy-Related Research from Mozambique	Gender and Development	Gender Studies
Deepak	2014	A Postcolonial Feminist Social Work Perspective on Global Food Insecurity	Journal of Women and Social Work	Gender Studies
Iruonagbe	2011	Gender Equity and Food Security: Lessons from Ozalla Community, Edo State, Nigeria	Gender & Behavior	Gender Studies
Geisler	1993	Silences Speak Louder Than Claims: Gender, Household, and Agricultural Development in Southern Africa	World Development	Gender Studies
Hart	2008	The ignorance of gender in agrarian livelihoods in rural South Africa	Agenda: Empowering Women for Gender Equity	Gender Studies
Ransom & Bain	2011	Gendering Agricultural Aid: An Analysis of Whether International Development Assistance Targets Women and Gender	Gender & Society	Gender Studies
Thamaga-Chitja	2012	How has the rural farming woman progressed since the setting up of the Millennium Development Goals for eradication of poverty and hunger?	Agenda: Empowering women for gender equity	Gender Studies
Ibnouf	2009	The Role of Women in Providing and Improving Household Food Security in Sudan: Implications for Reducing Hunger and Malnutrition	Journal of International Women's Studies	Gender Studies
Floro & Swain	2013	Food Security, Gender, and Occupational Choice among Urban Low-Income Households	World Development	Gender Studies
Kushnir	2012	Understanding the Gendered Fields of The Gambia for Food Security Programming	Women & Environments	Gender Studies
Sachs & Patel-Campillo	2014	Feminist Food Justice: Crafting a New Vision	Feminist Studies	Gender Studies
Karl	2009	Inseparable: The Crucial Role of Women in Food Security Revisited	Women in Action	Gender Studies

Iruonagbe	2011	Gender Equity and Food Security: Lessons from Ozalla Community, Edo State, Nigeria	Gender & Behaviour	Gender Studies
Hedge	1999	Empowerment: Women and Food Security	Yojana	Gender Studies
Lemke	2003	Empowered Women and the Need to Empower Men: Gender Relations and Food Security in Black South African Households	Studies of Tribes and Tribals	Gender Studies
Mathew	1998	Panchayati Raj, Food Security and Women's Participation	Mainstream	Gender Studies
Mengesha	2016	Food security: What does gender have to do with it?	Agenda: Empowering women for gender equity	Gender Studies
Lemke, Vorster, Jansen van Rensburg, & Ziche	2003	Empowered women, social networks and the contribution of qualitative research: broadening our understanding of underlying causes for food and nutrition insecurity	Public Health Nutrition	Gender Studies
Okoli & Umeh	2001	Food Security and Women in Developing Countries	Ahfad Journal	Gender Studies
Piaseu & Mitchell	2004	Household Food Insecurity Among Urban Poor in Thailand	Journal of Nursing Scholarship	Gender Studies
Meludu, Ifie, Akinbile, & Adekoya	1999	The role of women in sustainable food security in Nigeria: A case of Udu local government area of Delta State	Journal of Sustainable Agriculture	Gender Studies
Bushamuka, de Pee, Talukder, Kiess, Panagides, Taher, & Bloem	2005	Impact of a homestead gardening program on household food security and empowerment of Impact of a homestead gardening program on household food security and empowerment of Impact of a homestead gardening program on women in Bangladesh	Food and Nutrition Bulletin	Gender Studies
Razzaque & Toufique	2007	Does women's status matter for food security? Evidence from Bangladesh	WIDER Research Paper, The United Nations University World Institute for Development Economics Research (UNU-WIDER)	Gender Studies
Nichols	2016	Time Ni Hota Hai: time poverty and food security in the Kumaon hills, India	Gender, Place & Culture	Gender Studies

Sinha	2004	Rural women in dynamics of agriculture and food security	Kurukshetra	Gender Studies
Yengoh, Armah, & Steen	2015	Women's Bigger Burden: Disparities in Outcomes of Large-Scale Land Acquisition in Sierra Leone	Gender Issues	Gender Studies
Balakrishnan	2002	Rural Women & Food Security	Productivity	Gender Studies
Dreistadt	2006	Women, hunger, and food insecurity	The Socialist	Gender Studies
Sinha	1999	Empowering women for food security	Social Welfare	Gender Studies
Cramer, Förch, Mutie, & Thornton	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	Gender Studies
Bellows, Lemke, Jenderedjian, & Scherbaum	2015	Violence as an Under-Recognized Barrier to Women's Realization of Their Right to Adequate Food and Nutrition: Case Studies from Georgia and South Africa	Violence Against Women	Medline
Ghale, Pyakuryal, Devkota, Pant, & Timsina	2018	Gender Dimensions of Food Security, the Right to Food and Food Sovereignty in Nepal	Journal of International Women's Studies	Gender Studies
Riley & Dodson	2016	'Gender hates men': untangling gender and development discourses in food security fieldwork in urban Malawi	Gender, Place and Culture	Gender Studies
Sharma	2002	Empowering women for household food security	Woman and food security: role of panchayats	Gender Studies
Tshishonga	2017	Women growing livelihoods through food security: Inanda's Inqolobane Yobumbano Secondary Co-operative	Agenda: Empowering women for gender equity	Gender Studies
Smith	2012	Gender and Food Security in a Fair, Green Economy?	Development	Gender Studies
Patel	1990	Women: The Providers of Food Security in Lesotho	African Urban Quarterly	Gender Studies
Viswanath	2001	Women's Micro-enterprises for Food Security in India	Development	Gender Studies

Burroway	2016	Empowering Women, Strengthening Children: A Multi-Level Analysis of Gender Inequality and Child Malnutrition in Developing Countries	Gender and Food: From Production to Consumption and After	Gender Studies
Piaseu, Belza, & Shell-Duncan	2004	Less Money Less Food: Voices from Women in Urban Poor Families in Thailand	Health Care for Women International	Gender Studies
Hillenbrand	2010	Transforming gender in homestead food production	Gender and Development	Sociology
Scanlan	2004	Women, Food Security, and Development in Less-Industrialized Societies: Contributions and Challenges for the New Century	World Development	Gender Studies
Kerr	2005	Food Security in Northern Malawi: Gender, Kinship Relations and Entitlements in Historical Context	Journal of Southern African Studies	Gender Studies
Makki & Gebreel	2009	The Role of Women in Jubraka Farming and Household Food Security in Kadogli (South Kordofan State, Sudan).	The Ahfad Journal	Gender Studies
Yiping	2009	The Secrets in Feeding China	One on One: Women in Action	Gender Studies
Mpagi	1999	The Role of Women in Food Security and implementation of The National Gender Policy: A Case Study in Uganda	Impact	Gender Studies
Zimet	1997	Food Insecurity and Women's Role in the African Region	INSTRAW news: women and development (United Nations International Research and Training Institute for the Advancement of Women - INSTRAW)	Gender Studies
Lalaguna & Dorodnykh	2018	Gender Equality and Sustainable Development	Asian Development Perspectives	Gender Studies

Akter, Rutsaert, Luis, Htwe, San, Raharjo, & Pustika	2017	Women's empowerment and gender equity in agriculture: A different perspective from Southeast Asia	Food Policy	AGRICOLA
Galiè, Jiggins, Struik, Grando, & Ceccarelli	2017	Women's empowerment through seed improvement and seed governance: Evidence from participatory barley breeding in pre-war Syria	NJAS - Wageningen Journal of Life Sciences	AGRICOLA
Wambogo, Ghattas, Leonard, & Sahyoun	2018	Validity of the food insecurity experience scale for use in sub-Saharan Africa and characteristics of food-insecure individuals	Community and Global Nutrition	Gender Studies
Page-Reeves, Scott, Moffett, Apodaca, & Apodaca	2014	“Is always that sense of wanting... never really being satisfied”: Women’s Quotidian Struggles with Food Insecurity in a Hispanic Community in New Mexico	Journal of Hunger & Environmental Nutrition	Gender Studies
Anyangwe, Mtonga, & Chirwa	2006	Health Inequities, Environmental Insecurity and the Attainment of the Millennium Development Goals in sub-Saharan Africa: The Case Study of Zambia	International Journal of Environmental Research and Public Health	Gender Studies
Hyder, Maman, Nyoni, Khasiani, Teoh, Premji, & Sohani	2005	The pervasive triad of food security, gender inequity and women’s health: exploratory research from sub-Saharan Africa	African Health Sciences	Gender Studies
Diamond-Smith, Conroy, Tsai, Nekkanti, & Weiser	2019	Food insecurity and intimate partner violence among married women in Nepal	Journal of Global Health	Gender Studies
Chilton, Rabinowich, Council, & Breaux	2009	Witnesses to Hunger: Participation through Photovoice to Ensure the Right to Food	Health and Human Rights	Medline
Kerr, Chilanga, Nyantaki-Frimpong, Luginaah, & Lupafya	2016	Integrated agriculture programs to address malnutrition in northern Malawi	BMC Public Health	Gender Studies

Kuhnlein	2017	Gender roles, food system biodiversity, and food security in Indigenous Peoples' communities	Maternal & Child Nutrition	Gender Studies
Pala-Okeyo	1994	Community based food security through women: A gender advocacy strategy for linking local food needs, capacities and policy for sustainable development in Africa	African Crop Science Conference Proceedings	Gender Studies

APPENDIX B

Algeria	1	Ecuador	3	Malawi	5	Senegal	2
Angola	1	Egypt	1	Malaysia	1	Sierra Leone	2
Armenia	1	Eritrea	1	Maldives	1	Somalia	1
Bangladesh	6	Ethiopia	5	Mali	2	South Africa	7
Belize	1	Gabon	1	Mauritania	1	South Korea	1
Benin	2	Gambia	1	Mauritius	1	South Sudan	1
Bhutan	1	Georgia	1	Mongolia	1	Sri Lanka	1
Bolivia	2	Ghana	3	Morocco	2	Sudan	4
Botswana	1	Guatemala	1	Mozambique	3	Syria	2
Brazil	1	Guinea	1	Namibia	1	Tanzania	3
Burkina Faso	4	Guinea-Bissau	1	Nepal	5	Thailand	6
Burma/Myanmar	2	India	11	Nicaragua	1	Togo	2
Burundi	1	Indonesia	2	Niger	3	Tunisia	1
Cambodia	1	Iran	2	Nigeria	7	Uganda	3
Cameroon	1	Japan	2	North Korea	1	United Arab Emirates	1
Canada	1	Jordan	1	Oman	1	United States	2
Central African Rep	1	Kenya	4	Pakistan	3	Vietnam	2
Chad	2	Laos	2	Palestine	1	Yemen	1
Chile	1	Lebanon	1	Paraguay	1	Zambia	3
China	2	Lesotho	2	Peru	1	Zimbabwe	1
Congo	1	Liberia	1	Philippines	3		
Côte D'Ivoire	1	Libya	1	Rwanda	1		
D R Congo	1	Madagascar	1	Saudi Arabia	1		

APPENDIX C

MULTIVAR-SCALE-6: Patrilineality/Fraternity Syndrome Scale

Purpose: The purpose of this multivariate scale is to determine to what degree the country relies on the patrilineal/fraternal security provision mechanism within its society. It examines 11 variables for that purpose: MARR-SCALE-1, MULTIVAR-SCALE-3, AOM-SCALE-3, PW-SCALE-1, MARR-SCALE-3, MULTIVAR-SCALE-1, MURDER-SCALE-1, LO-SCALE-3, MARR-SCALE-2, ISSA-SCALE-1, and LRW-SCALE-9. The scale was originally coded in 2017; look for updates in the database.

Calculation of Baseline: Start with the Prevalence of Patrilocal Marriage Scale (MARR-SCALE-1) (ranges from 0-2) and add the Inequity in Family Law in Law and Practice score (MUTIVAR-SCALE-3; ranges from 0-4) to it. This is your baseline. Why? Patrilocal marriage is the most telling indicator of the patrilineality/fraternity security provision mechanism, and Inequity in Family Law in Law and Practice is a broad view of the position of women within their households.

Further Calculation: Then pull out the extremes of all the other Syndrome variables and mark the country if the extreme is present, as follows:

- If the Age of Marriage for Girls Combined Law and Practice Scale (AOM-SCALE-3) is 3 or 4, add 1 to the baseline.
- If the Polygyny Combined Scale of Law and Prevalence Scale (PW-SCALE-1) is 3 or 4, add 1.
- If the abridged 3-point Brideprice/Dowry scale (MARR-SCALE-3; abridgement rubric is 0-3=0, 4-5=1, 6-9=2; 10=3) is 2 or 3, add 1.
- If the Physical Security of Women Scale (MULTIVAR-SCALE-1) is 3 or 4, add 1 to the baseline.
- If the Culturally Based Exemption for Femicide Scale (MURDER-SCALE-1) is 2, add 1.
- If the Property Rights Combined Law and Practice Scale (LO-SCALE-3) is 3 or 4, add 1.

- If the Cousin Marriage Legality and Prevalence Scale (MARR-SCALE-2) is 3, add 1.
- If the Son Preference and Sex Ratio Scale (ISSA-SCALE-1) is 2, add 1; if it is 3 or 4, add 2.
- If the Rape Exemption if Offer Marriage Scale (LRW-SCALE-9) is 1, then add 1.

Range: The Patrilineality/Fraternity Syndrome Score can thus range from 0-16, with 16 being interpreted as meaning the society fully encodes Patrilineality/Fraternity Syndrome as its security provision mechanism. Four countries were missing one subscale score in the 2017 scaling, and their values were imputed to keep the national score comparable to the rest of the nations. These nations are Central African Republic, Libya, Syria, and Vanuatu. Please note Syria's imputation was actually 12.5, which was rounded up for input into the database to allow mapping to be possible.

Map: For the map's five legend colors, the cut points were [0,1,2], [3,4,5], [6,7,8,9], [10,11,12], [13,14,15,16]. If you wish to use a dichotomous measure, then 0-5 would be (roughly) non-Syndrome societies, and 6-16 would be (roughly) Syndrome societies (WomanStats Codebook, 2018).

APPENDIX D

Component	Indicator name	Definition	Source	Link
BASIC HUMAN NEEDS				
Nutrition and Basic Medical Care	Undernourishment (% of pop.)	The prevalence of undernourishment expresses the probability that a randomly selected individual from the population consumes an amount of calories that is insufficient to cover her/his energy requirement for an active and healthy life. The indicator is computed by comparing a probability distribution of habitual daily dietary energy consumption with a threshold level called the minimum dietary energy requirement. Both are based on the notion of an average individual in the reference population.	Food and Agriculture Organization of the United Nations	http://www.fao.org/economic/ess/ess-fs/ess-fadata/en/
	Maternal mortality rate (deaths/100,000 live births)	Maternal deaths per 100,000 live births in women aged 10-54 years.	Institute for Health Metrics and Evaluation	http://ghdx.healthdata.org/record/global-burden-disease-study-2016-gbd-2016-health-related-sustainable-development-goals-sdg
	Child mortality rate (deaths/1,000 live births)	Probability of dying between birth and exactly 5 years of age, expressed per 1,000 live births.	UN Inter-agency Group for Child Mortality Estimation	http://www.childmortality.org
	Child stunting (% of children)	Prevalence of stunting in children under 5.	Institute for Health Metrics and Evaluation	http://ghdx.healthdata.org/record/global-burden-disease-study-2016-gbd-2016-health-related-sustainable-development-goals-sdg
	Deaths from infectious diseases (deaths/100,000)	Age-standardized mortality rate from deaths caused by HIV/AIDS, tuberculosis, diarrhea, intestinal infections, respiratory infections, otitis media, meningitis, encephalitis, diptheria, whooping cough, tetanus, measles, varicella, herpes zoster, malaria, Chagas disease, leishmaniasis, typanosomiasis, schistosomiasis, cysticercosis, cycstic echinococcosis, lymphatic filariasis, onchocerciasis, trachoma, dengue, yellow feber, rabies, intestinal nematode infections, food-borne trematodiases, leprosy, ebola, zika virus, guinea worm disease, sexually transmitted diseases excluding HIV, hepatitis, and other infectious diseases per 100,000 people.	Institute for Health Metrics and Evaluation	http://ghdx.healthdata.org/gbd-results-tool?params=gbd-api-2016-permalink/35dbe0e97e0f81b904b1c62314c51ea1

Component	Indicator name	Definition	Source	Link
Water and Sanitation	Access to at least basic drinking water (% of pop.)	The percentage of the population with access to drinking water from an improved water source where collection time is not more than 30 minutes for a roundtrip including queuing.	WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation	https://washdata.org/data
	Access to piped water (% of pop.)	The percentage of the population with a water service pipe connected with in-house plumbing to one or more taps or a piped water connection to a tap placed in the yard or plot outside the house.	WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation	https://washdata.org/data
	Access to at least basic sanitation facilities (% of pop.)	The percentage of population with use of improved sanitation facilities which are not shared with other households.	WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation	https://washdata.org/data
	Rural open defecation (% of pop.)	The percentage of the rural population practicing defecation in fields, forests, bushes, bodies of water or other open spaces.	WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation	https://washdata.org/data
Shelter	Access to electricity (% of pop.)	The percentage of the population with access to electricity.	World Bank Global Tracking Framework	http://gtf.esmap.org/
	Quality of electricity supply (1=low; 7=high)	Average response to the question: "In your country, how would you assess the reliability of the electricity supply (lack of interruptions and lack of voltage fluctuations)?" [1 = not reliable at all; 7 = extremely reliable]	World Economic Forum Global Competitiveness Report	http://reports.weforum.org/global-competitiveness-index/downloads/
	Household air pollution attributable deaths (deaths/100,000)	Age standardized deaths caused from indoor air pollution, including indoor air pollution-derived cases of influenza, pneumococcal pneumonia, H influenzae type B pneumonia, respiratory syncytial virus pneumonia, other lower respiratory infections, trachea, bronchus, and lung cancers, ischemic heart disease, ischemic stroke, hemorrhagic and other non-ischemic stroke, chronic obstructive pulmonary disease, and cataracts per 100,000 people.	Institute for Health Metrics and Evaluation	http://ghdx.healthdata.org/gbd-results-tool?params=gbd-api-2016-permalink/3c9cee8ffeee3a9a8798c571373ba38f
Personal Safety	Homicide rate (deaths/100,000)	Number of homicides, defined as unlawful death inflicted upon a person with the intent to cause death or serious injury, per 100,000 people.	UN Office on Drugs and Crime	https://data.unodc.org/
	Perceived criminality (1=low; 5=high)	An assessment of the level of domestic security and the degree to which other citizens can be trusted. Measured on a scale of 1 (majority of other citizens can be trusted; very low levels of domestic security) to 5 (very high level of distrust; people are extremely cautious in their dealings with others; large number of	Institute for Economics and Peace Global Peace Index	http://static.visionofhumanity.org/#/page/indexes/global-peace-index

APPENDIX E

Corruption Perceptions Index 2018: Full Source Description

13 data sources were used to construct the Corruption Perceptions Index (CPI) 2018:

1. African Development Bank Country Policy and Institutional Assessment 2016
2. Bertelsmann Stiftung Sustainable Governance Indicators 2018
3. Bertelsmann Stiftung Transformation Index 2017-2018
4. Economist Intelligence Unit Country Risk Service 2018
5. Freedom House Nations in Transit 2018
6. Global Insight Business Conditions and Risk Indicators 2017
7. IMD World Competitiveness Center World Competitiveness Yearbook Executive Opinion Survey 2018
8. Political and Economic Risk Consultancy Asian Intelligence 2018
9. The PRS Group International Country Risk Guide 2018
10. World Bank Country Policy and Institutional Assessment 2017
11. World Economic Forum Executive Opinion Survey 2018
12. World Justice Project Rule of Law Index Expert Survey 2017-2018
13. Varieties of Democracy (V-Dem) 2018

```
. regress FI GI

      Source |       SS           df       MS      Number of obs   =       112
-------------+----------------------------------   F(1, 110)       =    137.69
       Model |  18701.6876         1  18701.6876   Prob > F        =    0.0000
    Residual |  14940.8035       110  135.825486   R-squared       =    0.5559
-------------+----------------------------------   Adj R-squared   =    0.5519
       Total |  33642.4911       111  303.085505   Root MSE        =    11.654

------------------------------------------------------------------------------
          FI |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          GI |  -2.825367   .2407826   -11.73   0.000    -3.302542   -2.348193
       _cons |   80.28563   2.150137    37.34   0.000     76.02456    84.5467
------------------------------------------------------------------------------
```

```
. regress FI GI, beta

      Source |       SS           df       MS      Number of obs   =       112
-------------+----------------------------------   F(1, 110)       =    137.69
       Model |  18701.6876         1  18701.6876   Prob > F        =    0.0000
    Residual |  14940.8035       110  135.825486   R-squared       =    0.5559
-------------+----------------------------------   Adj R-squared   =    0.5519
       Total |  33642.4911       111  303.085505   Root MSE        =    11.654

------------------------------------------------------------------------------
          FI |      Coef.   Std. Err.      t    P>|t|                     Beta
-------------+----------------------------------------------------------------
          GI |  -2.825367   .2407826   -11.73   0.000               -.7455836
       _cons |   80.28563   2.150137    37.34   0.000                       .
------------------------------------------------------------------------------
```

Figure 5-2. Model 1 regression results.

```
. sgmediation FI, iv(GI) mv(BHN)

Model with dv regressed on iv (path c)

      Source |       SS           df       MS      Number of obs   =       110
-------------+----------------------------------   F(1, 108)       =    135.69
       Model |  18313.3179         1  18313.3179   Prob > F        =    0.0000
    Residual |  14576.3548       108  134.966249   R-squared       =    0.5568
-------------+----------------------------------   Adj R-squared   =    0.5527
       Total |  32889.6727       109  301.740117   Root MSE        =    11.617

------------------------------------------------------------------------------
          FI |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          GI |  -2.814757   .2416406   -11.65   0.000    -3.29373   -2.335783
       _cons |   80.43996   2.152193    37.38   0.000    76.17394    84.70598
------------------------------------------------------------------------------

Model with mediator regressed on iv (path a)

      Source |       SS           df       MS      Number of obs   =       110
-------------+----------------------------------   F(1, 108)       =    130.97
       Model |  20328.7354         1  20328.7354   Prob > F        =    0.0000
    Residual |  16763.6545       108  155.219024   R-squared       =    0.5481
-------------+----------------------------------   Adj R-squared   =    0.5439
       Total |  37092.3899       109  340.297155   Root MSE        =    12.459

------------------------------------------------------------------------------
         BHN |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          GI |   -2.9656   .2591372   -11.44   0.000    -3.479254   -2.451945
       _cons |   95.05452   2.308028    41.18   0.000     90.47961    99.62943
------------------------------------------------------------------------------

Model with dv regressed on mediator and iv (paths b and c')

      Source |       SS           df       MS      Number of obs   =       110
-------------+----------------------------------   F(2, 107)       =    270.38
       Model |  27456.7794         2  13728.3897   Prob > F        =    0.0000
    Residual |  5432.89334       107  50.7747041   R-squared       =    0.8348
-------------+----------------------------------   Adj R-squared   =    0.8317
       Total |  32889.6727       109  301.740117   Root MSE        =    7.1256

------------------------------------------------------------------------------
          FI |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         BHN |   .7385348    .055035    13.42   0.000     .6294342    .8476354
          GI |  -.6245581   .2204647    -2.83   0.006    -1.061604   -.1875125
       _cons |   10.23889   5.395309     1.90   0.060    -.4566818    20.93446
------------------------------------------------------------------------------
```

Figure 5-3. Model 2 regression results.

```
Sobel-Goodman Mediation Tests

                    Coef         Std Err     Z           P>|Z|
Sobel              -2.1901985    .25152563  -8.708      0
Goodman-1 (Aroian) -2.1901985    .25192963  -8.694      0
Goodman-2          -2.1901985    .25112099  -8.722      0

                    Coef      Std Err    Z          P>|Z|
a coefficient   =  -2.9656   .259137  -11.4441          0
b coefficient   =   .738535  .055035   13.4194          0
Indirect effect =  -2.1902   .251526  -8.70766          0
  Direct effect = -.624558   .220465  -2.83292    .004613
   Total effect = -2.81476   .241641  -11.6485          0

Proportion of total effect that is mediated:  .77811293
Ratio of indirect to direct effect:           3.5067971
Ratio of total to direct effect:              4.5067971
```

Figure 5-4. Model 2 Sobel-Goodman mediation tests.

```
Bootstrap results                                 Number of obs     =        110
                                                  Replications      =      5,000

      command:  sgmediation FI, iv(GI) mv(BHN)
        _bs_1:  r(ind_eff)

-------------------------------------------------------------------------------
             |   Observed   Bootstrap                         Normal-based
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+-----------------------------------------------------------------
       _bs_1 |  -2.190198   .2189457   -10.00   0.000    -2.619324   -1.761073
-------------------------------------------------------------------------------
```

Figure 5-5. Model 2 Bootstrapping CI of indirect effect.

```
. estat bootstrap, percentile bc

Bootstrap results                                 Number of obs     =        110
                                                  Replications      =       5000

      command:  sgmediation FI, iv(GI) mv(BHN)
        _bs_1:  r(ind_eff)

-------------------------------------------------------------------------------
             |   Observed               Bootstrap
             |      Coef.       Bias    Std. Err.  [95% Conf. Interval]
-------------+-----------------------------------------------------------------
       _bs_1 |  -2.1901985   .0066553   .22082304  -2.634919  -1.761657   (P)
             |                                     -2.654495  -1.773117   (BC)
-------------------------------------------------------------------------------
(P)    percentile confidence interval
(BC)   bias-corrected confidence interval
```

Figure 5-6. Model 2 bias-corrected bootstrapping results.

APPENDIX I

```
regress C GI, beta

      Source |       SS           df       MS      Number of obs   =       111
-------------+----------------------------------   F(1, 109)       =     90.13
       Model |  20262.3125         1  20262.3125   Prob > F        =    0.0000
    Residual |  24505.4173       109  224.820342   R-squared       =    0.4526
-------------+----------------------------------   Adj R-squared   =    0.4476
       Total |  44767.7297       110  406.979361   Root MSE        =    14.994

------------------------------------------------------------------------------
           C |      Coef.   Std. Err.      t    P>|t|                     Beta
-------------+----------------------------------------------------------------
          GI |  -2.959053   .3116922    -9.49   0.000                -.6727628
       _cons |   67.03927   2.769275    24.21   0.000                        .
------------------------------------------------------------------------------

. regress FI GI C, beta

      Source |       SS           df       MS      Number of obs   =       111
-------------+----------------------------------   F(2, 108)       =    165.88
       Model |  25258.9938         2  12629.4969   Prob > F        =    0.0000
    Residual |  8222.89813       108  76.1379457   R-squared       =    0.7544
-------------+----------------------------------   Adj R-squared   =    0.7499
       Total |  33481.8919       110  304.380835   Root MSE        =    8.7257

------------------------------------------------------------------------------
          FI |      Coef.   Std. Err.      t    P>|t|                     Beta
-------------+----------------------------------------------------------------
          GI |  -1.282441    .245166    -5.23   0.000                -.3371508
           C |   .5233456   .0557403     9.39   0.000                 .6051543
       _cons |    45.2222   4.069491    11.11   0.000                        .
------------------------------------------------------------------------------
```

Figure 5-7. Model 3 regression results.

```
Sobel-Goodman Mediation Tests

                     Coef         Std Err     Z           P>|Z|
Sobel               -1.548607    .23197793  -6.676      2.461e-11
Goodman-1 (Aroian)  -1.548607    .23262762  -6.657      2.794e-11
Goodman-2           -1.548607    .23132642  -6.694      2.165e-11

                    Coef      Std Err    Z          P>|Z|
a coefficient   = -2.95905   .311692  -9.49351          0
b coefficient   =  .523346    .05574   9.38899          0
Indirect effect = -1.54861   .231978  -6.67567    2.5e-11
  Direct effect = -1.28244   .245166  -5.23091    1.7e-07
   Total effect = -2.83105   .243329  -11.6347          0

Proportion of total effect that is mediated:  .54700839
Ratio of indirect to direct effect:           1.2075464
Ratio of total to direct effect:              2.2075464
```

Figure 5-8. Model 3 Sobel-Goodman mediation tests.

```
Bootstrap results                                 Number of obs     =       111
                                                  Replications      =     5,000

      command:  sgmediation FI, iv(GI) mv(C)
        _bs_1:  r(ind_eff)

------------------------------------------------------------------------------
             |   Observed   Bootstrap                         Normal-based
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _bs_1 |  -1.548607   .2030953    -7.63   0.000    -1.946666   -1.150548
------------------------------------------------------------------------------
```

Figure 5-9. Model 3 Bootstrapping CI of indirect effect.

```
. estat bootstrap, percentile bc

Bootstrap results                                 Number of obs     =       111
                                                  Replications      =      5000

      command:  sgmediation FI, iv(GI) mv(C)
        _bs_1:  r(ind_eff)

------------------------------------------------------------------------------
             |   Observed               Bootstrap
             |      Coef.       Bias    Std. Err.  [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _bs_1 |  -1.548607   .0161258   .20087429  -1.950047  -1.158011   (P)
             |                                    -2.005231  -1.204445  (BC)
------------------------------------------------------------------------------
(P)    percentile confidence interval
(BC)   bias-corrected confidence interval
```

Figure 5-10. Model 3 bias-corrected bootstrapping results.

APPENDIX K

```
. regress FE GI, beta

      Source |       SS           df       MS      Number of obs   =       103
-------------+----------------------------------   F(1, 101)       =    178.40
       Model |  1097.72601         1  1097.72601   Prob > F        =    0.0000
    Residual |   621.46818       101  6.15315029   R-squared       =    0.6385
-------------+----------------------------------   Adj R-squared   =    0.6349
       Total |  1719.19419       102   16.854845   Root MSE        =    2.4806

------------------------------------------------------------------------------
          FE |      Coef.   Std. Err.      t    P>|t|                     Beta
-------------+----------------------------------------------------------------
          GI |   -.7150232    .053533   -13.36   0.000               -.7990694
       _cons |    15.42032   .4773883    32.30   0.000                       .
------------------------------------------------------------------------------

. regress FI GI FE, beta

      Source |       SS           df       MS      Number of obs   =       103
-------------+----------------------------------   F(2, 100)       =    131.71
       Model |  21821.7863         2  10910.8932   Prob > F        =    0.0000
    Residual |  8284.19426       100  82.8419426   R-squared       =    0.7248
-------------+----------------------------------   Adj R-squared   =    0.7193
       Total |  30105.9806       102  295.156672   Root MSE        =    9.1018

------------------------------------------------------------------------------
          FI |      Coef.   Std. Err.      t    P>|t|                     Beta
-------------+----------------------------------------------------------------
          GI |   -.7726297   .3267017    -2.36   0.020               -.2063345
          FE |    2.834748   .3651032     7.76   0.000                .6774084
       _cons |    36.36336   5.896211     6.17   0.000                       .
------------------------------------------------------------------------------
```

Figure 5-8. Model 4 regression results.

```
Sobel-Goodman Mediation Tests

                     Coef         Std Err     Z           P>|Z|
Sobel               -2.0269108    .30195993  -6.713      1.913e-11
Goodman-1 (Aroian)  -2.0269108    .30259182  -6.698      2.106e-11
Goodman-2           -2.0269108    .30132671  -6.727      1.736e-11

                     Coef      Std Err    Z          P>|Z|
a coefficient   = -.715023    .053533  -13.3567          0
b coefficient   =  2.83475    .365103   7.76424    8.2e-15
Indirect effect = -2.02691     .30196  -6.71252    1.9e-11
  Direct effect =  -.77263    .326702  -2.36494    .018033
   Total effect = -2.79954    .247447  -11.3137          0

Proportion of total effect that is mediated:  .72401553
Ratio of indirect to direct effect:           2.6233922
Ratio of total to direct effect:              3.6233922
```

Figure 5-9. Model 4 Sobel-Goodman mediation tests.

```
Bootstrap results                                 Number of obs     =        103
                                                  Replications      =      5,000

      command:  sgmediation FI, iv(GI) mv(FE)
        _bs_1:  r(ind_eff)

------------------------------------------------------------------------------
             |   Observed   Bootstrap                         Normal-based
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _bs_1 |  -2.026911   .3061743    -6.62   0.000    -2.627001    -1.42682
------------------------------------------------------------------------------
```

Figure 5-10. Model 4 Bootstrapping CI of indirect effect.

```
. estat bootstrap, percentile bc

Bootstrap results                                 Number of obs     =        103
                                                  Replications      =       5000

      command:  sgmediation FI, iv(GI) mv(FE)
        _bs_1:  r(ind_eff)

------------------------------------------------------------------------------
             |   Observed               Bootstrap
             |      Coef.       Bias    Std. Err.  [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _bs_1 |  -2.0269108   .0119564   .30476199    -2.61964  -1.429856   (P)
             |                                      -2.657884  -1.467878   (BC)
------------------------------------------------------------------------------
(P)    percentile confidence interval
(BC)   bias-corrected confidence interval
```

Figure 5-11. Model 4 bias-corrected bootstrapping results.

APPENDIX M

```
. regress GDP GI, beta

      Source |       SS           df       MS      Number of obs   =       109
-------------+----------------------------------   F(1, 107)       =     73.38
       Model |  1.5320e+10         1  1.5320e+10   Prob > F        =    0.0000
    Residual |  2.2340e+10       107   208783669   R-squared       =    0.4068
-------------+----------------------------------   Adj R-squared   =    0.4013
       Total |  3.7660e+10       108   348700618   Root MSE        =     14449

------------------------------------------------------------------------------
         GDP |      Coef.   Std. Err.      t    P>|t|                     Beta
-------------+----------------------------------------------------------------
          GI |  -2590.769   302.4477    -8.57   0.000                -.6378059
       _cons |   34204.69   2679.772    12.76   0.000                        .
------------------------------------------------------------------------------

. regress FI GI GDP, beta

      Source |       SS           df       MS      Number of obs   =       109
-------------+----------------------------------   F(2, 106)       =    147.96
       Model |  24091.1565         2  12045.5783   Prob > F        =    0.0000
    Residual |  8629.39395       106  81.4093769   R-squared       =    0.7363
-------------+----------------------------------   Adj R-squared   =    0.7313
       Total |  32720.5505       108   302.96806   Root MSE        =    9.0227

------------------------------------------------------------------------------
          FI |      Coef.   Std. Err.      t    P>|t|                     Beta
-------------+----------------------------------------------------------------
          GI |  -1.483685   .2452095    -6.05   0.000                -.3918586
         GDP |   .0005157   .0000604     8.54   0.000                 .5533023
       _cons |   62.81806   2.657742    23.64   0.000                        .
------------------------------------------------------------------------------
```

Figure 5-14. Model 5 regression results.

```
Sobel-Goodman Mediation Tests

                    Coef         Std Err     Z           P>|Z|
Sobel              -1.3361749    .22088746  -6.049      1.456e-09
Goodman-1 (Aroian) -1.3361749    .22164074  -6.029      1.654e-09
Goodman-2          -1.3361749    .22013161   -6.07      1.280e-09

                    Coef      Std Err    Z          P>|Z|
a coefficient   = -2590.77   302.448  -8.56601          0
b coefficient   =  .000516    .00006   8.54353          0
Indirect effect = -1.33617   .220887  -6.04912    1.5e-09
  Direct effect = -1.48368    .24521  -6.05068    1.4e-09
   Total effect = -2.81986   .244267  -11.5442          0

Proportion of total effect that is mediated:  .47384443
Ratio of indirect to direct effect:           .90057856
Ratio of total to direct effect:              1.9005786
```

Figure 5-15. Model 5 Sobel-Goodman mediation tests.

```
. estat bootstrap, percentile bc

Bootstrap results                                 Number of obs     =       109
                                                  Replications      =      5000

      command:  sgmediation FI, iv(GI) mv(GDP)
        _bs_1:  r(ind_eff)

------------------------------------------------------------------------------
             |   Observed               Bootstrap
             |      Coef.       Bias    Std. Err.  [95% Conf. Interval]
-------------+----------------------------------------------------------------
       _bs_1 |  -1.3361749   .0020621   .16379179   -1.675177  -1.036673   (P)
             |                                     -1.704558  -1.052135  (BC)
------------------------------------------------------------------------------
(P)    percentile confidence interval
(BC)   bias-corrected confidence interval
```

Figure 5-17. Model 5 Bootstrapping CI of indirect effect.

APPENDIX O

```
. estat gof, stats(all)

Fit statistic               Value   Description
-------------------------------------------------------------------------
Likelihood ratio
          chi2_ms(.)            .   model vs. saturated
            p > chi2            .
         chi2_bs(15)      746.907   baseline vs. saturated
            p > chi2        0.000
-------------------------------------------------------------------------
Population error
               RMSEA            .   Root mean squared error of approximation
 90% CI, lower bound        0.000
         upper bound            .
              pclose            .   Probability RMSEA <= 0.05
-------------------------------------------------------------------------
Information criteria
                 AIC     5381.798   Akaike's information criterion
                 BIC     5405.154   Bayesian information criterion
-------------------------------------------------------------------------
Baseline comparison
                 CFI        1.000   Comparative fit index
                 TLI            .   Tucker-Lewis index
-------------------------------------------------------------------------
Size of residuals
                SRMR        0.155   Standardized root mean squared residual
                  CD        0.830   Coefficient of determination
```

Figure 5-18. Model 6 results

```
Sobel-Goodman Mediation Tests

                     Coef         Std Err     Z           P>|Z|
Sobel               -1.548607    .23197793  -6.676      2.461e-11
Goodman-1 (Aroian)  -1.548607    .23262762  -6.657      2.794e-11
Goodman-2           -1.548607    .23132642  -6.694      2.165e-11

                    Coef      Std Err    Z          P>|Z|
a coefficient   = -2.95905   .311692  -9.49351          0
b coefficient   =  .523346    .05574   9.38899          0
Indirect effect = -1.54861   .231978  -6.67567    2.5e-11
  Direct effect = -1.28244   .245166  -5.23091    1.7e-07
   Total effect = -2.83105   .243329  -11.6347          0

Proportion of total effect that is mediated:  .54700839
Ratio of indirect to direct effect:           1.2075464
Ratio of total to direct effect:              2.2075464
```

Figure 5-21. Model 6 Sobel-Goodman mediation tests.

APPENDIX P

Module 1: Women's Impact on Global Food Insecurity

Importance of women in development:

In 2016, the United Nations Sustainable Development Goals (SDGs) recognized gender equity and female empowerment and opportunity as fundamental human rights. They also recognized gender equity as being essential for sustainable development (United Nations General Assembly Resolution, 2012). Improving gender equity, rooted in human rights, is recognized as both a key development goal on its own and as a "vital means to helping accelerate sustainable development" (Lalaguna & Dorodnykh, 2018, p. 2).

Gender inequity is a multi-dimensional issue rooted in economic, social, and cultural structures of a society, requiring a comprehensive approach. An analysis of a specific country's cultural context is needed in order to effectively improve its gender equity. Gender equity "requires a wide range of solutions and partners to work in a collective manner to address gender in a broad and holistic manner, thereby contributing to sustainable development" (Lalaguna & Dorodnykh, 2018, p. 10).

Information about this module:

This module is one of six different modules. Each module is designed in such a way that it can be independently incorporated into an existing course, used as part of a series in a course, or used as a key part of a course that focuses on women in development. Following are the topics of the six modules. Note that the sixth module is related to a Holistic Development course.

From the literature:	Modules:	To be addressed in the classroom:
Gender Inequity	**1. Food Insecurity**	**Severity of food insecurity, who is it affecting? What countries have higher rates of food insecurity?**
Social factors	2. Female Education	How does female education impact development?
Poor health HIV/AIDS	3. Health and Safety	What countries have the poorest health? What is contributing to the HIV/AIDS epidemic?
Economic factors Severe poverty	4. Economic Development	How do agencies try to improve GDP? Is it working? Does increased GDP increase development?
Political factors	5. Corruption	How does corruption impact development? What countries are most corrupt?
Environment/climate	6. Holistic Development	What do we do now?

Importance of the topic of the module:

Food insecurity is defined as being the absence of one or more pillar(s) in the food security framework (i.e. availability, access, utilization, and stability). Methods implemented to achieve food security often include increasing economic production (e.g. cash crop production and international trade) in order to increase gross domestic product (GDP).

The Global Food Security Index (GFSI) considers the affordability, availability, quality, and safety of food across 112 countries. The index scores countries from 0 (very food insecure) to 100 (highly food secure). A visual representation of the index created by GFSI is presented in Figure 5-20. The outer circle represents country population, while the inner colored circle represents the index score as percent of population.

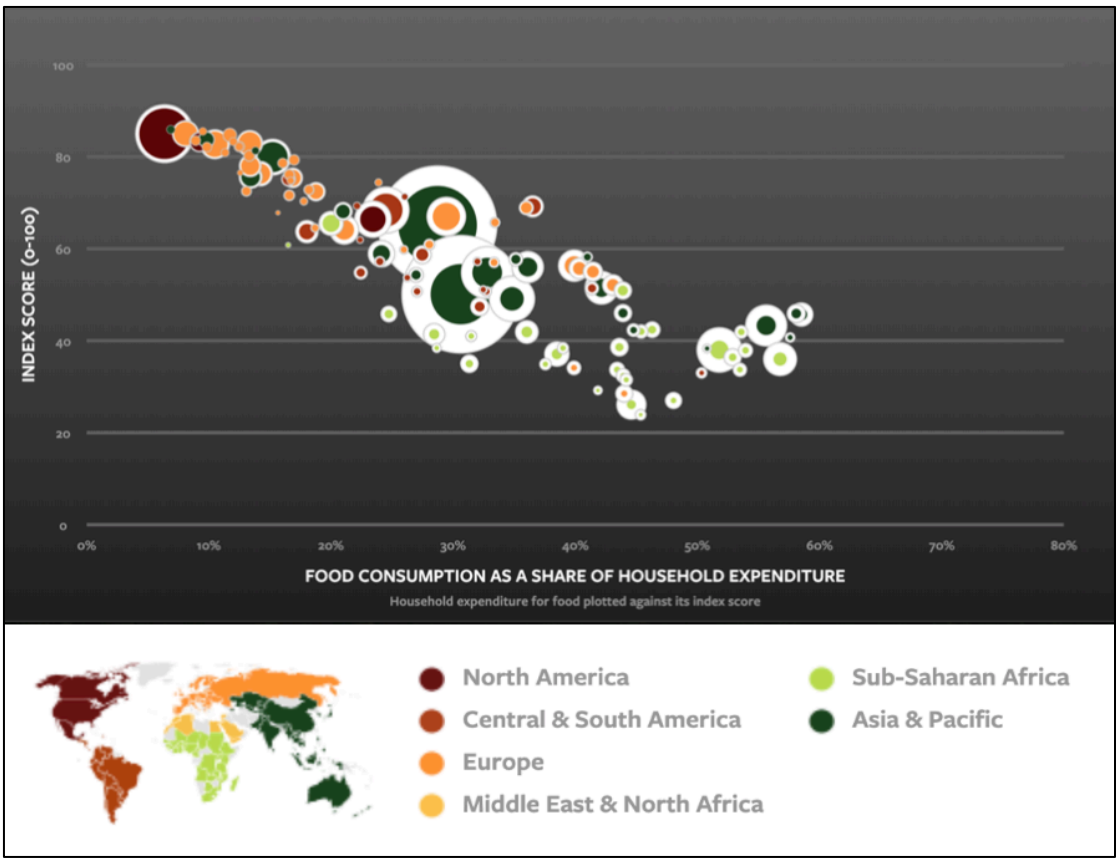


Figure 5-20. The global food security index 2018.

Women work to achieve household food security through food production, planting and harvesting, herding, cleaning, food processing and preparation, cooking, going to market, and collecting water and fuel (Becker, 2000; Dixon-Mueller, 1985; International Labor Organization Office for Women, 1981; Save the Children, 2002). Despite these vital contributions toward global food security, women farmers are

frequently underestimated and overlooked in development strategies (Makki & Gebreel, 2009).

Agricultural extension has long suffered from gender biases (Kahamba, Massawe, & Kira, 2017; Barodia, 2015). A majority of extension officers are male, and they are trained to deal solely with male farmers (Jacobson, 1992; O'Brien et al., 2016; Assan, 2014). Many challenges face women working in smallholder agriculture. Gendered norms regarding asset control and an assumption that women in agriculture are concerned with subsistence only reinforce biases in policies and institutions. Female food producers remain largely excluded from land ownership, technology training, tools, and extension services (Kelkar, 2009; Hillenbrand, 2010).

Women's work in agriculture often remains "invisible" because the products of their labor are primarily intended for household consumption and do not reach the market economy (Ibnouf, 2009). This prevents women from being regarded by policy-makers and extension agents.

A scoping review of the literature by Russell et al. (2019), the following symptoms of gender inequity were most prevalent among studies across 89 different countries (1) fewer resources; (2) gendered division of labor; (3) limited influence over decision-making; (4) time poverty; (5) unequal access to land rights; (6) unequal access to income; (7) work and responsibilities are undervalued; (8) limited access to technology; (9) lineage; (10) limited access to information; (11) low social status; (12) discrimination; (13) poor education; (14) discrimination receiving credit; (15) restricted access to markets due to customs or cultural norms; (16) lack of personal autonomy; (17) unable to buy seeds, fertilizer, or hire labor; and (18) illiteracy (see Figure 5-21).

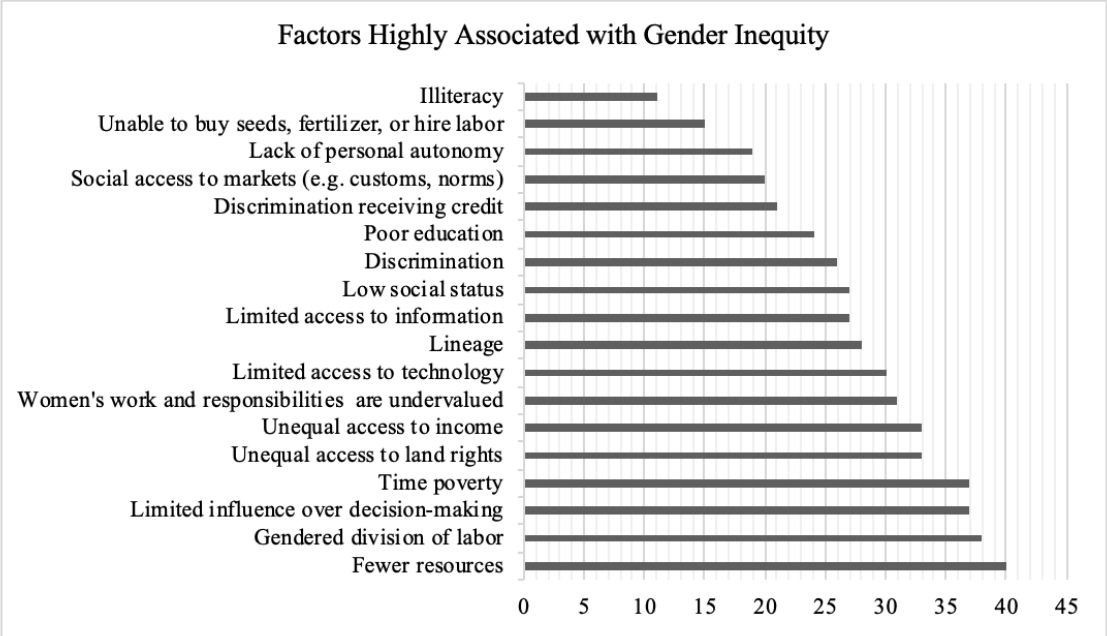


Figure 5-21. Factors highly associated with gender inequity.

Gender is a social category including roles, responsibilities, and ideas about what characteristics make a man or a woman. It is context-specific and complex, and can include unequal rights to employment or income, discriminatory land ownership, lower education of a specific sex, gender-based violence, and unequal workloads and/or division of labor (Kerr et al., 2016). Men are more likely to have access to resources and earn cash wages; however, they are less likely to spend it on family needs (i.e. food, clothes, health care, and education). Such patterns are disturbingly prevalent across countries and cultures (Jacobson, 1992; O'Brien et al., 2016).

Student learning measurable objectives:

1. Students will increase knowledge about the four food security pillars by 50 percent.
2. Students will increase understanding of the current state of global food insecurity by 20 percent.
3. Students will increase knowledge of the leading factors contributing to food insecurity by 20 percent.
4. Students will increase understanding of women's contribution to global agricultural production and household food security by 20 percent.

Guide for lecturers to use for conducting the class:

Module 1 "The Impacts of Gender Inequity on Global Food Insecurity" examines the relationship between gender inequity and food insecurity. Upon completion of this module, students will know the four food security pillars and have a better understanding of the current state of global food insecurity, the leading factors contributing to food insecurity, women's contribution to global agricultural production and household food

security, the effects of gender inequity on global food insecurity, and ways that gender inequity can appear in different societies. The attached PowerPoint presentation will guide the instructor through the lecture material, discussion, and student activity in a one-hour class period.

1. Before presenting the PowerPoint, administer the pre-test.
2. Note: If the module is part of a series in a course or central to Holistic Development course, students will be asked to read a few select materials prior to the class period (i.e. websites and articles) related to this module.
3. The student activity for this module is designed to provide class participation and discussion. Students will work in small groups in order to share openly and allow each individual student to speak and to be heard. This activity is also designed in a way as to help build relationships and understanding among peer differences. This activity is designed to be a debate that will force students to engage with their classmates, use critical thinking skills, time management, and leadership skills.
    - Student discussion sharing first-hand experience or knowledge on women's role in agriculture (e.g. could be student international experience, knowledge from other classes, insight from readings, etc.) ~10-15 minutes
    - Split students into three even groups (Group 1 represents U.S. legislation; Group 2 represents an international agency; Group 3 represents an indigenous people group)
    - Give each group approximately 10-minutes to discuss, research, and plan their argument
    - <u>Student Requirements:</u>
        i. Use 2-4 academic resources to support your standpoint (journal article, news release, reliable database)
        ii. Use at least 1 journal article
        iii. Give 2-4 supporting arguments

    Tip: *Spend time in your group discussing a topic and standpoint. Have at least one student finding online sources (reliable database, journal article, news release, etc.), while other students discuss compelling arguments for their standpoint.*
    - Group 3 will present their case first to Group 2
    - Group 2 will then present to Group 1
    - Group 1 will offer their decision and rationale
    - Following the debate discuss as a class
4. Administer the post-test at the end of the class period and discuss the correct responses.

Suggested open-ended questions for discussion:

- Has food insecurity increased or decreased in recent years?
- What are some reasons why it has increased?

- Do you believe the increase in food security is caused more from natural causes that cannot be prevented or from man-made, preventable causes?
- Why do you think women play such a vital role in providing household food security? What would happen if women stopped acting in this role?
- What are some of your personal experiences e.g., growing up, traveling, outside research, related to food security and household nutrition? Did gender roles play a part? If so, what did that look like?

Required readings for students in a Holistic Development Course:

- World Food Programme (WFP)
  - What Causes Hunger: https://www.wfp.org/stories/what-causes-hunger
- Food and Agriculture Organization of the United Nations (FAO)
  - Food Security and Nutrition around the World: http://www.fao.org/state-of-food-security-nutrition/en/
- Global Food Security Index (GFSI)
  - The Global Food Security Index: https://foodsecurityindex.eiu.com/

Pre-test:

1. What are the four food security pillars? (select all that apply)
    a. Availability
    b. Cost
    c. Accessibility
    d. Nutrition
    e. Utilization
    f. Stability
    g. Food Sourcing

2. How much food do women produce worldwide (%)?
    a. 10%
    b. 50%
    c. 25%
    d. 80%

3. How much food do women produce in Africa?
    a. 50%
    b. 25%
    c. 80%
    d. 90%

4. Female agriculturists account for ____% of the workforce in sub-Saharan Africa and nearly ___% in South Asia.
    a. 25% ; 10%
    b. 80% ; 50%
    c. 50% ; 50%
    d. 60% ; 70%

5. Fewer than ___% of landholders in North Africa and West Asia and ___% in sub-Saharan Africa are women.
    a. 1% ; 1%
    b. 10% ; 5%
    c. 15% ; 5%
    d. 5% ; 15%

Answers: (correct answers are in bold)

1. What are the four food security pillars? (select all that apply)
    - **a. Availability**
    - b. Cost
    - **c. Accessibility**
    - d. Nutrition
    - **e. Utilization**
    - **f. Stability**
    - g. Food Sourcing

2. How much food do women produce worldwide (%)?
    - a. 10%
    - **b. 50%**
    - c. 25%
    - d. 80%

3. How much food do women produce in Africa?
    - a. 50%
    - b. 25%
    - **c. 80%**
    - d. 90%

4. Female agriculturists account for ____% of the workforce in sub-Saharan Africa and nearly ___% in South Asia.
    - a. 25% ; 10%
    - b. 80% ; 50%
    - c. 50% ; 50%
    - **d. 60% ; 70%**

5. Fewer than ___% of landholders in North Africa and West Asia and ___% in sub-Saharan Africa are women.
    - a. 1% ; 1%
    - b. 10% ; 5%
    - c. 15% ; 5%
    - **d. 5% ; 15%**

Women's Impact on Global Food Insecurity

1

Agenda:

1. Pre-test (not for a grade)
2. Video and follow-up discussion
3. Class lecture and discussion
4. Student activity
5. Post-test

2

3

Video discussion questions:

1. What motivated Josette Sheeran to get involved with global hunger?
2. Is there enough food to feed the world's population?
3. What happens in the first 1,000 days (starting at conception) of a growing human being?
4. What were a few of the points Sheeran pointed to as possible solutions?

4

Answers:

1. Motherhood (famine in Ethiopia picturing a mother unable to breastfeed due to lack of food)
2. Yes!
3. Brain development - malnourishment causes permanent, irreversible physical and mental stunting
4. Breastfeeding, access to adequate nutrition/vitamins, school feeding, food banks/food storage

5

- Do you think food insecurity *increased* or *decreased* in recent years?
- What are some reasons for this change?

6

One out of every nine people in the world is undernourished (FAO, 2018). According to the Food and Agriculture Organization of the United Nations (FAO) and others, evidence indicates a rise in **world hunger that has been increasing over the past three years**. Food insecurity is an ever-growing issue with the total number of people suffering from **undernourishment or chronic food deprivation increasing from 804 million in 2016 to nearly 821 million in 2017** (FAO, IFAD, UNICEF, WFP & WHO, 2018).

7

8

According to women in Ethiopia, *food insecurity* means having a shortage of "**sufficient quantity** and **quality of food**, lack or **shortage of money to buy consumables** at the household level, **lack of access to schools for their children** and lack of access to **health facilities.**"

Women also consider:

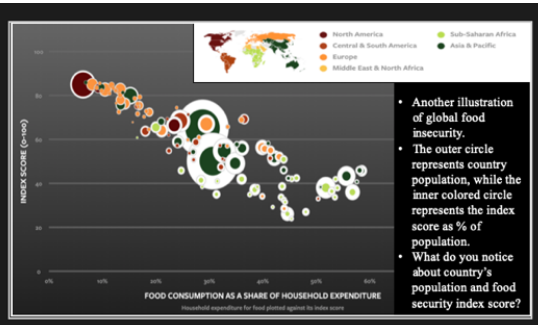
- Food storage
- Variety of food (i.e. taste & side dishes)
- Children & maternal health

Mengesha, 2016, p. 29

9

- What else do you know about the countries or regions of the world where food insecurity is higher?
- What are some common characteristics among these countries and regions?
- What is different about these countries and regions?

10



- Another illustration of global food insecurity.
- The outer circle represents country population, while the inner colored circle represents the index score as % of population.
- What do you notice about country's population and food security index score?

11

- Do you believe that food insecurity is caused more from natural causes that cannot be prevented or from man-made, preventable causes?

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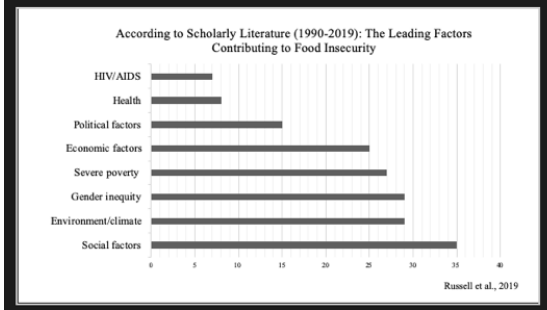

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- What are some of your personal experiences e.g., growing up, traveling, outside research, related to food insecurity and household nutrition?
- Did gender roles play a part? If so, what did that look like?

14

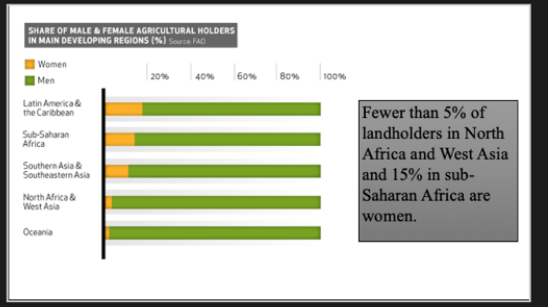
15

- Why do you think women play such a vital role in providing household food security?
- What would happen if women stopped acting in this role?

16

- Gender is a social construct formed by society.
- Gender inequity can include unequal rights, discriminatory land ownership, lower education of a specific sex, gender-based violence, and unequal workloads and/or division of labor (Kerr et al., 2016).

17

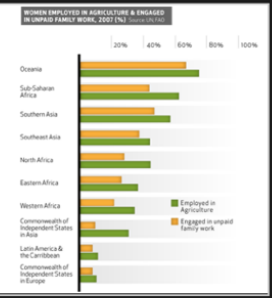


18

Rural Working Hours

Rural women typically work longer hours than men, when one takes into account both paid productive and unpaid reproductive or domestic and care responsibilities. When these tasks are taken into account, women's total work hours are longer than men's in all regions.

SOURCE: UN STATS FAO



19

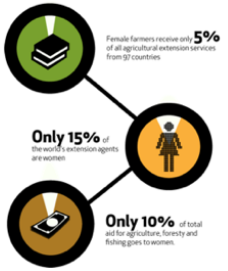
Men are more likely to have access to resources and earn cash wages; however, they are less likely to spend it on family needs (i.e. food, clothes, health care, and education).

20

Access to Extension Services

Because of cultural attitudes, discrimination and a lack of recognition for their role in food production, women enjoy limited to no benefits from extension and training in new crop varieties and technologies.

SOURCE: FAO



21

The yield gap between men and women farmers averages around **20-30%** mostly due to differences in resource use

22

Given equal access to resources as men, women would achieve the same yield levels, boosting total agricultural output in developing countries by **2.5-4%**

23

Student Activity

1. Form three even groups (Group 1 represents U.S. legislation; Group 2 represents an international agency; Group 3 represents an indigenous people group).
2. Each group will have approximately 10-minutes to discuss, research, and plan their argument.

Student Requirements:

- Use 2-4 academic resources to support your standpoint (journal article, news release, reliable database)
- Use at least 1 journal article
- Give 2-4 supporting arguments

Tip: *Spend time in your group discussing a topic and standpoint. Have at least one student finding online sources (reliable database, journal article, news release, etc.), while other students discuss compelling arguments for their standpoint.*

- Group 3 will present their case first to Group 2
- Group 2 will then present to Group 1
- Group 1 will offer their decision and rationale

24

- What are some of your first-hand experiences or knowledge on women's role in agriculture (e.g. could be an international experience, knowledge from another class, insight from readings, etc.)
- Why do you think food insecurity is still such a big issue?
- How severely do you think gender inequity impacts food insecurity?
- Closing questions and remarks

25

APPENDIX Q

Module 2: The Impacts of Female Education on Society and Development
Importance of women in development:

In 2016, the United Nations Sustainable Development Goals (SDGs) recognized gender equity and female empowerment and opportunity as fundamental human rights. They also recognized gender equity as being essential for sustainable development (United Nations General Assembly Resolution, 2012). Improving gender equity, rooted in human rights, is recognized as both a key development goal on its own and as a "vital means to helping accelerate sustainable development" (Lalaguna & Dorodnykh, 2018, p. 2).

Gender inequity is a multi-dimensional issue rooted in economic, social, and cultural structures of a society, requiring a comprehensive approach. An analysis of a specific country's cultural context is needed in order to effectively improve its gender equity. Gender equity "requires a wide range of solutions and partners to work in a collective manner to address gender in a broad and holistic manner, thereby contributing to sustainable development" (Lalaguna & Dorodnykh, 2018, p. 10).

Information about this module:

This module is one of six different modules. Each module is designed in such a way that it can be independently incorporated into an existing course, used as part of a series in a course, or used as a key part of a course that focuses on women in development. Following are the topics of the six modules. Note that the sixth module is related to a Holistic Development course.

From the literature:	Modules:	To be addressed in the classroom:
Gender inequity	1. Food Insecurity	Severity of food insecurity, who is it affecting? What countries have higher rates of food insecurity?
Social factors	**2. Female Education**	**How does female education impact development?**
Poor health HIV/AIDS	3. Health and Safety	What countries have the poorest health? What is contributing to the HIV/AIDS epidemic?
Economic factors Severe poverty	4. Economic Development	How do agencies try to improve GDP? Is it working? Does increased GDP increase development?
Political factors	5. Corruption	How does corruption impact development? What countries are most corrupt?
Environment/climate	6. Holistic Development	What do we do now?

Importance of the topic of the module:

Gender inequity is a strong predictor of lower female education in a country. Figure 5-22 illustrates the average school year attendance by women ages 25 to 34, including primary, secondary, and postsecondary education. Data for this map is from the Social Progress Index (SPI) that is making an effort to face social challenges and drive efforts to create equitable, inclusive, and prosperous societies (Social Progress Imperative, 2018).

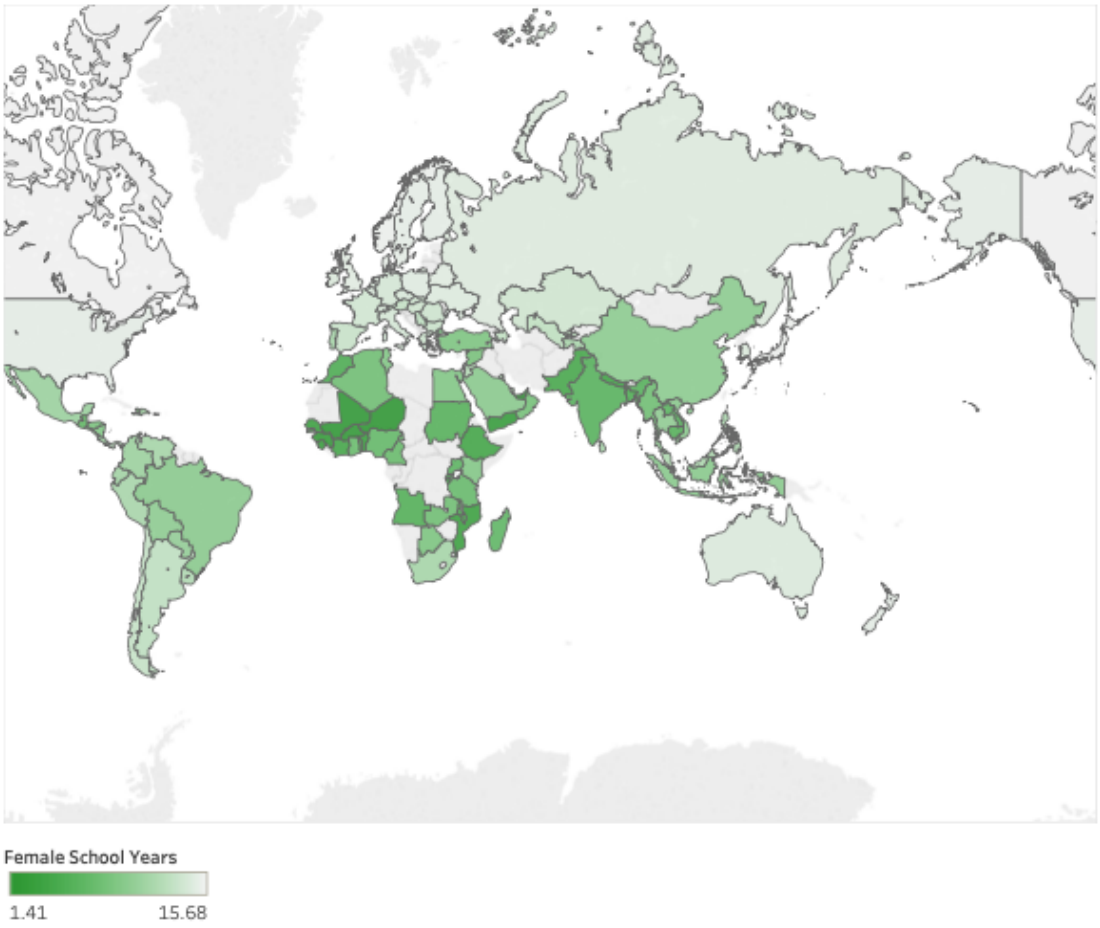


Figure 5-22. Female education in average school years (darker green indicates lower school years).

When women are educated, they have fewer children, they become empowered, and they are able to contribute more to their families and their community (O'Brien et al., 2016). Female education provides more opportunities to work outside the home and earn higher income, giving women more economic power, greater authority, and

bargaining power within the household (Nussbaum, 2004; Sen, 1999). When women earn wages, their families have better health, nutrition, and education. Mothers have shown, through household financial decisions, to prioritize the well-being of their children. So, when mothers are financially better off, children are less susceptible to many severe social ills (i.e. hunger, malnutrition, stunting, and wasting) (Cho, 2015; O'Brien et al., 2016).

The educational level of a mother is directly correlated with the survival and developmental prospects of her children. Even a slight increase in female education has a meaningful impact on the health of her children. Educated women are more likely to interact effectively with healthcare providers, comply with treatment regimens, and break from tradition in adopting newer innovations in nutrition" (Burroway, 2016, p. 121). "A cross-national study of 63 nations determined that women's education was the single most important factor in levels of malnutrition over a twenty-five-year period" (Hudson et al., 2012, p. 45).

Providing girls with equal access to education and training is a long-term strategy that can sustain changes in the status of women (Ibnouf, 2009). Women's empowerment within their households increases the likelihood that their children will attend school, which is particularly crucial for daughters (UNICEF, 2006). Everyone, even the uneducated, benefit from the higher educational level of a community (Kravdal, 2004; Burroway, 2016).

Student learning measurable objectives:

1. Students will improve their understanding of the impacts of female education in domestic and international development by 20 percent.
2. Students will improve their awareness of the barriers that females face trying to obtain an education in many parts of the world by 20 percent.

Guide for lecturers to use for conducting the class:

Module 2 "Impacts of Female Education on Development" examines the benefits of female education. Upon completion of this module, students will have a better understanding of the impacts of female education in domestic and international development and students will have greater awareness of the many barriers that females face trying to obtain an education in many parts of the world. The attached PowerPoint presentation will help guide the one-hour class period.

1. The attached PowerPoint presentation is intended to guide the instructor through the lecture material, discussion, and student activity in a one-hour class period.
2. Before presenting the PowerPoint, the instructor may administer the pre-test.
3. Note: If the module is part of a series in a course or central to a Holistic Development course, students will be asked to read a few select materials prior to the class period related to this module (i.e. websites and articles).
4. The student activity for this module is designed to promote class participation and discussion. Students will work in small groups in order to share openly and allow each individual student to speak and be heard. This activity is also designed to help build relationships and understanding among peer differences.
    - Arrange students in groups of 3-5 (depending on the class size) around tables so that each student can talk and discuss with their group members. Each

group will be given 1-2 different articles to discuss for 15-20 minutes. Instruct each small group to read their article aloud, discuss within their group, and then have each group share an overview of their article with the class. Encourage them to provide input based on their personal thoughts and reactions. After everyone has shared, open the floor to continued discussion (articles below):
    - When a Boy's Life Is Worth More Than His Sister's (2015): https://foreignpolicy.com/2015/07/30/when-a-boys-life-is-worth-more-than-his-sisters-sex-ratio/
    - Girls Not Brides: https://www.girlsnotbrides.org/wp-content/uploads/2012/09/Child-marriage-around-the-world-March-2014.pdf
    - Child Marriage: A Silent Health and Human Rights Issue: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2672998/
    - 13 reasons why girls are not in school: https://theirworld.org/news/13-reasons-why-girls-are-not-in-school
    - 10 toughest places for girls to go to school: https://www.bbc.com/news/business-41558486
    - Let Girls Learn: https://www.usaid.gov/sites/default/files/documents/1869/USAID_LGL_FactSheet.pdf
    - The effect of girls education on health outcomes: Fact sheet: https://www.prb.org/girls-education-fact-sheet/
    - The literacy injustice: 493 million women still can't read: https://www.theguardian.com/global-development-professionals-network/2014/jun/17/literacy-women-illiteracy-development
5. Administer the post-test at the end of the class period and discuss the correct responses.

Suggested open-ended questions for discussion:

- What are some of the benefits of female education on development?
- What are some barriers that females face trying to obtain an education in different parts of the world?
- Why are girls often pulled out of school in developing countries?
- What would happen if girls were able to stay in school longer?
- What else do you know about the countries or regions of the world where female education is drastically lower than other regions or countries?

Required readings for students in a Holistic Development Course:

- Council on Foreign Relations
    - What Work's in Girls' Education: Evidence and Policies from the Developing World (Herz & Sperling, 2004): http://www.ungei.org/resources/files/councilforaff_Girls_Education_full.pdf

- TED Talk, Sheryl WuDunn (2010)
    - Our Century's Greatest Injustice: https://www.ted.com/talks/sheryl_wudunn_our_century_s_greatest_injustice
- Malala Fund (2018)
    - Girls Education: https://www.malala.org/girls-education

Pre-test:

1. What are some benefits from female education? (select all that apply)
    a. Women have fewer children
    b. Child health improves
    c. Increases in women's decision-making power
    d. Children are more likely to attend school

2. What are some barriers to females attending school? (select all that apply)
    a. Child marriage
    b. Dangerous walking to school
    c. Menstruation
    d. No access to toilets at school
    e. Girl's education is of lower value compared to boys

3. An estimated _____ of the 300 million children without access to education are girls, and _____ of the 880 million illiterate adults are women.
    a. Two-thirds ; two-thirds
    b. One-half ; one-half
    c. One-fourth ; one- fourth

4. A cross-national study of 63 nations determined that women's education was the single most important factor in levels of _____ over a twenty-five-year period.
    a. Malnutrition
    b. Husband's education
    c. Divorce rates
    d. Household income

5. Studies across various developing countries have found a strong positive correlation between _____ and varying education levels of mothers with children's _____ levels.
    a. Literacy ; Nutrition
    b. Age ; Competency
    c. Religion ; Resilience
    d. Health ; Growth

Answers: (the correct answers are in bold)

1. What are some benefits from female education? (select all that apply)
    a. **Women have fewer children**
    b. **Child health improves**
    c. **Increases in women's decision-making power**
    d. **Children are more likely to attend school**

2. What are some barriers to females attending school? (select all that apply)
    a. **Child marriage**
    b. **Dangerous walking to school**
    c. **Menstruation**
    d. **No access to toilets at school**
    e. **Girl's education is of lower value compared to boys**

3. An estimated _____ of the 300 million children without access to education are girls, and _____ of the 880 million illiterate adults are women.
    a. **Two-thirds ; two-thirds**
    b. One-half ; one-half
    c. One-fourth ; one- fourth

4. A cross-national study of 63 nations determined that women's education was the single most important factor in levels of _____ over a twenty-five-year period.
    a. **Malnutrition**
    b. Husband's education
    c. Divorce rates
    d. Household income

5. Studies across various developing countries have found a strong positive correlation between _____ and varying education levels of mothers with children's _____ levels.
    a. **Literacy ; Nutrition**
    b. Age ; Competency
    c. Religion ; Resilience
    d. Health ; Growth

The Impacts of Female Education on Society and Development

1

Agenda:

1. Pre-test (not for a grade)
2. Video and follow-up discussion
3. Class lecture and discussion
4. Student activity
5. Continue class lecture and discussion
6. Post-test

2

3

Video discussion questions:

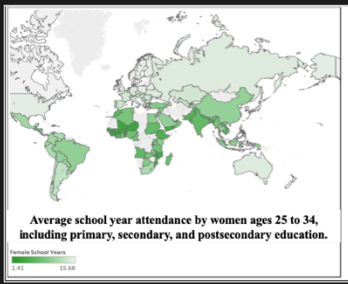
1. What were some barriers girls face in trying to go to school?
2. How did Kakenya Ntaiya address some of these problems?
3. Who's support did she need to advance her goal?
4. Why is it important to include boys?

4

Answers:

1. FGM, tired and hungry, not safe going to and from school (i.e. raped or kidnapped), child marriage, lack of family support, no way of getting to school, cannot afford school supplies
2. She built a boarding school
3. Elders, parents, religious leaders, other teachers, political leaders, community members, "most importantly" **the chief**, **fathers**, mothers, grandmothers (keepers of stories and culture)
4. To create change!

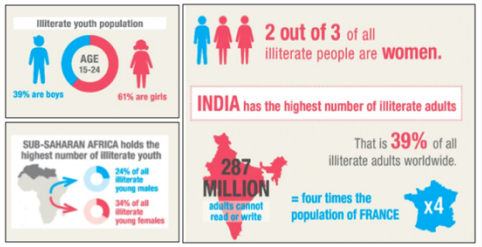
5



Average school year attendance by women ages 25 to 34, including primary, secondary, and postsecondary education.

- What else do you know about the countries or regions of the world where female education is drastically lower than other regions or countries?
- What are some common characteristics in these countries and regions?
- What is different about these countries and regions?

6



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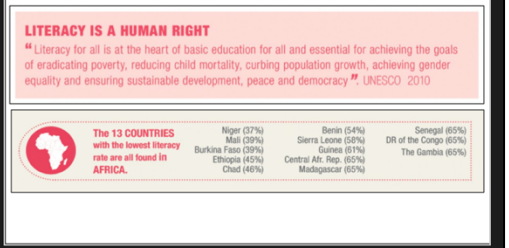
- Why does literacy matter?
- How would your life be different if you could not read or write?

8



9

"An estimated two-thirds of the 300 million children without access to education are girls, and two-thirds of the 880 million illiterate adults are women"

Crossette, 2000, para. 8

"Every literate woman is a victory over poverty." Ban Ki-moon

Almost 75% of the world's illiterate adults are found in only **10 countries:**

1. India
2. China
3. Pakistan
4. Bangladesh
5. Nigeria
6. Ethiopia
7. Egypt
8. Brazil
9. Indonesia
10. DR of the Congo

10

- Why are girls often pulled out of school in developing countries?
- What would happen if girls were able to stay in school longer?

11

Student Activity

1. Form groups of 3-5 students around tables so that each student can talk and discuss with their group members.
2. Each group will be given an article to discuss for 15-20 minutes.
3. Read their article aloud and discuss within your group.
4. Each group will share an overview of their article with the class (include your personal thoughts and reactions).

12

"If you educate a man you educate an individual, but if you educate a woman you educate a nation"

UN Commission on the Status of Women, Sierra Leone's Parliamentary Committee on Agriculture and Food Security Member, Bernadette Lahai

13

- What does this quote mean?
- What does education mean to you?
- What does education include?

14

When women are educated…

- They have fewer children.
- They become empowered.
- Women are offered more opportunities to work outside the home.
- Women have opportunities to earn a higher income.
- "Educated women are more likely to interact effectively with healthcare providers, comply with treatment regimens, and break from tradition in adopting newer innovations in nutrition" (Burroway, 2016, p. 121).
- Women have greater access to political processes and are able to request specific resources (Nussbaum, 2004).

15

When women earn higher income…

- Women have more economic power.
- Women have greater authority.
- Women have more bargaining power within the household (Nussbaum, 2004; Sen, 1999).
- Children have better health, nutrition, and education.
- Mothers have shown, through household financial decisions, to prioritize the well-being of their children. So, when mothers are financially better off, children are less susceptible to many severe social ills (i.e. hunger, malnutrition, stunting, and wasting) (Cho, 2015; O'Brien et al., 2016).

16

And what about their community…

- Educated females can transform social institutions, promote growth in public services, and mobilize resources that could help satisfy their own and other women's needs.
- Women are able to contribute more to their families and community (O'Brien et al., 2016).
- Everyone, even the uneducated, benefit from the higher educational level of a community (Kravdal, 2004; Burroway, 2016).
- Providing girls with equal access to education and training is a long-term strategy that can sustain changes in the status of women (Ibnouf, 2009).

17

And what about their children…

- Children have better health and nutrition.
- Women's empowerment within their households increases the likelihood that their children will attend school, which is particularly crucial for daughters (UNICEF, 2006).
- Children are less susceptible to many severe social ills (i.e. hunger, malnutrition, stunting, and wasting) because mothers have shown, through household financial decisions, to prioritize the well-being of their children (Cho, 2015; O'Brien et al., 2016).
- Female education has been shown to improve child nutrition through access to information and greater health knowledge (Glewwe, 1999; Thomas, Strauss, & Henriques, 1991).
- The educational level of a mother is directly correlated with the survival and developmental prospects of her children.
- Studies across various developing countries have found a strong positive correlation between literacy and varying education levels of mothers with children's nutrition levels.

18

"A cross-national study of 63 nations determined that women's education was the single most important factor in levels of malnutrition over a twenty-five-year period"

Hudson et al., 2012, p. 45

19

A study in the Philippines found that a mother's education was more of a contributing factor to her children's health status than household income

Hudson et al., 2012

20

Gender-based socio-cultural values in low income countries have contributed to unequal female enrollment rates in higher education

Kahamba et al., 2017

21

- What are some of the benefits of female education on development?
- How can you help improve female education in your personal or professional life?
- Closing thoughts and remarks?

22